D5.1: Diagnosis: RRI in Widening Participation, SWAFS, EIT, JRC, EURATOM and Instruments of H2020

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1. Executive Summary

The project NewHoRRIzon seeks to promote a strong integration of Responsible Research and Innovation (RRI) into Horizon 2020 and national research and innovation funding. To achieve its objectives NewHoRRIzon organises 19 Social Labs — one for each Horizon 2020 programme line.

NewHoRRIzon Social Labs build on a tradition of participatory action research to bring together people with common interests in solving complex problems related to technology and society. Inviting people with a range of expertise from all across society, the labs will be creative, engaging spaces for collaborative experimentation. Each Social Lab hosts three workshops and a series of smaller additional activities and meeting formats. Participants have the opportunity to co-create, prototype and test pilot actions and activities to support RRI. The diagnosis phase is part of the Social Lab process and has two intertwined tasks: (1) to identify and recruit Social Lab participants (H2020 stakeholders) and (2) to start to analyse the specifics of the current use and practices of RRI within the respective programme line" (GA Part B: 16 ff.).

Deliverable 5.1 presents, summarises and analyses the results of Diagnosis reports about current practices of RRI in the NewHoRRIzon Social Lab cluster "Diversity of Approaches". This cluster includes the following NewHoRRIzon Social Labs:

- Social Lab 14: Spreading Excellence and Widening Participation (Widening)
- Social Lab 15: Science with and for Society (SWAFS)
- Social Lab 16: European Institute of Innovation and Technology (EIT)
- Social Lab 17: Non-Nuclear direct actions of the JRC (JRC)
- Social Lab 18: Instruments of H2020 (Instruments)
- Social Lab 19: European Atomic Energy Community (EURATOM)

Programme lines within the "Diversity of Approaches" cluster are diverse. They include two funding schemes (Widening, SWAFS), but also programme lines which essentially are institutions: EIT, JRC and EURATOM. The Programme lines have very different objectives: Widening promotes the participation of Member States and Accession Countries which so far are underrepresented in H2020. The SWAFS programme promotes the better integration of science and society and RRI. The European Institute of Innovation and Technology (EIT) funds multi-actors institutions to promote innovation activities to tackle societal challenges. The Joint Research Centre (JRC) is an institution that provides policy advice in different areas to the European Commission (EC) and other stakeholders. "Instruments" is a funding programme to foster innovation. The European Atomic Energy Community (EURATOM) deals inter alia with the funding of research in the field of nuclear energy (fission and fusion).

The concept of RRI as a compressive concept is only present within the SWAFS programme. In most of the five programme lines there is "some awareness" for keys and the three O's. There are two outliers in this picture: SWAFS, which has "high awareness" and the Widening programme with "limited awareness".

A closer look into different keys and O's reveals diversity as regards the intensity of institutionalisation: (1) Open Access and Open Science as well as Governance and Open Innovation are strongly institutionalised. (2) Public Engagement, Gender balance and Open to the World

moderately institutionalised. (3) Bidirectional Public Engagement, SLSE and Ethics (micro) are weakly institutionalised and (4) Gender (dimension) and Ethics (macro) are very weakly institutionalised. In addition, there is variation within programme lines, e.g. in different parts of EIT and JRC and interesting bottom up initiatives for various keys on project level.

The comparison revealed lack of knowledge of RRI as a concept. Gender, Public Engagement and Ethics are narrowly defined and understood in the research programmes in a "light" version as Gender balance (in contrast to Gender dimension), unidirectional communication and research integrity/research Ethics (instead of socio- /macro-Ethics). Although many programme lines address societal challenges, this must not be equated with RRI. In addition, lacks of funding and (governance) structures are an impediment to RRI. The understanding of Open Innovation and the role public in Open Innovation is not clear. Open Data creates a dilemma between openness and protecting intellectual property rights in business environment.

Lessons, to be learned from the various programme lines include: (1) Initiatives should be strengthened to familiarise all the actors in R&I with the concept of RRI, its keys and the three O's[1]. (2) Existing examples of de facto RRI for the implementation of the keys and O's in the programme lines should be examined. (3) The SWAFS unit could lead to a way of demonstrating how the concept of RRI can be implemented at proposal and evaluation level. (4) Pilots in the Social Labs could be connected to existing initiatives in projects under each programme line.

2. Introduction

2.1. NewHoRRIzon objectives and approach

The project NewHoRRIzon seeks to promote a strong integration of Responsible Research and Innovation (RRI) into Horizon 2020 and national research and innovation funding. Its objectives are:

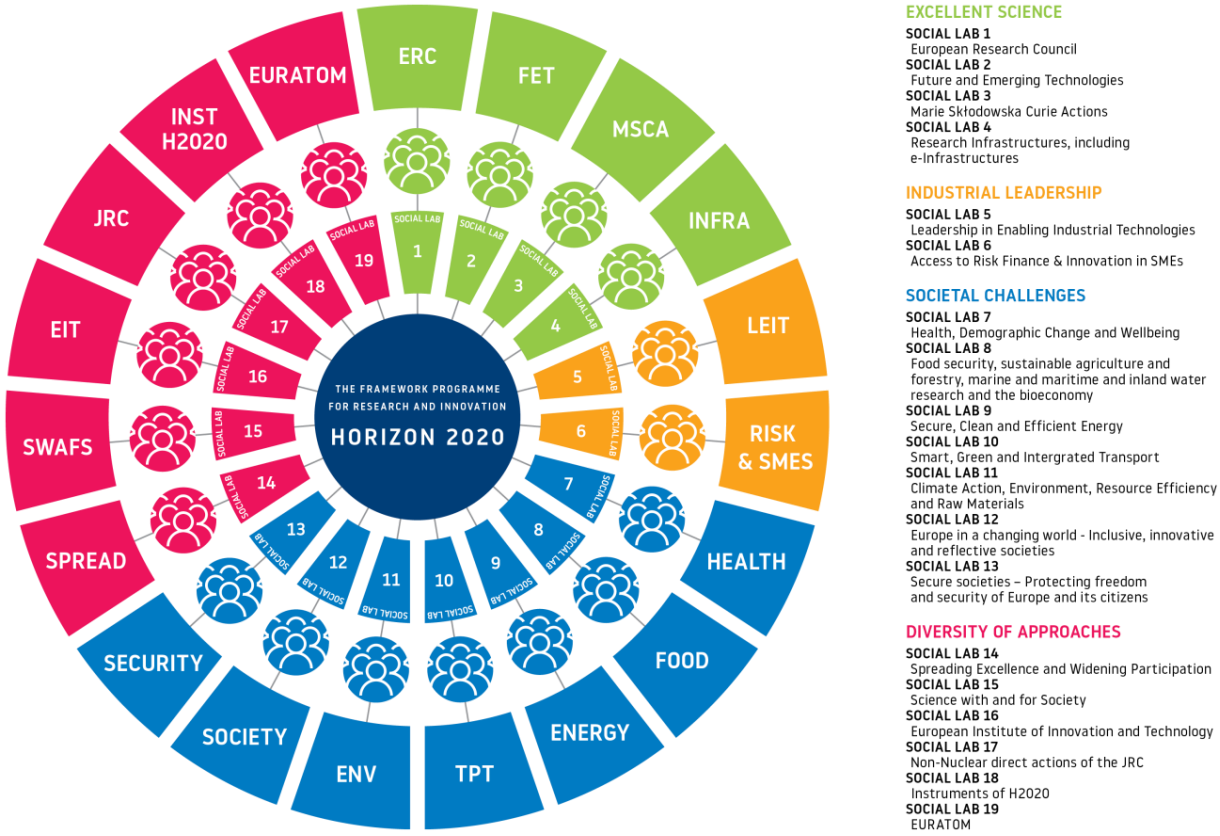
- Bringing together different stakeholders to co-create social experiments that foster the uptake of RRI.
- Developing narratives and storylines on how to implement RRI.
- Providing recommendations on how to better integrate RRI into the next European Framework Programme and beyond.
- Raising awareness, mainstreaming best practices and sharing NewHoRRIzon results.
- Developing and disseminating a concept of Societal Readiness Levels (SRL) of technology; and creating a sustainable RRI Network and RRI Ambassador Programme.

To achieve its objectives NewHoRRIzon organises 19 Social Labs — one for each Horizon 2020 programme line (see Figure 1). NewHoRRIzon Social Labs build on a tradition of participatory action research to bring together people with common interests in solving complex problems related to technology and society. Inviting people with a range of expertise from all across society, the labs will be creative and provide spaces for collaborative experimentation. Every Social Lab hosts three workshops and a series of smaller additional activities and meeting formats. Participants have the opportunity to co-create, prototype and test pilot actions and activities to support RRI. Three

[1] The three O's are: Open Innovation, Open Science and Open to the World.

workshops are planned to take place in each of the 19 Social Labs. In addition, selected participants of each Social Lab are invited to cross-sectional exchange workshops after the second and third series of Social Lab workshops.

Figure 1: NewHoRRIzon Social Labs



Deliverable 5.1 presents, summarises and analyses the results from the Diagnosis reports on current RRI practices in the NewHoRRIzon Social Lab cluster "Diversity of Approaches". This cluster includes the following NewHoRRIzon Social Labs:

- Social Lab 14: Spreading Excellence and Widening Participation (Widening)
- Social Lab 15: Science with and for Society (SWAFS)
- Social Lab 16: European Institute of Innovation and Technology (EIT)
- Social Lab 17: Non-Nuclear direct actions of the JRC (JRC)
- Social Lab 18: Instruments of H2020 (Instruments)
- Social Lab 19: European Atomic Energy Community (EURATOM)

The diagnosis phase is part of the Social Lab process and has two intertwined tasks:

1. to identify and recruit Social Lab participants (H2020 stakeholders) and
2. to start to analyse the specifics of the current use and practices of RRI within the respective programme line" (GA Part B: 16 ff.).

Diagnosis should provide first information for the Social labs about the "concepts of RRI, current experiences with RRI in this part of H2020, potentials, visions, benefits, costs, barriers, instruments, RRI relevant practices in R&I and funding (including various instruments), innovation culture, good practices of RRI" (GA Annex 1: 14).

This report presents, compares and analyses the following Diagnosis reports (see Annex):

- NewHoRRIzon Diagnosis Report Social Lab No. 14. Spreading Excellence and Widening Participation (Bierwirth et al 2018).
- NewHoRRIzon Diagnosis Report Social Lab No. 15. Science With and For Society (Daimer and Goos 2018).
- NewHoRRIzon Diagnosis Report Social Lab No. 16. The European Institute of Innovation and Technology (Christensen et al. 2018).
- NewHoRRIzon Diagnosis Report Social Lab No. 17. Joint Research Centre (JRC). (Starkbaum et al. 2018).
- NewHoRRIzon Diagnosis Report Social Lab No. 18. Instruments of H2020. (Nielsen et al. 2018).
- NewHoRRIzon Diagnosis Report Social Lab No. 19. EURATOM (Hönigmayer, Griessler 2018).

2.2. Overview funding programmes

Programme lines within the "Diversity of Approaches" cluster are diverse. They include two funding schemes (Widening, SWAFS), but also programme lines which essentially are institutions: EIT, JRC and EURATOM. The Programme lines have very different objectives: Widening promotes the participation of Member States and Accession Countries which so far are underrepresented in H2020. The SWAFS programme promotes the better integration of science and society and RRI. The EIT funds multi-actor institutions to promote innovation activities to tackle societal challenges. The Joint Research Centre is an institution that provides policy advice in different areas to the European Commission (EC) and other stakeholders. Their funding programme instruments foster innovation. EURATOM deals inter alia with the funding of research in the field of nuclear energy (fission and fusion).

Table 1 presents an overview of total approved budgets, current expenditures, signed grants, contributions per project and general participation statistics of Diversity of Approaches activities.

Table 1: Proposal and funding information "Diversity of Approaches"

	WIDENING	*SWAFS*	*EIT*	*JRC*	*Cross Cutting Activities (Instruments)*	*EURATOM*[2]
Total approved budget (in million EUR) (share of H2020) €[3]*	**816 (1, 06%)**	**462 (0, 60%)**	**2,711 (3, 52%)**	**1,903 (2, 47%)**	**n/a**	**1,603**
EU contribution as of 31st July 2018 (in million EURs) (Share of H2020)	**527 (1, 50%)**	**213,5 (0,64)**	**n/a**	**n/a**	**206, 5 (0, 62%)**	**639, 9 (1, 93%)**
Signed grants as of 31st July 2018	**204 (1, 06%)**	**101**	**n/a**[4]	**JRC does not have calls**	**103**	**50**
Average EU contribution per project as of 31st July 2018	**2,58**	**2,11**	**n/a**	**n/a**	**2**	**12,8**
Average participation per project as of 31st July 2018	**4,11**	**10,57**	**n/a**	**n/a**	**5,11**	**22,38**

*This is for the H2020 budget as set in 2013.

The following sections describe the Programme lines in more detail.

2.2.1. Spreading Excellence and Widening Participation (Widening)

Some Member States, mainly those that joined the EU after 2004, have low participation rates in FP7 projects. The Spreading Excellence and Widening Participation Programme line (Widening) aims at tackling these inequalities.[5] Widening addresses the causes of low participation and consists of three main or "core" actions, i.e. Teaming, Twinning and ERA Chairs, for which specific eligibility conditions apply.

- Teaming projects create new or update existing centres of excellence in the Widening countries through a coupling process with a leading scientific institution.
- Twinning projects strengthen a specific field of research in an emerging institution in a Widening country. Twinning links the institution with at least two internationally leading counterparts in Europe. Activities like short-term staff exchanges, expert visits, on-site or

[2] EC (2013): https://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf.
[3] All data available retrieved from https://webgate.ec.europa.eu/dashboard/sense/app/93297a69-09fd-4ef5-889f-b83c4e21d33e/sheet/erUXRa/state/analysis.
[4] Three KICs were established in 2010 (EIT Climate, EIT InnoEnergy, and EIT Digital), two in 2014 (EIT Health and EIT Raw Materials), and one in 2016 (EIT Food). A second KIC, called EIT Manufacturing, was also announced in 2016, but no project was initiated, as the proposals did not meet the standards of excellence. Two KICs are scheduled for 2018; the EIT Manufacturing will be re-called together with a KIC on Urban Mobility (European Institute of Innovation and Technology, n.d.b). (European Institute of Innovation and Technology, n.d.a).
[5] Eligible Widening Member States are currently: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. Eligible Widening Associated Countries currently are: Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, Former Yugoslav Republic of Macedonia, Georgia, Moldova, Montenegro, Serbia, Tunisia, Turkey and Ukraine.

virtual trainings, workshops, conference attendances, dissemination and outreach are supported.

- ERA Chair projects bring outstanding academics with proven research excellence and management skills to universities and research institutions in Widening countries with potential for research excellence.

2.2.2. Science With and For Society (SWAFS)

The SWAFS programme intends to bridge the gap between science and society. SWAFS' focus is "to develop a concept reconciling the aspirations and ambitions of European citizens and other Research and Innovation actors: a framework for RRI".[6] SWAFS is the main programme within H2020 dealing with issues regarding achieving a "fruitful and rich dialogue and active cooperation between science and society to ensure a more responsible science and to enable the development of policies more relevant to citizens" which is necessary, as the "strength of the European Union and technology system depends on its capacity to harness talent and ideas from wherever they exist" (European Commission 2017a, p.1118).

The Regulation on H2020[7] describes the three overarching specific objectives for SWAFS:

1. Build effective co-operation between science and society;
2. Foster the recruitment of new talents for science;
3. Pair scientific excellence with social awareness and responsibility.

To achieve these aims, the programme focuses on eight specific lines: science careers, Gender Equality, Public Engagement, Science Education, Open Access/Open Data, Governance and Ethics, due and proportional precaution, and science communication.

2.2.3. The European Institute of Innovation and Technology (EIT)

The European Institute of Innovation and Technology (EIT) is an independent funding body and addresses the perceived challenge of European countries to turn academic research and discoveries into commercial opportunities and marketable products (Reillon, 2016). The EIT's aim is to strengthen "sustainable growth and competitiveness by reinforcing the innovation capacity of the EU" (European Commission, n.d.). The EIT should achieve this goal by bringing together industry, researchers, and educators in Knowledge and Innovation Communities (KICs).

KICs are networks between private companies, universities, research centres, funding organisations, and labs, which work together to develop new products and services, establish start-up companies, and train future entrepreneurs through a variety of educational programmes. KICs are not only innovation communities or networks, but also physical innovation hubs across Europe. KICs are managed as single legal entities with a high degree of autonomy in order to make the EIT a highly de-centralised organisation. Each KIC is designed to address a major societal challenge as defined by the European Commission.

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[6] http://ec.europa.eu/research/SWAFS/index.cfm?pg=about.

[7] Regulation (EU) No. 1291/2013 of the European Parliament and of the Council, of 11 December 2013, establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No. 1982/2006/EC. Official Journal of the European Union, L 347/104, 20.12.2013. Accessed here: https://publications.europa.eu/en/publication-detail/-/publication/83aea4a3-6bff-11e3-9afb-01aa75ed71a1/language-en.

2.2.4. Joint Research Centre (JRC)

The Joint Research Centre (JRC) exists for more than 60 years and has undergone multiple transformations. Belgium, Germany, France, Italy, Luxembourg and the Netherlands signed in 1957 the Treaty on the European Economic Community and the Treaty on the European Atomic Energy Community (EURATOM). "The latter established a Joint Nuclear Research Centre (JNRC)"[8]. The Joint Research Centre (JRC) has grown into a significant research body for the European Union. The JRC today describes itself as the in-house science service for the EC that provides scientific evidence for policy: "The Joint Research Centre is the Commission's science and knowledge service. The JRC employs scientists to carry out research in order to provide independent scientific advice and support to EU policy."[9] Between 1971 and 1973 it was approved that the JRC should work on non-nuclear issues, whereas in 1989 the Council permitted the JRC to do research for third parties, including financial compensation or payment. In the 1980s, the activities of the JRC became part of the EU Framework Programme for Research. Already in 1998, the Council approved the JRC focus on "policy support" that is still visible in the recent mission and vision (such as the JRC 2030 strategy, see chapter 4.1). The JRC currently is in a phase of intense transformation.

2.2.5. Instruments of H2020

The Cross-Cutting Activities programme line (CCA) includes three focus areas:

1. Industry 2020 in the Circular Economy (IND),
2. Internet of Things (IoT), and
3. Smart and Sustainable Cities (SSC).

The three-pronged objective of the programme is:

- to "boost economic growth and renew Europe's industrial capacities in a world of finite resources (…)" by "(…) demonstrating the economic and environmental feasibility of the circular economy approach" (IND);
- to support "the combination of different technologies such as internet, components, big data, cloud or advanced computing and their integration in innovative use cases addressing major societal challenges" (IoT);
- to bring "together cities, industry and citizens to demonstrate the feasibility of developing (…) successful solutions for smart and sustainable cities in Europe" and to create "urban spaces powered by secure, affordable and clean energy, with smart electro-mobility and showcasing effective, innovative nature-based solutions." (SSC) (Horizon 2020a accessed 2018).

The programme allocates funding for coordination and support actions and R&I projects involving a variety of stakeholders in research, industry, public bodies and civil society organisations (CSOs).

[8] http://publications.jrc.ec.europa.eu/repository/bitstream/JRC111359/annual_report_2017_final_online.pdf
[9] https://ec.europa.eu/info/departments/joint-research-centre_en

2.2.6. EURATOM

The EURATOM Treaty defines the purpose of the European Atomic Energy Community[10] as creating the necessary conditions for the development of a powerful European nuclear industry. In order to achieve this goal, the Community shall use the following goals of EURATOM: [11]

- promote research and ensure the dissemination of technical information;
- establish uniform safety standards to protect the health of workers and of the general public and to ensure that they are applied;
- facilitate investment and ensure, particularly by encouraging ventures on the part of undertakings, the establishment of basic installations necessary for the development of nuclear energy in the Community;
- ensure that all users in the Community receive a regular and equitable supply of ores and nuclear fuels;
- ensure through appropriate supervision that nuclear material is not diverted from its intended use;
- exercise the right of ownership conferred upon it with respect to special fissile materials;
- ensure wide commercial outlets and access to the best technical facilities by nuclear energy in Europe;
- ensure wide commercial outlets and access to the best technical facilities by the creation of a common market in specialised materials and equipment's, by free movement of capital for investment in the field of nuclear energy and by freedom of employment for specialists within the Community;
- establish relations with other countries and international organisations that foster progress in the peaceful use of nuclear energy.[12]

The JRC "EURATOM Research and Training Programme" has the following specific objectives:[13]

- Support safety of nuclear systems;
- Contribute to the development of safe longer term solutions for the management of ultimate radioactive waste;
- Support the development and sustainability of nuclear expertise and excellence in the European Union;
- Support radiation protection and development of medical applications of radiation, including, inter alia, the secure and safe supply and use of radioisotopes;
- Move toward demonstration of feasibility of fusion as a power source by exploiting existing and future fusion facilities;
- Lay the foundations for future fusion power plants by developing materials, technologies and conceptual design;
- Promote innovation and industrial competitiveness;

[10] As defined in §1 of the EURATOM treaty the European Atomic Energy Community (EURATOM) will be founded.
[11] European Parliament (2017).
http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608665/EPRS_BRI(2017)608665_EN.pdf
[12] See EURATOM Treaty §2f.
[13] EURATOM (2018).

- Ensure availability and use of research infrastructures of pan-European relevance.

Since the negotiations with the JRC management regarding the Social Lab Workshop took longer than expected, the workshop was postponed but confirmed for 24 and 25 September 2018. We agreed with JRC officials to focus on a project that is part of the JRC's Exploratory Research programme and related to the Scientific Development Unit in Ispra, Italy. This will provide access to a current project that includes elements that relate to RRI and that allow generalisation for wider JRC activities.

Preceding this agreement, there was e-mail contact with the JRC Directorate level and two meetings with JRC members in leading positions. The first meeting was held in Brussels in May 2018 and was attended by two persons working at the management level of the JRC and the Policy Lab. The second meeting took place in Vienna in July 2018 and was attended by two different persons working at the JRC management level and the Scientific Development Unit. The Social Lab workshop was scheduled right after this second meeting.

While the first interviews started before the negotiations outlined above, the interview study and its analysis were stopped until the terms of cooperation with JRC officials has been clarified. The following section thus provides only preliminary findings based on 13 interviews with JRC staff and external actors that cooperate with the JRC.

3. Current state of RRI in Widening Participation, SWAFS, EIT, JRC, EURATOM and Instruments of H2020

3.1. RRI in Horizon 2020 Policy Documents

In addition to the three distinct priorities of Excellent Science, Industrial Leadership, and Societal Challenges research areas, the Commission further notes that H2020 programmes must take account "(o)f advice and inputs provided by independent advisory groups of high level experts set up by the Commission from a broad constituency of stakeholders, including research, industry and civil society, to provide the necessary inter-disciplinary and cross-sectoral perspectives, taking account of relevant existing initiatives at Union, national and regional level" (EC 2013, II.1.12.1). H2020 therefore includes a variety of cross-cutting issues and other mechanisms to foster "informed engagement of citizens and civil society in research and innovation" (EC 2013, Annex I). In particular, all programmes have a requirement to advance "responsible-research and innovation [RRI] including Gender" as a cross-cutting issue (EC 2013, sec. 14.1.l). As articulated in the founding regulation of H2020, RRI consists of attending to six cross-cutting issues: Gender, Ethics, science literacy, stakeholder and Public Engagement, Open Access, and Governance (EC 2013).

Beyond these RRI keys, which are offered in the founding regulation of H2020, the Commission has since further prioritised a broader means of fostering the alignment of science and society through the ideas of Open Innovation, Open Science and Open to the World (Open Agenda) (EC 2016). The EC Open Agenda describes these dimensions, respectively, as:

- Open Innovation — "co-creation" that unfolds across innovation ecosystems and requires knowledge exchange and innovation capacity of all actors involved, be they financial institutions, public authorities or citizens, businesses or academia (EC 2016, p.12).

- Open Science — a concept of transformed scientific practice in which the focus of research activity shifts from “publishing as soon as possible” to “sharing as early as possible” in a way that is accessible to as many parts of the innovation ecosystem as possible (EC 2016, p. 34).
- Open to the World — “Fostering international cooperation in research and innovation” to enable access to “the latest knowledge and the best talent worldwide, tackle global societal challenges more effectively, create business opportunities in new and emerging markets, and use science diplomacy as an influential instrument of external policy” (EC 2016, p. 59).

The following sections provide a formal analysis of the current state of RRI.

3.2. RRI in Widening Participation, SWAFS, EIT, JRC, EURATOM and Instruments of H2020 Programmes: Document Research

This section summarises the key content of the desktop finding in the sections from Annex 1 to 5, in which the NewHoRRIzon partners provide evidence of the implementation of RRI and the Open Agenda in the respective programme lines.

Based on the data available from each Annex diagnosis input, only six of seven levels are summarised below: policy document, work programme, call, proposal template, evaluation and project level examples.

For policy, work programme, and call levels, results are subdivided into sections for each RRI key and Open Agenda element, with Open Access and Open Science presented together. For complete tables and text excerpts, readers are referred to the relevant sections of the respective programme-specific annex. The results on RRI and the Open Agenda with regard to proposal templates and evaluations as well as project examples are presented in summary form.

3.2.1. Policy document, work programme, and call levels by RRI key and Open Agenda element

Public Engagement (PE)

Table 2: Public Engagement dimension of RRI at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	Not present in identified relevant documents.	RRI is not mentioned in the WP 2014–2015. In WP 2016-2017 and 2018-2020 the RRI concept is generically embedded by referring to RRI as cross cutting issue.	No specific mentioning of RRI
SWAFS	Several instruments integrate PE in H2020: • 'participatory' RIA, • CSA aiming to contribute to defining future EU R&I policy, whereby the outcome of the project is designed to provide ideas and direction for further research and innovation, • CSA aiming to support thematic priorities (e.g. environmental, health, transport) to give Public Engagement and co-creation their rightful place in science/policy/society interfaces to support the thematic policy development and policy implementation, • CSA or RIA to foster institutional change with the purpose to foster the uptake of Public Engagement of research and innovation actors.	PE of activity in SWAFS	Call for Integrating society in science and innovation (ISSI) (2014-2015). Call for Developing governance for the advancement of responsible research and innovation (GARRI) (2014-2015). Theme: Institutional Change to Support Responsible Research and Innovation in Research Performing and Funding Organisations (2017-2017). Theme: Embedding Responsible Research and Innovation in Horizon 2020 Research & Innovation (2016-2017). Theme: Strengthening the Science with and for Society Knowledge-Base (2016-2017). Accelerating and catalysing processes of institutional change (2018-2020). Building the territorial dimension of SWAFS partnership (2018-2020). Exploring and supporting citizen science (2018-2020). Building the knowledge base for SWAFS (2018-2020).
EIT	PE is mentioned once as a general principle in	Mentioned a few times. There is no clear	Not addressed.

	Policy document level	Work Programme level	Call level
	H2020. Stakeholder inclusion is mentioned several times. An EIT Stakeholder Forum should be established, bringing together stakeholders around horizontal issues. This platform is also open to organised interests and CSOs, offering an opening to engage a general public.	expressed ambition or priority to involve end-users, costumers, or a wider public.	
JRC	Efforts to strengthen links to the "outside-world". Engagement is mainly targeted at experts, but sometimes at less-established actors, e.g., patients, publics, and citizens.	Plays a relatively minor role. Engagement is focused towards non-JRC experts and experts and less towards actors such as CSOs and the public.	Not applicable.
Instruments of H2020	Involvement of multiple stakeholders and users is emphasised as key activity in the three focus areas. Policy documents closely link these activities to ideas about Open Innovation and Public Engagement.	In all three focus areas stakeholder and user involvement is emphasised as one key activity. They are represented as closely linked to ideas about PE as well as OI.	Examples of PE and stakeholder involvement in all three focus areas with numerous examples in IND call documents.
EURATOM	No traces of RRI concept.	Although the public is mentioned often, Public Engagement is never included. "Public interest" is mentioned several times without explaining what it is.	RRI was not mentioned explicitly on call level.

Gender Equality (GE)

Table 3: Gender dimension of RRI at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	RRI is not present in identified relevant documents.	Reference that RRI is a cross cutting issue in WP 2016-2017 and 2018-2020.	No specific mentioning of RRI.
SWAFS	The EC is also committed to promoting GE in R&I, which is part of the EC's strategic engagement for GE in all EC policies for the period 2016-2019.	GE is reflected as one of the eight lines of activities in SWAFS.	Call for Promoting GE in research and innovation (GERI) (2014-2015). Theme: Institutional Change to Support Responsible Research and Innovation in Research Performing and Funding Organisations (2016-2017). Theme: Developing Inclusive, Anticipatory Governance for Research & Innovation (2016-2017). Stepping up support to Gender Equality in Research and Innovation Policy (2018-2020).
EIT	GE is mentioned a few times in relation to a broader principle of diversity in partnerships of KICs. It is part of the general Horizon 2020 framework.	Mentioned a few times.	Brought up once or twice but not in direct relation to a KIC call.
JRC	2015 evaluation suggests paying attention to Gender balance in management positions and recruitment. 2017 implementation noticed positive developments.	Similar to policy document level.	Not applicable for the JRC.
Instruments of H2020		GE is mentioned as a barrier of relevance to co-creation in SSC and as a dimension of consideration in the development of user-driven business models in IND.	Attention to Gender-related issues is limited to the calls of the three focus areas.
EURATOM	No traces of an RRI concept.	GE was mostly understood as Gender balance in research teams.	RRI was not mentioned explicitly on call level.

Science education and science literacy (SLSE)

Table 4: SLSE dimension of RRI at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	RRI is not present in identified relevant documents.	Reference that RRI is a cross cutting issue in WP 2016-2017 and 2018-2020.	No specific mentioning.
SWAFS	High priority. SLSE is pursued by SWAFS, e.g. the EC established a Science Education Expert Group in the SiS 2013 work programmes.	Science Education is reflected as one of the eight lines of activity in SWAFS.	Call for Making Science Education and careers attractive for young people (SEAC) (2014-2015). Theme: Embedding Responsible Research and Innovation in Horizon 2020 Research & Innovation (2016-2017). Theme: Strengthening the Science with and for Society Knowledge-Bas (2016-2017). Theme: Developing Inclusive, Anticipatory Governance for Research & Innovation (2016-2017). Building the knowledge base for SWAFS (2018-2020).
EIT	Rarely mentioned.	Equipping the public to understand and take part in discussions about R&I is mentioned several times, primarily regarding MOOCs, but also for training trainers, and executive training.	Not addressed.
JRC	SLSE is not mentioned, but the importance to communicate activities.	Similar to policy document level.	Not applicable.
Instruments of H2020			Only few calls in the CCA programme highlight aspects of Science Education.
EURATOM	No traces of an RRI concept.	Science Education was mentioned three times in the three Work Programmes. It was rather understood as training PhD students than educating the public.	RRI was not mentioned explicitly on call level.

Ethics (ET)

Table 5: Ethics dimension of RRI at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	RRI is not present in identified relevant documents.	Reference that RRI is a cross cutting issue in WP 2016-2017 and 2018-2020.	No specific mentioning.
SWAFS	The Ethics policy requires that all domains of research have to apply fundamental ethical principles. Horizon 2020 legislation defines the ethical principles and as a special feature in H2020, an Ethics appraisal procedure is required.	Governance and Ethics are reflected as one of the eight lines of activity in SWAFS.	Call for Developing governance for the advancement of responsible research and innovation (GARRI) (2014-2015). Theme: Developing Inclusive, Anticipatory Governance for Research & Innovation (2016-2017). Theme: Developing Inclusive, Anticipatory Governance for Research & Innovation (2016-2017).
EIT	Rarely mentioned.	Ethics/fairness mentioned a few times.	Rarely brought in direct relation to a KIC call. External experts have to abide by a code of conduct. Ethics is only brought up once in a very general sense.
JRC	Minor role. Additional ethical principles mentioned by the JRC: accountability, openness, inclusiveness, innovation.	Similar to policy document level. Ethics is only mentioned as a sense of fairness and non-discrimination, and not as ethical standards for research, innovation or teaching activities of EIT or KICs.	Not applicable.
Instruments of H2020		Ethical issues are raised in discussions of IoT and IND, primarily with respect to safeguarding Ethics and privacy rights.	Ethics receive limited attention in SSC calls, some attention in IND and high awareness in IoT calls.
EURATOM	No traces of an RRI concept.	Ethics was addressed four times within the Work Programmes. Given its few mentions and the way it is dealt with, Ethics seems to have the status of a tick box exercise	RRI was not mentioned explicitly on call level. Ethics, as an issue that needs to be addressed in every proposal, seems to have the status of a tick box exercise.

Governance (GOV)

Table 6: Governance dimension of RRI at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	RRI is not present in identified relevant documents.	Reference that RRI is a cross cutting issue in WP 2016-2017 and 2018-2020.	No specific mentioning.
SWAFS	The overarching, systemic perspective is implemented via the support for Governance approaches for RRI.	Governance is reflected as one of eight lines of activity in SWAFS.	Call for Developing governance for the advancement of responsible research and innovation (GARRI) (2014-2015).Institutional Change to Support Responsible Research and Innovation in Research Performing and Funding Organisations. Theme: Embedding Responsible Research and Innovation in Horizon 2020 Research & Innovation (2016-2017). Accelerating and catalysing processes of institutional change (2018-2020).
EIT	Rarely mentioned.	Governance principles for R&I are underlying many activities of KICs. Climate KIC acknowledges that in addition to creating innovative products and services a pull is necessary for change.	Governance is the only RRI key brought up as a requirement for the Food KIC, which is expected to contribute to a better governance framework for innovation in the food sector.
JRC	Governance plays an important role in restructuring. Idea of inclusive knowledge production has arrived at some places of JRC but not in others.	Similar to policy document level.	Not applicable.
Instruments of H2020		Legal and regulatory issues pertaining to the Governance category are emphasised in all three focus areas, but most clearly in SSC. Here, Governance not only refers to the societal challenges addressed but also to components of RRI, e.g. PE and OI. In contrast, in IND Governance is defined from a business perspective.	Calls in the IND focus area contain several examples of Governance for supporting the circular economy approach. Governance receives limited attention in the other two CCA focus areas (IoT and SSC).
EURATOM	No traces of an RRI concept.		RRI was not mentioned explicitly on call level.

Open Access (OA)/Open Science

Table 7: Open Access dimension of RRI and Open Science dimension of Open Agenda at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	RRI is not present in identified relevant documents.	No mentioning of the three O's.	No specific mentioning.
SWAFS	OA was one of the early-defined keys of RRI. The EC seems to move decisively from 'Open Access' to the broader picture of 'Open Science', reflected in the 3Os.	OA/Open Data is reflected as one of the eight lines of activity in SWAFS.	Projects funded under work programme 2014-2015 can participate in the Pilot on Open Research Data. Theme: Institutional Change to Support Responsible Research and Innovation in Research Performing and Funding Organisation (2016-2017). Exploring and supporting citizen science (2018-2020). Building the knowledge base for SWAFS (2018-2020).
EIT	Documents highlight several times the importance of disseminating results, sharing good practices, and exchanging knowledge with the wider innovation community, stakeholders, and decision-makers. Open Science is only mentioned once.	Not addressed.	Not addressed.
JRC	OA is given attention across the JRC. Policy documents heralded a shift towards Open Science. Several activities were launched to make data and infrastructure accessible for externals. Citizen science is acknowledged in the 2030 Strategy.	See policy document level.	Not applicable.
Instruments of H2020	The concepts of Open Data and Open Science are linked to discussions of digitisation (including IoT) in a "tick box" manner. Little attention is paid to Open Science.	The provision of open service platforms, open standardised Application Platform Interfaces (API), Open Data and interoperability is highlighted as key focus points in the IoT focus	SSC calls are concerned with Open Data, Open Access, common long term data collection systems, interoperability along data infrastructures, a common footprint calculation

	Policy document level	Work Programme level	Call level
		area and in SSC. Little attention is paid to Open Science in the work programmes.	methodology and a continuous building up of the 'knowledge portfolio'. RRI inspired ideas of Open Science do not appear in any of the calls, but there are examples of multi-disciplinary approaches in IoT and IND calls.
EURATOM	No traces of an RRI concept.	OA is the most trending RRI key mentioned in WPs. This mends not only OA to data, but also to research infrastructure within the EU. Open Science was rarely mentioned in the WPs. The need to include scholars from Social Sciences and Humanities (SSH) was stressed a few times in WP 2016-2017.	

Open Innovation

Table 8: Open Innovation dimension of Open Agenda at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	No data presented.	No mentioning of the three O's.	No specific mentioning.
SWAFS	No data presented.	No data presented.	Building the territorial dimension of SWAFS partnership (2018-2020). Exploring and supporting citizen science (2018-2020).
EIT	OI is provided for in the KIC model and is prevalent in documents. Researchers, educators and innovators from different sectors, backgrounds, and disciplines are brought together to work on joint projects. While co-creation and collaboration is embraced, the focus on the end-user, consumer, or simply the citizen is less pronounced.	OI is seen as the heart of the KIC-model and is therefore important in all documents. Stakeholder inclusion is a dominant principle throughout all documents; see also annual stakeholder forum, website, social media newsrooms, multi-user blogs and social media groups. Stakeholder inclusion should increase the visibility, quality, and impact of EIT. While collaboration between stakeholders is pivotal, the user-centric approach of OI is absent.	Mentioned several times, in much the same manner as on the other levels: OI is given by design in the KIC-model due to the collaboration between partners. Knowledge sharing and dissemination activities are important. The proposal must include a communication strategy and an outreach and dissemination plan.
JRC	No data presented.	No data presented.	No data presented.
Instruments of H2020	No data presented.	No data presented.	OI is more prevalent, and includes examples of stakeholder platforms in IoT, social innovation and other ways of stakeholder involvement (IND) (see also PE and stakeholder involvement above).
EURATOM	No traces of an RRI concept.	No data presented.	No data presented.

Open to the World

Table 9: Open to the World dimension of Open Agenda at policy document, work programme, and call levels

	Policy document level	Work Programme level	Call level
Widening	No data presented.	No mentioning of the three O´s	No specific mentioning
SWAFS	No data presented.	No data presented	The participation of third countries and international organisations is welcome (2014-2015) Theme: Strengthening the Science with and for Society Knowledge-Base (2016-2017) Exploring and supporting citizen science (2018-2020)
EIT	Highly connected to the concept of Open to the World. Openness towards new partners, external experts and stakeholders like national, regional, and local authorities, and partners outside Europe is prioritised and several times mentioned in the documents.	Important throughout the documents. KICs are open to international partners.	Hardly addressed.
JRC	Not explicitly mentioned.	See policy document level.	Not applicable.
Instruments of H2020	Little attention.	Little attention to openness to the world in WPs. Open to the World is emphasised in SSC, while in IND openness to the world is pursued with the aim of penetrating new markets worldwide.	Examples of being Open to the World include international collaboration between stakeholders (IoT and SSC), developing solutions useable on a global market (SSC) and transferability of technologies across borders (IND). Aspects of being Open to the World can be identified in call objectives, fostering international cooperation through IoT integration and IoT platforms. However, these aims and examples do not appear to be linked to RRI. The main goal seems to be gaining additional market shares which might not necessarily benefit 'the world' outside Europe.
EURATOM	No traces of an RRI concept.	The global dimension aspect was mentioned eight times in WPs, stressing benefits of being open.	

On proposal level template and evaluation level SWAF stands out with addressing the five keys. All other programme lines mention the one or other RRI key only infrequently or not at all.

Proposal template level

SWAFS

The term RRI itself does not appear in the SWAFS proposal template.[14] However, several references are given to the threes O's, the keys and "de facto RRI" (Rip: 2014). Open Access, Ethics, Gender, stakeholder engagement and Public Engagement are explicitly mentioned, although mostly in a "basic" way. There is no obligation to explain these dimensions (except Ethics), but a rather voluntary task to take them into account, where relevant. Beyond the dimensions and the three O's, "benefits for society" are also mentioned, i.e. the substantial RRI.

On Ethics the template contains a check box, investigating whether the research involves human embryos/foetuses, humans, human cells/tissues, personal data, animals, third countries, environment and health, safety, dual use, exclusive focus on civil applications, misuse and other Ethics issues.

Another template section contains information about the "Extended Open Research Data Pilot", which is related to the three O's. Participation is flexible in the sense that not all research data needs to be open and that applicants can opt out of the pilot. Part of the dissemination and exploitation of results are also "measures to provide Open Access".

The RIA/IA template requires in the "Concept section" that applicants have to "identify any inter-disciplinary considerations and, where relevant, use of stakeholder knowledge. Where relevant, include measures taken for public/societal engagement on issues related to the project".

As regards Gender it is stated under section "1.3 concept and methodology; quality of measures" in the proposal template: "Where relevant, describe how the Gender dimension i.e. sex and/or Gender analysis is taken into account in the project's content".

In sub-section 2.1 "expected impacts" of the "2. Impact" section, RIA/IA applicants have to describe "any substantial impacts not mentioned in the work programme that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society". Barriers and obstacles should be described, such as regulation and standards, but also public acceptance, workforce considerations or financing of follow-up steps - the idea of anticipation is reflected here.

Section 2.2 "measures to maximise impact" requires the provision of a "plan for the dissemination and exploitation of the project's results". In addition it is stated that "the full range of potential users and uses, including research, commercial, investment, social, environment, policy-making, setting

[14] The Participant portal offers proposal templates for different funding opportunities (http://ec.europa.eu/research/participants/portal/desktop/en/funding/reference_docs.html#h2020-call_ptef-pt-2018-20). To exemplify, the proposal template for RIA/IA 2018-2020 was analysed (European Commission 2018): Differences to WP 14-15 and WP 16-17 and CSAs are minor, as RIA/IA and CSAs are the main funding instruments, we chose to analyse them.

standards, skills and educational training where relevant" should be considered. Another note relates to the follow-up of the project saying that the applicant "should give due consideration to the possible follow-up of your project, once it is finished. Its exploitation could require additional investments, wider testing or scaling up. Its exploitation could also require other pre-conditions like regulation to be adapted, or value chains to adopt the results, or the public at large being receptive to your results." Again, an anticipatory dimension can be found here.

Section 5.1 is fully devoted to Ethics, in a sense of "responsible conduct of research". The requirements are stated in case any Ethics issues are entered: an Ethics self-assessment has to be submitted and particular Ethics documents (such as Ethics committee opinion) have to be provided.

The other project lines address RRI, its keys and the three O's to limited extent.

EIT

On proposal template level, communication, outreach and dissemination must be part of a KIC's strategy. As regards Ethics, societal impact is limited to job creation, human capital and economic impact. It is unclear whether benefit of wider society is concerned.

Instruments

All proposal template documents have an open section on communication activity measures including some degree of public or societal engagement ("… or the public at large being receptive to your results.") (European Commission, 2017c; European Commission, 2017d).

Proposal templates in the Cross-cutting Activities programme line include a section on Ethics covering use of humans (stem cells, etc.) or animals, personal data, third countries, environment, health and safety issues, misuse, etc. All proposal template documents have an open section on call specific questions, including an "extended open research data pilot in Horizon 2020" and some proposal templates include a Data Management Plan (DMP) for balancing Open Data.

Evaluation level

SWAFS

RRI as a term does not explicitly play a role in the General Annex H "Evaluation rules", but some RRI dimensions are mentioned. The wording related to RRI gives some room for interpretation though and therefore seems to be rather soft.

The General Annex "H. Evaluation rules" for H2020 Work Programme 2016-17 lists the award criteria "excellence", "impact" and "quality and efficiency of the implementation" and the related aspects that have to be considered to receive scores. Within the "excellence" criteria, for RIA, IA and SME instruments one RRI relevant aspect is the "appropriate consideration of interdisciplinary approaches and, where relevant, the use of stakeholder knowledge". Proposals must show that interdisciplinary approaches and the use of stakeholder knowledge are adopted if appropriate. Proposals must explain if an interdisciplinary approach is not appropriate.

RRI relevant aspects of the award criteria "impact"can be found in the following phrases: RIA, IA and SME instrument actions should deliver "any substantial impact not mentioned in the work programme, that would enhance innovation capacity, create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the

environment, or bring other important benefits for society". Almost all types of actions should "exploit and disseminate the project results (including management of IPR) and manage research data where relevant" as well as "communicate the project activities to different target audiences".

ERA-NET Cofund actions in particular should pool "national/regional resources and contribute to establishing and strengthening a durable cooperation between the partners and their national/regional research programme". Regarding quality and efficiency of implementation, all types of actions have to take into account "appropriateness of the management structures and procedures, including risk and innovation management".

The Participant Portal FAQs explain how RRI should be addressed and evaluated in H2020 proposals.[15] If topics are RRI flagged, applicants should respond to the topic description and explain how "they will involve societal actors relevant to the topic in specific activities or in the overall approach in one or more of the five dimensions of RRI (depending on the topic text)". Reviewers will consider the explanations when evaluating the "excellence" criteria. Currently (Feb 2018) 27 out of 29 (open and forthcoming) topics in the SWAFS line are tagged with an RRI flag (81 – open and forthcoming – topics of all current topics have an RRI tag in the Participant Portal).[16]

If Public Engagement is indicated in the topic description, evaluators assess the proposals under the criteria of "excellence" (concept and methodology, appropriate interdisciplinary considerations, stakeholder knowledge where relevant) and "impact" (communication, dissemination and exploitation activities).[17] It is examined if the engagement process is methodologically sound, includes the appropriate expertise and resources, is well-timed and is likely to have a genuine positive impact during and after the project.

The same applies for Gender: if the call raises the question in what way Gender is relevant under the scope and impact of the topic description, evaluators check how sex and/or Gender analysis is taken into account and consider this while giving scores under the criteria of "excellence" and/or "impact" criteria.[18] In addition, if several proposals score equal, Gender becomes a ranking factor.

EIT

As regards Public Engagement, evaluation criteria of 2016 call require an explanation of the quality and relevance of the communication strategy including sharing good practices with various stakeholders. For Open Innovation, the evaluation form includes a guiding question about stakeholder inclusion: "Does the proposal build on already existing, excellent initiatives and engage the relevant target groups and stakeholders?" There is an indirect indication of Openness to the World: "*Does the proposal demonstrate readiness to establish concrete synergies and complementarities with EU and other relevant global initiatives? Is a list of potential synergies provided in the proposal?"* (The European Institute of Innovation and Technology, 2015b: 3).

[15] https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-944.html
[16] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/ftags/rri.html#c,topics=flags/s/RRI/1/1/0/default-group&callStatus/t/Forthcoming/0/1/0/default-group&callStatus/t/Open/1/1/0/default-group&callStatus/t/Closed/1/1/0/default-group&+callStatus/asc
[17] https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-939.html
[18] https://ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-977.html

Project level

The following section provides examples for RRI and the three O's on project level. Again SWAFS is outstanding as concerns the number of projects and coverage of RRI keys, but also other programme lines have projects which address the keys, at least implicitly.

Widening

RRI appears in the abstracts of two funded Widening projects. Implicit mentioning occurs most frequently through related words such as "sustainable" and "responsible". The keys Public Engagement, SLSE, Ethics and Open Access appear frequently in the project abstracts as key words. Gender Equality appears in none of the abstracts of funded projects.

SWAFS

CORDIS abstracts and the project websites show that many projects are focusing on Public Engagement, involving a great variety of stakeholders. Initiating sustainable change is a recurrent theme as well as building networks of European researchers and engaging the public. The Work Programme does not fund activities that directly involve all parts of society "doing R&I". According to interim evaluation, projects often target citizens instead of involving them in R&I. In addition to increased involvement of CSOs and OTH-type organisations (other organisations), greater involvement of PRCs (private companies), including social entrepreneurs, would likely help to achieve longer-term results for Open Innovation (European Commission 2017a, p.1143. SWAFS funds the science shops network (SciShops.eu) and the InSPIRES project. An example of an activity that promotes stakeholder participation is the network of SWAFS National Contact Points, which aims to provide more effective and better quality services to potential SWAFS applicants. Another one is the European Science Open Forum (ESOF), which is a huge platform for science, where all stakeholders and the general public can meet and debate cutting-edge research, R&I policies and global challenges. CORDA data indicates that 41 (85.4%) SWAFS projects take into account the Gender dimension of R&I content (i.e. receive a Gender flag) (H2020 average 36.4%). The OSOS project covers Science Education, Open Science and Public Engagement by creating a core network of 100 Open Schooling Hubs in 12 countries. SWAFS has three projects on Ethics, i.e. EnTIRE, I-CONSENT and SIENNA. In Open Access two projects, FutureTDM and openUP are funded in WP 2014-2015. ORION explores ways in which research and funding organisations in life sciences and biomedicine can open up the way they fund, organise and do research. FIT4RRI intends to bridge the gap between RRI and Open Science. Open Science is the focus of FOSTER Plus, which aims to contribute to a shift in the behaviour of European researchers to ensure that Open Science becomes the norm.

EIT

The factsheet about EIT Food, FoodConnects specifies six strategic goals including number 3: "*Build a consumer centric connected food system to develop a digital food supply network with consumers and industry as equal partners"* (European Institute of Innovation and Technology, 2016b: 1). This indicates that EIT Food is more concerned about the user-centric approach of Open Innovation and maybe even engaging the public in their work. No references were found in projects towards Gender and SLSE.

JRC

JRC as part of the broader strategy to foster knowledge management across the JRC aims to help researchers and policy makers to develop skills in the area of PE. Skills focus on

- Policy deliberation: Focus on long-range planning perspectives, continuous public consultation, and institutional self-reflection and course correction.
- Knowledge co-production: Focus on intentional collaborations in which citizens engage in the research process to generate new knowledge.
- Citizen science: Engage citizens in data gathering to incorporate multiple types of knowledge.
- Informality: Encourage less structured one-on-one interactions in daily life between researchers and publics.

JRC hosts a Visitor's Centre at Ispra that is open to interested citizens. A newly established Collaborative Doctoral Partnership (CDP) allows students to be co-hosted by universities and the JRC. Scientists should be trained at the intersection of policy. Beyond that, JRC offers multiple training programmes for other DGs of the EC. The project RESONANCES II operates at the intersection of art and science[19]. The JRC's Centre of Advanced Studies, together with the Leonardo Da Vinci Museum in Milan and other actors, seeks to find answers to the question of how to build a fair world. This project follows an inclusive strategy, is dedicated to Open Science and addresses questions of science literacy and education. The Project brings together scientists and artists to find new topics and to generate visibility of JRC activities via exhibitions. The JRC Data Catalogue provides access to JRC data of different kind since 2016. JRC also participates in the EU Open Data Portal. JRC has an Agreement on Open Access Publications with Elsevier and has its own repository.

Instruments

Several projects in the three focus areas provide concrete examples of relevant stakeholders and how to engage them. Projects in the SSC focus area strongly emphasise the importance of Public Engagement and stakeholder involvement. Projects funded under IND and IoT have, with a few exceptions, less emphasis on Public Engagement and stakeholder involvement. Awareness of Gender varies across the focus areas and their respective projects. A Gender dimension in the knowledge or subject of R&I activities is hardly present in any of the projects. There is low to limited awareness for SLSE with a few exceptions of projects that include some educational elements. There is also a limited level of attention to Ethics-related concerns in the 34 projects. While the IND projects have "some (level of) awareness" with respect to governance, projects in IoT and SSSC show relatively high levels of Governance awareness. Governance is rarely directly related to RRI keys or O's. Instead, examples of Governance are most frequently related to the societal challenges addressed or referred to e.g. compliance with legal regulations. Overall, there is some awareness of aspects linked to Open Access and Open Data in the projects assessed with high awareness in CONNECTING Nature (SSC) and in SYSTEMIC (IND). Projects in all three focus areas address data protection issues. Concerns related to data protection indirectly address limitations of the RRI aspects of openness in the respective projects (e.g. Open Data). The focus areas' awareness of Open Innovation and Open Science in the project documents assessed is limited. In several projects, being Open to the World

[19] https://ec.europa.eu/jrc/en/event/exhibition/resonances-ii-exhibition-fairfear

does not appear to be a prioritised goal in itself and often only covers, for example, the disclosure of selected project information and findings on the Internet.

EURATOM

The two trending topics in projects were Public Engagement and Open Access. *Science Education* was mentioned two times, Gender was only named once and Ethics wasn't addressed at all.

Project 196907 mentions that "special attention will be paid to the diversity of stakeholders in the Nuclear Fission and Radiation Protection sectors, the Gender dimension [….]". By expressing it this way, it seems like the Gender dimension is not perceived as part of a diverse stakeholder group but rather something that needs to be accomplished by default.

Project 198383 states that "the interaction tools already built with the Civil Society Organisations would worth being enlarged to stakeholders outside SITEX or in educational perspectives" which can be related to an effort towards *Science Education*. Otherwise no similar approach on this RRI key could be found.

Although *Open Access* was mentioned four times, three of the notions refer to project 203753. Here Open Access was seen as a way to provide NCP[20]'s information to improve the quality of proposals submitted as well as to enable those who are new to the job, to catch up quickly in terms of expertise.

Public Engagement has been described as a goal in several projects referring to the nuclear waste debate. Project 200955 states that "the best way to handle and dispose this material is a topic of broad public debate and concern".

This project states that "this has impact on the public debate on nuclear waste disposal, also by keeping non-scientific stakeholders involved". This might not seem like an eagerness to engage people directly in research, nevertheless the influence of research on public opinion is acknowledged, which might be a beginning to spread RRI. The reserved attitude of EURATOM funded projects continues with project 198045, where researchers want to "exchange and communicate with all stakeholders" and "the public and media where necessary". Again, the public is at least mentioned.

3.3. Overall assessment of RRI in the programme lines

Table 10 and Table 11 provide an overview about the institutionalisation of RRI keys and the three O's in the Social Lab.

- Micro Ethics refers to issues of research integrity most commonly covered in Ethics self-assessments, data management and privacy Ethics. Macro Ethics or socio-Ethics refers more broadly to topics like dual use, role of technology in society, how diverse values shape technology, etc.[21]
- Gender balance refers to team composition considerations.

[20] NPC = National Contact Points for H2020

[21] For an elaboration of micro and macro ethics see Herkert 2005.

- Gender dimensions (of research) refer to whether and how projects consider the way Gender concepts shape research content, and whether and how research content affects Gender differently.[22]
- Unidirectional modes of Public Engagement refer to R&I actors seeking to fill a deficit in public knowledge.
- Bidirectional modes of Public Engagement refer to R&I actors seeking to exchange information and values through dialogue with a variety of people.

Table 10: Overview of level of institutionalisation of RRI and Open Agenda Elements

	Level of Institutionalisation Across Excellent Science Programmes
Open Access and Open Science	Strong
Governance	Strong
Open Innovation	Strong
Public Engagement (unidirectional)	Moderate
Gender (balance)	Moderate
Open to the World	Moderate
Public Engagement (bidirectional)	Weak
Science Literacy and Science Education	Weak
Ethics (micro)	Weak
Gender (dimensions)	Very weak
Ethics (macro)	Very weak

Table 11: Keys and O's per Programme Line

Keys and O's	Widening	SWAFS	EIT	JRC	Instruments	EURATOM
Public Engagement	No	High	Limited	Some	Some	Some
Gender Equality	Limited	High	Limited	Some	Limited	Some
SLSE	Limited	High	Limited	Some	Limited	Limited
Open Access	Limited	High	No	High	High	High
Ethics	Limited	High	No	Limited	Limited	Some
Governance	No	High	Some	High	Some	No
Open Science	No	High	Limited	High	Limited	Limited
Open Innovation	No	High	High	Some	Some	No
Open to the World	No	Some	Some	Some	Some	Some
Overall Assessment	**Limited**	**High**	**Some**	**Some**	**Some**	**Some**

Table 10 describes that in none of the programmes RRI keys and the three O's are very strongly institutionalised. Open Access and Open Science, Governance and Open Innovation, however, are strongly institutionalised, Public Engagement (unidirectional) and Gender (balanced) moderately. The rest of the keys and O's are weakly or very weakly institutionalised.

[22] For the difference between the methods used by programmes to realise the cross-cutting gender dimension of H2020, see EC 2017a.

3.3.1. Widening

Widening countries focus primarily on ways to eliminate participation and performance barriers. There is either limited or no awareness for the keys and O's. The concept of RRI is still remote. RRI descriptions in documents are brief and generic and some implicit references of minor importance such as "societal challenges" can be found on a topic level. The three O´s are not embedded in the Widening programme but they are briefly brought up in the in the Scoping Paper for SEWP 2018-2020 Spreading Excellence and Widening Participation.

3.3.2. SWAFS

RRI is very present in SWAFS policy documents, work programmes, calls and projects since RRI is the central mission and vision in the programme line. Looking at Table 11 it becomes clear that the SWAFS programme has a positive impact on overall assessment of the keys and O's. In all but one dimension it is rated with "high awareness". The five keys are essential for SWAFS and reflected in the programmes' lines of activity. The three O's gained importance in the recent work programme (2018-2020) and find its manifestation mainly in the aim to foster citizen science, multinational cooperation, funding for Open Data and Open Access projects and the participation in the Pilot on Open Research Data.

3.3.3. EIT

There is some awareness of RRI in the programme line (keys, O's, and beyond). While the focus on RRI keys is rather limited or not existing, the governance structure reflects some level of societal embeddedness with a focus on solving societal challenges for the good of a general public. There is a strong focus on stakeholder inclusion and collaboration and for sharing knowledge, which is in line with principles of Open Innovation.

3.3.4. JRC

Desktop research identified almost no use of RRI as an all-inclusive concept by the JRC. The current transformation process of JRC aims at stimulating exchange within the JRC and between the institution and the outside world. This approach connects with ideas related to RRI and may also be considered de facto as RRI. Particularly recent activities and missions of the JRC have embraced RRI aspects, such as Public Engagement, Governance, Gender Equality, and Open Science. However, there seems to be room to move further in this direction if this is to be preferred. Although RRI elements are visible in JRC activities, RRI does not seem to be considered as a concept, neither by senior nor by executive staff. There is knowledge about RRI (particular in the management sections of JRC); yet other employees do not know the concept at all.

3.3.5. Instruments

Overall, the CCA programme line does not appear to reflect visions of the concept of RRI. Though the overall awareness of the concept of RRI in IoT, SSC and IND is limited, there is a great variety of RRI components addressed in the three focus areas and their respective projects.

Besides addressing societal challenges and governance in relation to societal challenges, Open Innovation, Public Engagement and stakeholder involvement are RRI components that appear most frequently in documents.

Several documents and projects also include components related to Ethics, Open Data and Open Access, openness towards the world and Governance. I.e., the Governance component can include Governance in relation to RRI components and/or Governance in relation to societal challenges.

Societal challenges, and the ways in which the projects target the respective societal challenges, do not reflect the concept of RRI. Even though the societal challenges addressed overlap in some cases (e.g. several focus areas target sustainability issues), there is some variation in the focus areas' approaches of addressing these challenges. Documents in all three focus areas (IoT, SSC and IND) contain examples where Public Engagement and stakeholder involvement (and/or Open Innovation) is prioritised. This is usually the case in projects aiming at changing public attitudes towards an issue as well as in projects where ensuring user acceptance in the uptake of an output is key. The most clearly defined and perhaps also most ambitious aim of approaching societal challenges is found in the SSC focus area. Here, ensuring solutions related to environmental sustainability is the main overall goal of the R&I activities. However, RRI as a *concept* only appears in a few cases in SSC, and is not explored or explained in much detail. In general, we have only identified 'intended connections' between addressing societal challenges and components of RRI (e.g. openness) in few of the focus areas.[23]

The RRI components receiving the least attention are Science Education and Gender (as well as Open Science, if transdisciplinary approaches are not considered Open Science).

3.3.6. EURATOM

Desktop research showed that RRI was not applied as integrated and comprehensive concept on any level. However, analysis of the Working Programmes and projects funded under the EURATOM line show that most of the keys have been addressed in one way or the other to some extent. Open Access was the most prominent key in documents. The other keys and three O's were infrequently mentioned. The public is mentioned often, however, Public Engagement is never included in the Work Programmes. In the same way, "public interest" is mentioned several times without explaining its meaning. With reference to Gender Equality, the Working Programmes focused on numbers; Science Education activities focused mainly on (potential) PhD students. Governance as RRI key was never mentioned in documents. Given its few mentions and the way it is dealt with Ethics seems to have the status of a tick-box exercise.

3.4. Findings from the stakeholder interviews

In the following section we present the findings about the use of RRI and the three O's in the interviews. Due to organisational reasons it was only possible to carry out interviews in the Social Labs Widening, EIT, Instruments and EURATOM.

[23] However, this diagnosis presents some examples of the RRI component *Governance*. E.g. some projects (especially in the SSC focus areas) are intentionally steered towards goals such as the involvement of stakeholders or the development of solutions to the societal challenges addressed.

Table 12 - Number of interviews in "Diversity of Approaches"

Social Lab	Interviews
Widening	10
SWAFS	No data available
EIT	14
JRC	13
Instruments	15
EURATOM	10
Total	62

3.5. Understandings of RRI

3.5.1. Overall uptake

The vast majority of Widening participants in the interviews and in the discussions show a limited awareness of the RRI concept. For many of the researchers of Widening counties RRI is a new concept. Many Widening countries lack appropriate R&D investments, infrastructure and a vibrant ecosystem.

There is some level of RRI awareness in EIT. Awareness is not widespread, but several RRI-related aspects are addressed. The interviews resemble the findings of the document analysis: Open Innovation is emphasised as an important aspect of the EIT identity. Science Education is considered quite important in some KICs and several initiatives are in place. Finally, Public Engagement is emphasised as a priority, though, it is for the most part still in early phases. These are the only two keys of RRI that seems to be prioritised.

Across Instruments there is no general understanding of the concept of RRI projects or focus areas.

EURATOM interviews confirmed the document analysis that RRI does not play a significant role as a comprehensive concept, but interviewees were to a certain degree aware of some RRI keys.

3.5.2. Public Engagement

Widening interviews showed one positive example for Public Engagement. An interviewed researcher aimed at fostering in his project the collaboration among all societal actors during the research and innovation process.

In the EIT, openness in terms of communicating results and sharing good practices is a high priority (this is done mainly via the Internet). However, interviews also showed clear limitations to openness. KICs experience a permanent conflict between openness and data protection. Business partners are generally reluctant to share ideas, technology, and results with others in the innovation communities as most of the value of a new product or service depends on how close you keep intellectual property. Understanding of Public Engagement varies between different KICs. Some consider Public Engagement important in order to be able to create innovations which are accepted by, marketable with and working for patients and consumers. Other KICs see PE as education. In one

KIC Public Engagement was considered irrelevant altogether, because consumers could not contribute meaningfully to generate changes on a (n infra) structural level.

In Instruments some interviewees emphasised Public Engagement as a highly valued aim. The following (professional) stakeholders are relevant for their respective projects: Industries, companies, SME's, private service providers and business communities in general (e.g. engineers, architects, urban designers, and pharma groups), financial stakeholders (e.g. the European Investment Bank), consultants and communicators, as well as the media for dissemination/communication activities. With respect to Public Engagement, the interviewees mention the following relevant public stakeholders: Public service providers and public utilities, policy-makers, universities and research centres (i.e. sociologists, political scientists, technical researchers, civil society, Non-Government Organisations (NGO), charity communities and individual communities, citizens, users/consumers, schools, and education specialists).

For most respondents in EURATOM the crux of the matter of Public Engagement was how to convince the public of the value of nuclear research and draw their awareness to the emerging energy crisis that will require, in the interviewees' point of view, the acceptance of nuclear as a relevant and important source of energy for the future. Several interviewees mentioned consulting and informing the public - and this was also addressed in some projects. However, most interviewees rejected the idea to include the public in the research process. In this line of argument nuclear energy is far too complex to involve people from outside research. Interviewees were conscious of the importance of public acceptance, e.g. to gain support. One NCP reported about meeting a few times a year with CSO's to address potential fears and to create shared ground. But he also emphasised the limits of this approach, as there are different interests between nuclear researchers and CSOs.

3.5.3. Gender

In general all interviewed participants in Widening agreed that Gender is not considered a problem in their projects and institutions. Few of them were aware of the Gender dimension in research. Also in EIT the importance of Gender Equality was in general acknowledged in terms of equal representation of men at different working levels, but the issue was not defined as top-priority. In Instruments Gender was mainly perceived in terms of the projects' Gender composition. All interviewees but one stated that they have a good Gender balance (i.e. a balanced number of women in the project consortia). Gender, just as Ethics, was not brought forward by any of the EURATOM interview partners. When asked, most interviewees perceived an imbalance favouring male researchers. Interviewees often stated that Gender balance in research teams is difficult to accomplish, as nuclear research is still a field dominated by men. However, there was also an example to show the opposite. One coordinator mentioned that all senior staff in a project (coordination and work package lead) were women. The project involved mainly partners from Central and Eastern European countries where women traditionally, as she explained, were more encouraged to enter the field of natural sciences and engineering.

3.5.4. SLSE

Many Widening interviewees were aware of the need to better equip citizens with the necessary knowledge and skills and to motivate students towards scientific careers. EIT respondents referred with regard to Science Education to education in general. They referred to their programmes at

master, PhD, and postdoc level and to the importance of teaching entrepreneurial skills as an integral part of the knowledge triangle. Interviewees did not understand Science Education as specifically directed at people not traditionally considered as part of a scientific community. However, there were also examples of "wider society learning" like MOOCs and professional training. The Instruments' interviews confirmed the very limited attention paid to Science Education. There were no examples of citizen science. However, there were a few examples of related activities. Interviewees from EURATOM raised the topic of Science Education differently. Although respondents did not consider it as a topic of highest importance, interviewed NCPs suggested a number of activities to inform and educate the public.

3.5.5. Open Access

Open Access was perceived positively in EIT interviews. However, it was less relevant for EIT which is dealing with innovation and less with basic research. In Instruments some interviewees stated that they plan to exhibit use cases for interested stakeholders. For most EURATOM interviewees Open Access is established standard. They tried to publish Open Access as much as possible and stressed the importance of this approach. One interviewee stressed several times Open Access' importance for the research community. One NCP perceived Open Access as a matter of transparency and also stated that in EUROFUSION a publication procedure is established.

3.5.6. Ethics

Most of the Widening interviewees agreed that they don't have to deal with any Ethics issues in their research. Their understanding of Ethics is limited and does not include an RRI perspective such as research integrity and the prevention of unacceptable research and research practices or the ethical acceptability of scientific and technological developments in the society.

Respondents within the EIT funding programme considered Ethics as a given within their programme line, because KICs would address pressing societal challenges. Ethics was understood in micro Ethics terms as research Ethics. Only one KIC had clear ethical rules. Understanding of Ethics, as macro Ethics or socio-ethical considerations, included good Governance, safety, sustainability and the protection of the environment and climate compliance with clinical guidelines and the integrity of research in clinical research.

In Instruments some interviewees mentioned the use of ethical standards and general ethical guidelines. Interviewees stressed the importance of identifying potential ethical risks and taking unwanted side effects of, e.g., new technologies into consideration. Some interviewees have broader perceptions of ethical aspects that they thought should be taken into account in EC projects. For instance, an interviewee stressed that project participants are responsible for being open and honest, e.g. communicating openly about issues and societal challenges.

EURATOM interviewees had only a limited awareness of ethical issues. Most of them considered Ethics as an inherent part of their work. They emphasised that an Ethics commission is involved whenever a research project needs clearance and that Ethics assessment is a requirement in EC calls. Informants considered this as sufficient to ensure that research is carried out according to ethical requirements. Some informants were also critical about Ethics. One interviewee mentioned that some researchers might have difficulties to address Ethics properly. They hire specialists to address the Ethics dimension required by the EC. This practice does not address the need for deeper integration of Ethics assessment. The Ethics section in the proposal was perceived rather as tick box

exercise than as a useful tool to maintain highest ethical standards. One interviewee stated that ethical issues are only addressed if the European Union makes them compulsory. Some interviewees believed that the "administrative burden" to address ethical issues increased in recent years. Compliance with these requirements deprives research of capacities.

3.5.7. Governance

Governance as "horizontal dimension" was poorly understood and implemented by the interviewed Widening organisations.

Instruments interviewees considered the platforms for dialogue or stakeholder platforms to be useful methods with regard to Governance of RRI issues. Interviewees also expressed an interest in or need for Governance across similar projects, e.g. using the EC coordinated support actions, expanding the EC Common Dissemination Booster (CDB) and similar tools and initiatives.

Governance as a key was hardly addressed by any of the EURATOM interviewees. One interviewee stated that "the Governance perspective was included because it was mandatory in the call". They knew from previous projects that the public will be included sooner or later, so one should work transparent and inclusive. Therefore they tried to engage all relevant stakeholders from the very beginning to make them understand the content of the project, and to win them over. The respondent called this approach "inclusive Governance".

3.5.8. Open Innovation

At the EIT, cooperation and co-creation between hundreds of partners across industry, research and education is very important. Open Innovation is a "founding concept" of the EIT and in the "DNA of EIT". It is less clear, however, how strong the user-centric approach is. This seems to vary between KICs. It is unclear whether user interests are considered, or if they are actively involved in the innovation process, and if so, how and when.

As an incentive or enabler for promoting RRI, and Open Innovation in particular, some Instruments interviewees expressed their views on "good innovation processes" as something that is essentially connected to ideas about openness/Open Innovation, Public Engagement and stakeholder involvement and addressing societal challenges. In this manner, Open Innovation as "social innovation" is closely related to the question of Public Engagement and stakeholder involvement.

Dissemination and communication strategies and activities appear to be strongly present 'responsibility components' in all three focus areas. Making information and results publicly available is a key focus in projects across all three focus areas. For instance, the projects are developing dissemination and communication plans and programmes using different dissemination and communication types and formats, e.g. information material or tools for different groups of stakeholders (including public/civic stakeholders).

3.5.9. Open to the World

Most KICs are directed at European countries, but there is a certain degree of Openness to the World, especially with initiatives in the US and BRIC countries.

Instrument interviewees mentioned with regard to openness towards the world that some projects communicate in different languages and disseminate results to wide audiences. Similarly, in another project an effort was mentioned to link similar initiatives. Several interviewees mentioned various

dissemination and communication activities (e.g. using social media which is by definition open to most of the world). Other examples mentioned were participation in international conferences, cooperation with project partners outside the EU and the creation of demo sites or city cases in several countries and parts of the world. On a higher level of Governance, the aim of aligning the project work with societal challenges across the globe and the aim of aligning Sustainable Development Goals (SDG's) with national and local goals and vice versa are mentioned. An interviewee also connected this with openness in the use of the EC's Common Dissemination Booster (CDB) by projects and participation in the CDB, which provides a platform for gathering information from projects with similar societal challenges and thus strengthens the opportunity to improve policy in a given area.

The EURATOM interviewees involved in fusion research strongly emphasised the global dimension (Open to the World). They explained openness with the small number of fusion researchers. The ITER[24] test reactor works as major unifier of a global researcher community. Economic reasons are a driving force behind openness of nuclear research to the world. Nuclear safety needs global standards and interviewees stressed the importance of information exchange.

3.6. Understandings of societal impacts and embeddedness of R&I

Again, the key findings and patterns observed in section 4.3.2 of the Diagnosis reports will be analysed in a comparative perspective.

3.7. RRI-oriented assessment of the six programme lines based on interviews

The following table provides a summary of the assessment based on interviews.

[24] ITER = International Thermonuclear Experimental Reactor

Table 13: Overview of level of institutionalisation of RRI and Open Agenda Elements from interviews

	Level of Institutionalisation Across Excellent Science Programmes
Open Access and Open Science	Strong, partly established practices
Open Innovation	Strong, but focus on experts, authorities and institutions; role of public is unclear, conflict between openness and intellectual property rights
Public Engagement (unidirectional)	Moderate
Gender (balance)	Moderate, awareness for Gender Equality and Gender balance
Public Engagement (bidirectional)	Weak, attempts to engage the public in early stages; limitations because of lack of trust and assumed knowledge asymmetries
Open to the World	Weak
Science Literacy and Science Education	Weak
Governance	Weak
Ethics (micro)	Weak, Ethics perceived as part that is already integrated ; Ethics as administrative burden and not as research burden; tick boxing
Gender (dimensions)	Very weak
Ethics (macro)	Very weak

3.8. Selected projects

The Diagnosis in the Annex provides examples of projects with connections to RRI and the three O's.

4. Conclusions

4.1. Overall Assessment

At a glance, in most of the five programme lines there is "some awareness" for RRI, its keys and the three O's. There are two outliers in this overall picture: SWAFS, which has a "high awareness" and the Widening programme with a "limited awareness".

A closer look at different keys and O's reveals the diversity in terms of the intensity of institutionalisation:

- Open Access and Open Science as well as Governance and Open Innovation are strongly institutionalised.
- Public Engagement, Gender balance and Open to the World are moderately institutionalised.
- Bidirectional Public Engagement, SLSE and Ethics (micro) are weakly institutionalised.
- Gender (dimension) and Ethics (macro) are very weakly institutionalised.
- In addition, there is variation within the programme lines, e.g. in different parts of EIT and JRC and interesting bottom up initiatives for various keys on project level.

Most comprehensive institutionalisation can be found for particular, individual RRI and Open Agenda *elements*. By contrast, there is far less evidence of institutionalisation on a *conceptual* level (i.e., with reference to overarching concepts of RRI and the Open Agenda in a way that reflects systemic, strategic intent). This disparity illustrates the remaining distance on the way to building an 'epistemic community' in European R&I capable of fulfilling the EC and Union vision of "a Research

and Innovation policy driven by the needs of society and engaging all societal actors via inclusive participatory approaches" (EC 2014, p. 3)."

4.2. Lack of knowledge

Particularly in the Widening programme, but also in other programme lines with the exception of SWAFS, the concept of RRI is little known. In Widening there is a lack of awareness even among the NCPs.

4.3. "Light" version of Gender, Public Engagement and Ethics

Several keys were often narrowly defined and used in their "light" version:

- Gender was not understood as recognising the Gender dimension in the definition of research programmes, questions and methods but rather as Gender balance in research teams and management.
- Public Engagement was not understood as deep, bilateral and inclusive interaction but rather as unilateral education and information.
- Ethics was often narrowly understood as research Ethics and integrity rather than the wider societal implications of research and innovation.

4.4. Level of congruency between meeting societal challenges and RRI

Programme lines like EIT, Instruments and EURATOM have an "inbuilt" notion of addressing various societal challenges. To put it in a nutshell, some interviewees expressed the opinion that their research and innovation activity is intrinsically responsible because they would address a societal challenge. In the case of EIT, each KIC is established to address a specific societal challenge – as defined in the Horizon 2020 framework and Europe 2020 strategy – and the perceived ability of such a contribution is an important criterion for selecting winning consortia, just as the operating KICs are expected to deliver such solutions and are evaluated on their ability to do so. It is important to mention, though, that while this is emphasised as key, so is contribution to economic growth, European competitiveness, job creation, development of marketable products and services, and the establishment of new companies. Increasing innovation capacity in Europe is indeed the primary purpose, and long term financial sustainability of the KICs is fundamental, while solving societal challenges is secondary. The KIC-model, with its co-location centres and collaboration between multiple partners from industry, research, and education, is seen as the tool to increase innovation capacity, which is perceived as a prerequisite for addressing societal challenges. A few interviewees stressed that there is an inherent conflict between some of the long-term goals of societal impact (e.g. reducing carbon emission) and short-term financial goals (e.g. developing and marketing new products), just as funding and Key Performance Indicators (KPI) focus primarily on the latter, which takes time and focus from the long term solutions and complicates this work. This example raises the important question about potential tensions between meeting societal challenges and RRI.

4.5. Lack of funding and structure

An issue raised in several programme lines was the lack of financial resources for RRI, as this is not a core task of R&I organisations.

This problem was even more severe in the Widening programme. The Widening countries experience difficulties to access Horizon 2020 funding, especially the less developed countries in

South-Eastern Europe. This makes it particularly difficult for them to prepare for the requirements of RRI. In many of the organisations analysed and in their national context the conditions for successful RRI work are not provided and in many cases RRI keys are supported from committed individuals. If researchers and their organisations do not have enough funding for scientific work, basic utilities or international travels, RRI and the three O´s are not yet a priority. When responsibility is imposed externally as evaluation criteria without understanding these stages in the development of countries and societies, RRI can be adopted only "artificially" without true commitment to the social outcome.

4.6. Open Innovation and Public Engagement: for whom?

Although many programme lines mentioned openness, Public Engagement and Open Innovation, these approaches clearly had their limits in assumed knowledge asymmetries and (dis)trust (e.g., EURATOM). But Public Engagement in other programme lines also proves to be complex and not least straightforward. In the KIC-model, for example, Open Innovation is consistently encouraged and emphasised in documents and interviews. An important part of Open Innovation is stakeholder inclusion. However, stakeholder collaboration is just one aspect of Open Innovation; another aspect, which sees end-users as the centre of the innovation process, is less clear in the EIT: Are their interests heard? Should they be actively involved? When and how? Some KICs plan to involve end-users in their work, but this is still in its early phases. Stakeholder inclusion is currently highly focused on the general principle of wide sharing of knowledge, best practices, and results in the innovation communities and on regional, national, and EU policymakers and authorities.

4.7. Open Data: open for whom?

Publishing results in reports and papers, in traditional and social media, hosting an interactive website and a stakeholder forum are some of the tools used to further openness, knowledge sharing, and stakeholder inclusion. However, the innovation-related programme lines showed a permanent conflict between sharing work openly and involving business partners concerned about protecting their intellectual property and thus their profits.

4.8. Lessons to be learned

Lessons to be learned from the various programme lines include: (1) Initiatives should be strengthened to familiarise all the actors in R&I with the concept of RRI, its keys and the three O's. (2) Existing examples of de facto RRI of implementing the keys and O's in the programme lines should be studied. (3) The SWAFS unit could lead to a way of demonstrating how the notion of RRI can be enforced on proposal and evaluation level. (4) Pilots in the Social Labs could be connected to existing initiatives in projects of each programme line.

5. Literature, links, resources

5.1. Literature

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5.2. List of Abbreviations

CCA	Cross Cutting Activities
CSO	Civil Society Organisation
EC	European Commission
EIT	European Institute of Innovation and Technology
IND	Industry 2020 in the Circular Economy
Instruments	Instruments of H2020
IoT	Internet of Things
JRC	Joint Research Centre
RRI	Responsible Research and Innovation
SSC	Smart and Sustainable Cities
Six keys	Public Engagement, Gender Equality, Science Education and Science Literacy, Open Access, Ethics and Governance
SWAFS	Science with and for Society
Three O's	Open Science, Open Innovation, Open to the World
Widening	Spreading Excellence and Widening Participation
WP	Work programme

6. Annex New HoRRIzon Diagnosis Report, Social Lab 14 WIDENING

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6.1. Executive Summary

The "Spreading Excellence and Widening Participation" (in short SEWP or Widening) programme line is part of Horizon 2020 and aims at tackling the inequalities in participation that were highlighted in the interim evaluation of FP7. Although specific measures have been carried out in the new Framework Programme, the diagnosis still recognises several gaps in access to European funding and a series of national and institutional barriers to the embedding of RRI and its specific keys.

6.2. Scope of this document

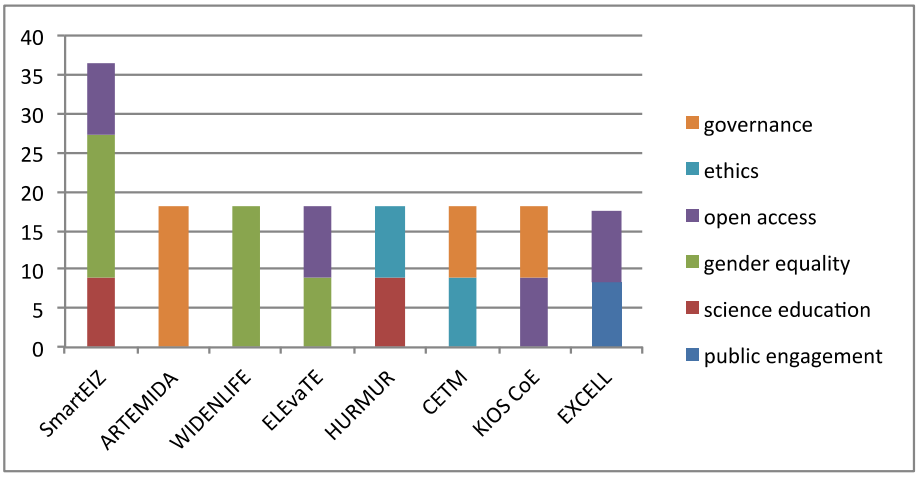
This document provides a diagnosis of Social Lab 14 regarding the implementation of RRI in the "Spreading Excellence and Widening Participation" (Widening) Programme line. The document has been developed by the Tecnalia research team using quantitative and qualitative data that has been collected by a variety of methods (see next section). The diagnosis provides an overview about the situation of RRI practices in the Widening Programme line, from different perspectives.

6.3. Methods

The methods used in the diagnosis were a combination of quantitative and qualitative methods. Several steps were taken to proceed with an accurate diagnosis of the Work Programme.

The first important step of the methodology was to identify "right" projects so that their coordinators could be involved in the interviews and Social Labs. For this reason, our research team has used the key terms of CWTS/KU Leuven's bibliometric work in order to obtain some insights into how the RRI keys are scattered in the abstracts of the projects. As the preparations for the interviews started before receiving this classification, the first finding was that the projects identified by manual keyword search in CORDIS were more RRI-relevant than the projects ranked highest by CWTS/KU Leuven. This may be explained by the fact that the manual search of RRI-relevant projects identifies mainly the subject of the project, which implicitly contains RRI issues, without mentioning so much the specific RRI keys in the abstract.

Figure 2: Ranking of the Widening Top 8 RRI projects



Thus, the first selection of projects resulted in a rich diversity of RRI-sensitive/controversial topics that, in our opinion, had a good potential for intervention by the Social Labs and covered different industries/research areas:

- **Big Data** for smart society
- Enhancing excellence and innovation capacity in **sustainable transport interchanges**
- Multidisciplinary Institute for **Ageing**
- Strengthening the Research potential of CAREESD in the field of **Electromechanical Systems and Power Electronics for Sustainable Applications**
- **Research on renewable materials and healthy environments** and innovation centre of excellence
- Industrial Cell Factories and **Sustainable Bioprocessing for Future Bioeconomy**
- Establishment of a Centre of **Plant Systems Biology and Biotechnology** for the translation of fundamental research into **sustainable bio-based technologies** in Bulgaria

It is important to note that due to the low response rate to invitations, only one of the initially identified projects was successfully included in the analysis, namely "Strengthening the Research potential of CAREESD in the field of Electromechanical Systems and Power Electronics for Sustainable Applications" from Romania, coordinated by Dr. Claudia Martis. Several times we had to select new projects and send out new invitations to find coordinators interested in participating in the interviews and Social Labs.

As already mentioned, the success rate was low and this was also due to the fact that RRI awareness in the Widening countries is poor and experts were afraid to make a "bad impression" when revealing their institutional practices during a recorded interview. Many of the experts of these low-innovation countries strive to find their place in the EU research community and saw RRI and Ethics screening as a barrier. This was the reason to separate the interview process into a formal and an informal part. The informal part, a kind of "friendly ice-breaking conversation", often took much longer and was introduced to prepare the participants for the recorded interview. In one occasion the participant even preferred to have first the informal conversation in order to decide later if to continue with the interviewing process or not. Some participants registered for the Social Lab but declined the interview. The quantitative identification of suitable projects served for inviting the eight "RRI winners", as they felt privileged and chosen. However, only one of these projects, the last

one of the ranking, was successfully involved in the interviews and in the Social Lab, namely the EXCELL project, presented by Dr. Branislava Lalić from the University of Novi Sad, Serbia.

In order to draw up the list of the Social Lab's most suitable projects, we included two more criteria independent from RRI and the diversity of research areas - geographical balance and balance between Twinning and Teaming projects. We excluded the third pillar of the Widening programme – the ERA Chairs – from selection because, although it is a programme, it is in reality funding top academics or "ERA Chairholders" who have the capacity to raise standards in their host institution. As such, the abstracts available in CORDIS have a format of a job offer rather than of a research project. For example, "*The ERA Chair position will help to better integrate the J. Heyrovsky institute of the Academy of Sciences into the European research landscape*" (J. Heyrovsky Chair, Project ID: 810310, Funded under: H2020-EU.4.c. - Establishing , ERA Chairs). Another argument for excluding the ERA Chair pillar is that the funded institutions have the same profile as those funded by Twinning and Teaming and in this case the decision would not change the final conclusions of the analysis.

Another important decision for the design of the research methodology was taken - to include a participant from Bulgaria, despite the fact that the considered organisation was an applicant and not a beneficiary of Widening. According to the Innovation Scoreboard 2017 Romania and Bulgaria are the poorest innovation performers of the EU, labelled as the only "modest innovators". During the process of project identification it became apparent that Bulgaria has a very low rate of success in the Widening programme and only few projects coordinated by a Bulgarian organisation were found in CORDIS. The coordinators of the approved projects were contacted, but did not respond to the invitation. During the two interviews with the NCP for Bulgaria, Theodora Sotirova, it was stated that the Bulgarian scientific community lacks expertise, support and resources to be able to participate in EU competitive funding. This was the reason to make an exception from the general rule and to invite the Bulgarian Academy of Science (Institute of Plant Physiology and Genetics, represented by Dr. Georgy Bonchev) for participation, which was recommended by the Bulgarian NCP as the most committed and suitable institution. At this moment the institute was waiting for the evaluation results of the presented H2020-WIDESPREAD-05-2017-Twinning proposal called "Fostering biodiversity research capacity in Bulgaria through scientific excellence in DNA barcoding and metabarcoding". The research team made an effort to successfully include participants from Romania in the interviews as well as in the Social Lab.

For the analysis of the Widening programme, ten interviews have been conducted so far, four with NCPs (from Spain, Greece, the Czech Republic and Bulgaria) and the rest with the beneficiaries of the programme. All interviews have been recorded after obtaining a signed consent form. Furthermore, four open discussions about RRI have been organised at different institutions (Madrid, Novi Sad, Sofia and Innsbruck) after Tecnalia gave presentations about RRI and its current challenges. The event in Innsbruck involved 17 Widening NCPs from 17 different countries, lasted a whole day and included different interactive techniques for reflection. It provided the research team with very rich data about the situation regarding RRI in the different regions/research areas/types of entities. More information about the currently conducted social Labs can be found in Section 4.4.

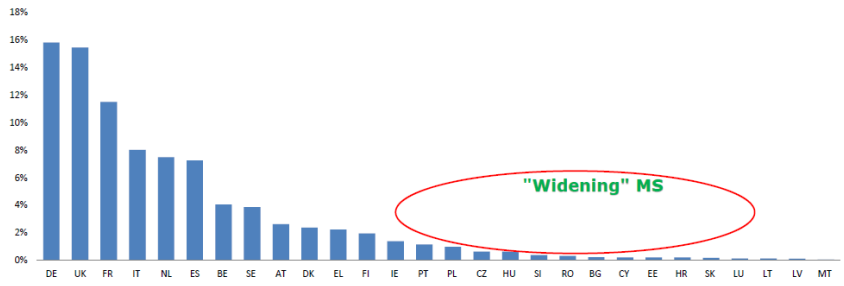
A desktop research has been conducted and all relevant documents have been screened for the purpose of this analysis. All official relevant documents are easily accessible at Widening section of

the H2020 website: http://ec.europa.eu/programmes/horizon2020/en/h2020-section/spreading-excellence-and-widening-participation.

6.3.1. General scope of the programme

When defining the Framework Programme running from 2014 until 2020, the EU was determined to deal with the significant gaps among European regions in terms of research and innovation performance. In 2012 the ratio of R&D intensity (R&D investment as a percentage of their GDP) was 2.01% for the entire EU-28.[25] It was estimated that out of the EU's 266 regions, only 10.5% had an R&D intensity above 3%, which remained a target within the Europe 2020 strategy. Furthermore, the interim evaluation of FP7 (November 2010) identified that some Member States, mainly those that joined the EU after 2004, had low participation rates in FP7 projects.

Figure 3: FP7 Budget share per country %



Source: EC, RTD-B5, 2016

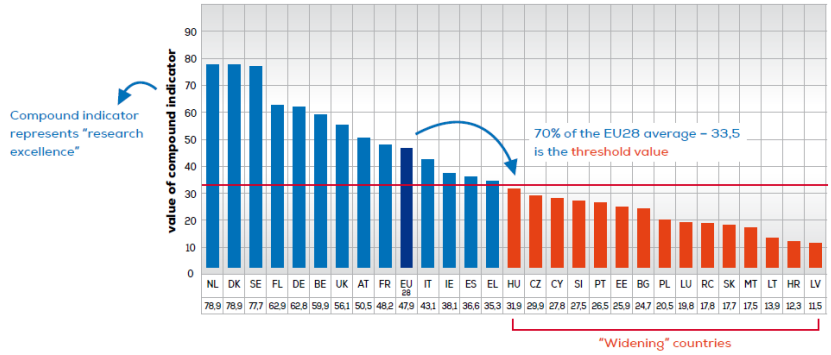
Despite serious efforts by the European Union and the Member States, there were still significant gaps among European regions due to different levels of economic development and deep structural differences linked to many diverse factors (geography, specific localisation issues, socio-economic and cultural aspects, etc.). A composite indicator was developed to measure the research excellence in Europe, meaning the effects of the European and national policies on the modernisation of research institutions, the vitality of the research environment and the quality of research outputs in both basic and applied research. The indicator consisted of four variables:

- Highly cited publications of a country as a share of the top 10% most cited publications normalised by GDP
- Number of world class universities and public research institutes in a country normalised by population in the world top 250 universities and research institutes
- Patent applications per million population
- Total value of ERC grants received divided by public R&D performed by the higher education and government sectors

The threshold for defining the "Widening countries" is below 70% of the EU average.

[25] NCP_WIDE.NET (2013). How to participate in the Spreading Excellence and Widening Participation activities

Figure 4: Performance in the compound indicator "research excellence"



Source: NCP Wide NET, 2013

The "Spreading Excellence and Widening Participation" programme was introduced as part of Horizon 2020 to address a number of causes such as weak expertise in preparing successful proposals, lack of professional contacts and research networks, low focus on R&D in policy and in business, limited options for exploitation of research results at the national level[26], etc.

This programme has the aim to ensure that the benefits of an innovation-led economy are both maximised and widely distributed across the European Union. Synergies with European Structural and Investment funds are an important component. The programme seeks to maximise investments in research and innovation and to enable the European Union to function in a more streamlined and homogeneous way.

Figure 5: Reasons for the creation of SEWP

Source: European Commission, DG RTD, 2017

[26] EC, DG RTD (2017). The Programme Spreading Excellence and Widening Participation (SEWP) under Horizon 2020, 2017

6.3.2. What is the Widening programme about?

The Widening programme aims at closing the gap between European countries and regions in order to safeguard the quality and sustainability of science on the whole territory of the EU. It is considered as a precondition for regional growth and prosperity, and for eradicating the economic divide across Europe which has led to elevated social tensions in the past years[27].

The gap between EU Member States in terms of research and innovation performance is reflected in the success and participation rates of the Framework Programme. The most recent data on the first Horizon 2020 calls for proposals indicate that in terms of budget share, EU-15 countries ("old Member States") received 90% of the EU financial contribution while EU-13 countries ("new Member States") received 4%. This is similar to the situation in FP7[28].

This is a key to ensuring that (1) citizens have access to high-quality, research-led education, (2) excellent researchers from all over Europe can succeed in applying for European Union (EU) funds, and (3) Europe achieves its full potential by harnessing the talent and knowledge of its citizens[27].

There is no limitation of the scientific scope in the calls for proposals and the coverage of the areas in the funded projects is broad:

Table 14: Coverage of scientific areas

Scientific area	#	% of all short listed proposals
Physics & Chemistry	9	29,03%
Industrial Technologies, Transport, Space & Security	1	3,23%
Social Science, Economics and institutional development	4	12,90%
Agriculture & Food,	3	9,68%
Environment & Earth, Energy	1	3,23%
Medicine, Life Sciences	8	25,81%
ICT	5	16,13%
Grand Total	**31**	**100,00%**

Source: EC DG Research and Innovation, 2015

The specific measures are targeting at low-performing Member States in terms of research and innovation. Member States currently eligible for Widening support are: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. Associated Countries currently eligible for Widening support are (subject to valid association agreements of Third Countries within Horizon 2020): Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, Former Yugoslav Republic of Macedonia, Georgia, Moldova, Montenegro, Serbia, Tunisia, Turkey and Ukraine.

[27] The Guild, Mind the Gap (2018): Supporting Excellence across. Europe in the 9th Framework Programme, https://era.gv.at/object/document/3605/attach/The_Guild_Wid_Part_Paper_07032018.pdf

[28] EC (2017) Scoping paper for the Horizon 2020 work programme 2018-2020, Spreading Excellence and Widening Participation

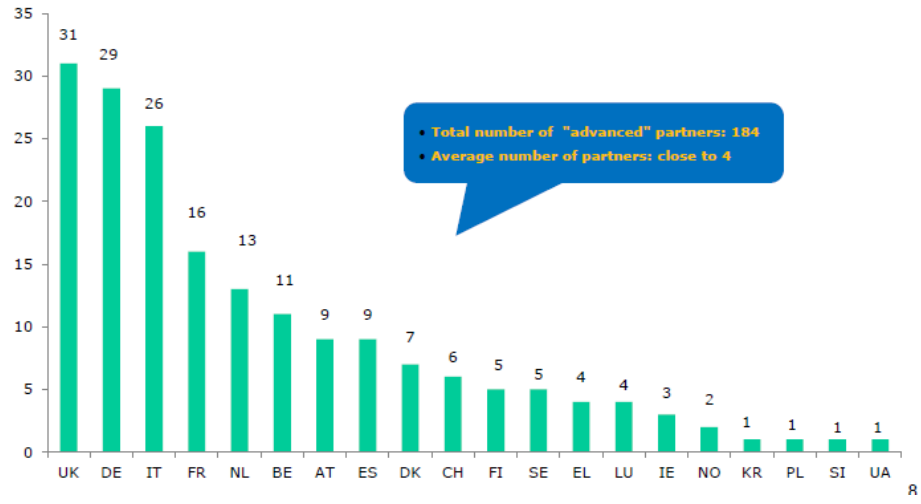
There are significant differences in the quality and sustainability of science between these countries and not surprisingly, according to the last statistics of Twinning (2015), Portugal is the most successful country.

Figure 6: Twinning: Successful Proposals by country of coordinator

Source: EC, DG RTD, 2015

On the side of the "advanced partner countries" highest ranks have UK, DE and Italy. At a proposal stage frequent advanced partners are Germany (136 participations) followed by the UK (67), and then Italy (35) and Spain (29)[29].

Figure 7: Twinning Successful Proposals 2015: "advanced" partners by country



Source: EC, DG RTD, 2015

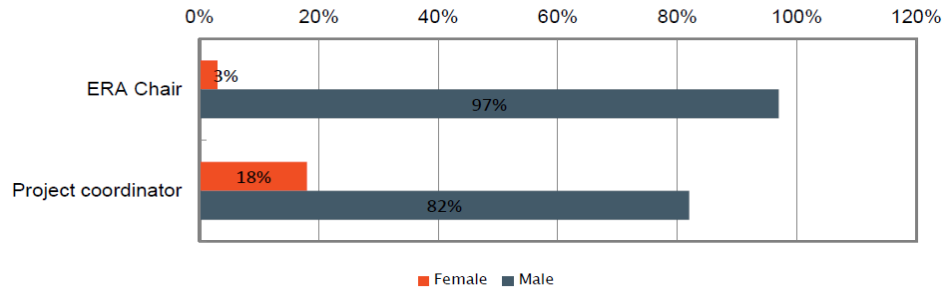
Widening consists of three main or "core" actions, i.e. **Teaming**, **Twinning** and **European Research Areas (ERA) Chairs**, for which specific eligibility conditions apply.

[29] EC DG Research and Innovation (2015), Feedback on the first Widening Calls, Brussels, CPU Clora, 18/3/15, http://www.cpu.fr/wp-content/uploads/2015/03/D.-Corpakis-Feedback-on-widening-projects-18032015.pdf

- **Teaming means institution building**. Teaming projects create new or update existing centres of excellence in Widening countries through a coupling process with a leading scientific institution. The programme has two phases:
    - Phase 1, funding is provided to develop a business plan for the future centre in line with the host region's smart specialisation strategy.
    - Phase 2, selected Phase 1 proposals receive financial support to start implementing the future centre.
- **Twinning stands for institutional networking**. A twinning project strengthens a specific field of research in an emerging institution in a Widening country. It links the institution with at least two internationally leading counterparts in Europe. Activities like short-term staff exchanges, expert visits, on-site or virtual trainings, workshops, conference attendances, dissemination and outreach activities are supported. Although RRI is not explicitly embedded in the programme, a recent survey showed that the projects under the Twinning actions are perceived as beneficial by the interviewees as the standards of science were raised. 88% of the survey's respondents expect that the results of the Twinning projects will have an impact on the coordinating institutions. Even more important, 81% of the respondents expect that the achieved results will have a significant impact on society[30]. In the interviews, stakeholders confirmed that the development of the research fields and the new knowledge generated is expected to benefit both local populations and EU citizens. Some of the Twinning projects have established partnerships with local institutions or ministries who approach them for advice or invite them to collaborate on other projects[30].
- **ERA Chairs stand for bringing excellence to institutions.** ERA Chair projects bring outstanding academics with proven research excellence and management skills to universities and research institutions in Widening countries with potential for research excellence. They aim to attract and maintain high quality human resources under the leadership of an outstanding researcher (the ERA Chairholder), while at the same time implementing the structural changes necessary to achieve sustainable excellence.

Despite the predominant opinion of the interviewed experts/participants of the Social Labs that Gender is not a problematic issue within the Widening programme, there is a big Gender gap among the holders of ERA Chairs and project coordinators.

Figure 8: Gender Equality in ERA Chairs



[30] COWI (2017): Interim Evaluation on Twinning and ERA Chairs, July http://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/interim_evaluation_of_twinning_and_era_chairs_2007_3.pdf

Source: COWI Twinning and ERA Chairs survey, 2016

The three actions have a targeted approach towards Widening Member States and Associated Countries.

Other widening actions

- The **Policy Support Facility (PSF)** offers expert advice to public authorities. It helps to improve the design, implementation and evaluation of national or regional research and innovation policies. The PSF was launched in March 2015.
- The **European Cooperation in Science and Technology (COST)** provides cross-border scientific networking. COST helps excellent researchers and innovators to get access to European and international networks.
- The Widening Network of **National Contact Points (NCPs)** is a transnational network of NCPs for Spreading Excellence and Widening Participation under Horizon 2020. It aims to share good practices among NCPs and provide better support to potential programme applicants.
- The **Joint Programming Initiative (JPI) Urban Europe** stimulates research which supports research in urban innovation and technologies. It supports European cities in their transition towards a sustainable, resilient and liveable future.

6.3.3. Size and structure of Widening in terms of budget, applications and projects

From 2014 to 2020 the total budget of the work programme will be around EUR 886 million. Since 2014 123 projects have been funded. The estimated budget allocated for the work programme (2018-2020) is around EUR 474.56 million. The budget is shared as follows:

Table 15: Estimated budget 2018-2020

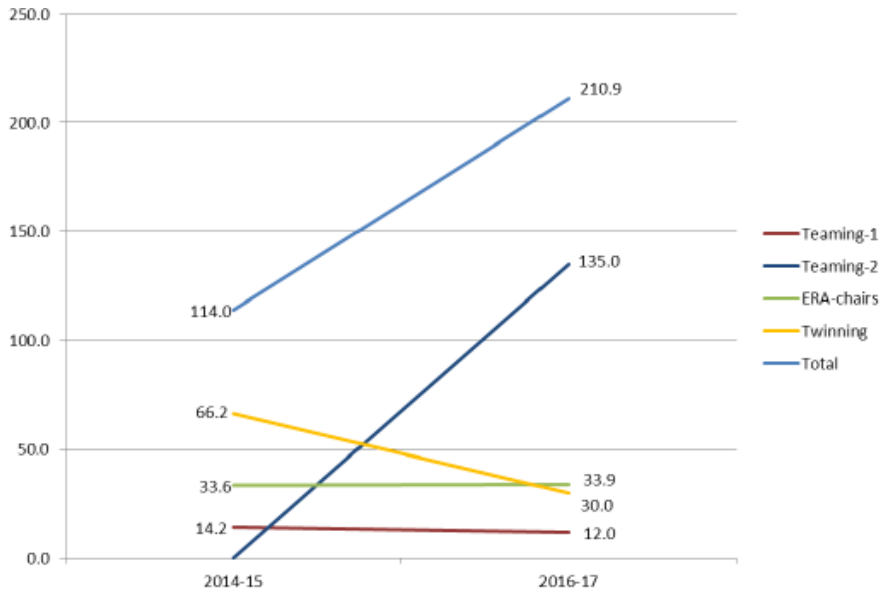
	Budget 2018 (EUR million)	Budget 2019 (EUR million)	Budget 2020 (EUR million)
Calls			
H2020 WIDESPREAD	134.5	141.00	
H2020-WF-2018-2020 (WIDENING FELLOWSHIPS)	5.00	6.00	
H2020-WIDESPREAD-2018-2020-continued			119.00
H2020-WF-2018-2020-continued (WIDENING FELLOWSHIPS)			7.00
Other Actions			
Expert Contract	0.07	0.20	0.20
Specific Grant Agreement	20.28	20.28	20.28
Grant to Identified beneficiary	0.25	0.25	0.25
Estimated total budget	**160.10**	**167.73**	**146.73**

Source: EC, Horizon 2020 Work Programme 2018-2020[31]

The budget allocated for the work programme (2016-2017) is around EUR 262.43 million, it is significantly higher than the allocated budget for 2014/2015.

[31] EC, Horizon 2020 Work Programme 2018-2020, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-sewp_en.pdf

Figure 9: SEWP Budget 2014/15 – 2016/17



Source: REA, Widening calls (2014-2016), Lessons learnt, 2016

The budget for 2016-2017 is divided as follows:

Table 16: Estimated budget 2016-2017

	Budget 2016 (EUR million)	Budget 2017 (EUR million)
Calls		
H2020-WIDESPREAD-2016-2017	90.78	121.38
Other Actions		
Expert Contract	0.02	0.40
Public Procurement	0.03	2.00
Specific Grant Agreement	20.28	26.95
Grant to Identified beneficiary	0.35	0.25
Estimated total budget	**111.45**	**150.98**

Source: EC, Horizon 2020 Work Programme 2016-2017[32]

In relation to this call it is necessary to highlight the following figures:

- For the topic H2020-WIDESPREAD-03-2017: ERA Chairs, a total of 103 proposals were submitted.
- For the topic H2020-WIDESPREAD-05-2017: Twinning, a total of 483 proposals were submitted.
- For the topic H2020-WIDESPREAD-04-2017: Teaming Phase 1, a total of 208 proposals were submitted in response to this call.

[32] EC, Work Programme 2016 – 2017, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-sewp_en.pdf

The budget allocated for the work programme (2014-2015) is around EUR 165.68 million. The budget is divided as follows:

Table 17: Estimated budget 2014-2015

	Budget 2014 (EUR million)	Budget 2015 (EUR million)
Calls		
Call H2020-WIDESPREAD-2014 (WIDESPREAD 1-2014: Teaming)	11.85	
Call H2020-WIDESPREAD-2014 (WIDESPREAD 2-2014: ERA Chairs)	33.60	
Call H2020-WIDESPREAD-2014 (WIDESPREAD 3-2014: Transnational Network of National Contact Points (NCP))	2.00	
Call H2020-TWINN-2015 (TWINN-2015: Twinning)		66,24
Other Actions		
Experts (expert evaluators. expert groups. monitoring)	0.85	1,50
Grant to identified beneficiary – COST	20.59	28,02
Grant to identified beneficiary – Greek EU Presidency Conference	0.25	-
Expert contracts - Policy Support Facility (Innovation missions)		0,50
Grant to identified beneficiary – Latvian EU Presidency Conference		0,25
Studies		0,03
Estimated total budget	**69.14**	**96,54**

Source: EC, WORK PROGRAMME 2014 – 2015[33]

In relation to this call it is necessary to highlight the following figure: For the call H2020-WIDESPREAD-2014, a total of 169 proposals were submitted.

6.4. Current situation of RRI in the programme

6.4.1. RRI in brief

Our research revealed that RRI is not mentioned in the Work programme 2014-2015. In the Work Programmes 2016-2017 and 2018-2020, the RRI concept is generically embedded through the following statement:

"*The Work programme is in line with the Horizon 2020 Responsible Research and Innovation (RRI) cross-cutting issue, engaging society, integrating the Gender and ethical dimensions, ensuring the access to research outcomes and encouraging formal and informal Science Education*."

The Widening programme supports only coordination and support actions (CSA) and no research is funded, which significantly limits the relevance of RRI in this programme.

[33] EC, Work Programme 2014-2015, https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-sewp_en.pdf

6.4.2. Desktop findings

Desktop research shows that the role of RRI is limited at work programme and project level. The three O´s - Open Innovation, Open Science and Open to the World - have less relevance in the Widening programme than in most other programme lines targeting all EU countries. RRI was first mentioned in the Widening Work Programme 2016-2017; the following text remains unchanged in Work Programme 2018-2020:

The Work programme is in line with the Horizon 2020 Responsible Research and Innovation (RRI) cross-cutting issue, engaging society, integrating the Gender and ethical dimensions, ensuring the access to research outcomes and encouraging formal and informal Science Education.

Responsible Research and Innovation (RRI) is the on-going process of aligning research and innovation to the values, needs and expectations of society which allows to identify and to deliver new solutions to the societal challenges. In this process it is not only matter to engage the traditional stakeholders and partners but to engage wider the civil society and citizens to participate to definition and implementation of research and innovation policy agenda and activities. Therefore RRI policy approach is to be taken into account as well at local and regional levels, when relevant, in the processes on how to improve and optimise to the outcomes of the research and innovation activities presented in the submitted proposals[31].

6.4.2.1. Role of RRI

Policy document level

If the policy level is understood as the generic definition of SEWP, then RRI is in no way defined in any of the identified relevant documents. In other words, there is no awareness of RRI in reviewed policy documents. If the level of policy documents refers to a more generic policy definition, a number of relevant documents with a high level of awareness can be found. Most importantly, RRI is a 'cross-cutting issue' in Horizon 2020, promoted through the Horizon 2020 objectives.

Yes: High awareness	Keys**: Public Engagement, Gender quality, Open Access, Ethics, Governance** O's**: Open Innovation, Open Science and Open to the World** Implicit**: Not relevant**
Explanation	• Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields: Ethical frameworks for new and emerging fields of science and technology must increasingly address privacy and data protection issues. This topic emerges as a theme across various new technologies, such as information technology, security technology, biometrics, biomedical technology and the prospective applications of particular nanotechnologies. At the same time, it is a relevant policy issue for various sectors, such as health, justice and homeland security. • Options for Strengthening Responsible Research and Innovation: Research and Innovation is a key pillar in the strategy of the European Union to create sustainable, inclusive growth and prosperity and address the societal challenges of Europe and the world. The need to gear the innovation process to societal needs is reflected in many high-level policies, strategy and programming documents, such as the Europe 2020 strategy (2010) and the Horizon 2020 framework programme proposal (2011). Furthermore, for example the Lund Declaration (2009) underlines the importance of

	addressing societal needs and ethical questions in research and development, as well as the Council conclusions on the Social Dimension of the European Research Area (2010).

Scoping level

Yes: Some awareness	Keys**: Gender Equality** O's**: Open Innovation, Open Science and Open to the World** Implicit**: No**
Explanation	• The Scoping Paper for SEWP 2018-2020 Spreading Excellence and Widening Participation mentions the objective of *"maximizing the potential of human resources by addressing issues related to Gender and age".* • In addition, the principle of inclusiveness is implicitly referred to: *"The aim is to fully exploit the potential of Europe's talent pool and ensure that the benefits of an innovation-led economy are both maximised and widely distributed across the Union in accordance with the principle of excellence".* • There is a brief but explicit mention of "Open innovation", "Open science" and "Open to the world". • The document does not refer to "society", "social" or "responsible.

Work programme level

Yes: Some awareness	Keys**: No specific mentioning** O's**: No** Implicit**: Yes**
Explanation	• The work programmes 2016-2017 and 2018-2020 stated that the work programme was in line with the cross-cutting issue of Horizon 2020 Responsible Research and Innovation (RRI), engaging society, integrating the Gender and ethical dimensions, ensuring access to research outcomes and encouraging formal and informal Science Education. • No mention of the three O´s. • Open research data is mentioned under Article 29.3 of the Horizon 2020 Model Grant Agreement. • The word "society" is not mentioned in the work programmes 2014-2015 and 2016-2017. • No mention of "*societal challenges*" in the work programme 2014-2015.

Call level

Yes: Some awareness	Keys**: No specific mentioning** O's**: Open Innovation, Open Science and Open to the World** Implicit**: Yes**
Explanation	The calls are generic and do not pose specific challenges. No specific mention of RRI: • WIDESPREAD-01-2018-2019: Teaming Phase 2 description contains "*ability to address societal challenges in the future".* • WIDESPREAD-02-2018 contains *„In tackling societal challenges".* • WF-01-2018: Widening Fellowships contain *„solve current and future societal challenges"*. • WIDESPREAD-01-2016-2017/Teaming Phase and WIDESPREAD-04-2017: Teaming Phase 1 Topic descriptions contain "*ability to address societal* challenges in the future". • WF-01-2018: The topic of the Widening Fellowships requires in the impact *"Society and Enterprise panel"*.

Project level

Yes: Some awareness	Keys**: Public Engagement, Science Education, Gender Equality, Open Access, Ethics, Governance** O's**: No** Implicit**: Yes**
Explanation	• *Public Engagement* appears frequently as a key word in the abstracts of the funded Widening projects. • *Ethics* appears frequently as a key word in the abstracts of the funded Widening projects. • *Science Education* appears frequently as a key word in the abstracts of the funded Widening projects. • *Open Access* appears as a key word in some of the abstracts of the funded Widening projects. • *RRI* appears in the abstracts of two funded Widening projects. • *Gender* appears in none of the abstracts of the funded Widening projects. • Implicit mentions occur most frequently when it comes to related words such as "sustainable" and "responsible".

Proposal Template level

No awareness	
	Keys: No **O's**: No **Implicit**: No
Explanation	No references

Evaluation level

No awareness	
	Keys: Gender **O's**: No **Implicit**: Difficult to assess
Explanation	The Polish NCP Katarzyna Walczyk-Matuszyk stated during the NCP Social Lab in Innsbruck on July 3rd that the Gender evaluation criteria for the Widening Programme will be changed at the end of 2018. No further evidence of this statement was found.

6.4.2.2. General use of RRI

Widening countries focus primarily on how to eliminate participation and performance barriers. The concept of RRI is still a remote objective for them, and this is perceivable from all reviewed documents and primary data obtained during interviews and pilot management. The RRI descriptions in the documents are brief and generic, and some implicit references of minor importance such as "societal challenges" can be found at topic level. The three O´s are not embedded in the Widening programme, but are briefly brought up in the in the Scoping Paper for SEWP 2018-2020 Spreading Excellence and Widening Participation.

6.4.2.3. Theoretical framework of RRI applied in the programme line

There is no sophisticated theoretical model of RRI applied in the Widening programme line and the explicit and implicit mention of RRI is mainly intended to achieve a greater consistency with the other H2020 work programmes.

6.4.2.4. Overall assessment of RRI in the programme line

There is some too limited awareness of RRI in the programme line, as RRI is implicitly and explicitly present as a concept in some documents. Direct references of RRI keys and O's are of a limited number and importance. The Widening programme does not fund Research and Innovation Action (RIAs) and thus limits the need of RRI in this programme to a significant level.

Category	Value	Description
C	Limited awareness	• Responsibility or ethical awareness is referred to in every document. • Each RRI key is mentioned. • The need for social embedding of this research is pointed out.

6.4.3. Interview findings

6.4.3.1. Shared understanding of RRI

RRI as a label took off in Europe with René von Schomberg's publication on RRI in ICT in 2011[34]. It is still a novel framework for researchers from "advanced countries" and it is a completely new

[34] Von Schomberg R. (2011), Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields, Luxembourg: Publications Office of the European Union http://ec.europa.eu/research/science-society/document_library/pdf_06/mep-rapport-2011_en.pdf

concept for many of the researchers of the Widening countries. One of the reasons is that RRI deals with responsibility associated with R&D and many of the Widening countries lack appropriate R&D investments, infrastructure and vibrant ecosystems. Most RRI projects mainly include "advanced partners", thus there are a lot of information barriers and insufficient communication, advice and training on RRI in the Widening countries. In order for organisations (universities, research institutes, etc.) to have ownership of the concept of RRI, they have to be able to relate it to their own mandates, cultures and worldviews. Conditions for successful RRI work and shared understanding of RRI are however not provided in most of the analysed organisations. In some parts of the Widening area we find poor countries, with weak R&D and a collapsing social structure, while in other parts there are relatively well-functioning and economically stable democracies with vibrant R&D institutions, empowered societies and universities. It is difficult to draw generic conclusions, and despite the poor embedding of RRI in the Widening programme, we can highlight some RRI-related practices and a common understanding of the RRI values from the interviews such as:

- **Public Engagement**: The interviewed researcher states that his activities are aimed at fostering the collaboration of all societal actors during the research and innovation process: *"We are doing (science) in a way to benefit society, we are doing this to have methodologies or products that are able to save lives or to improve the quality of lives.*" (Ricardo Pires, Portugal)

- **Science Education**: Many of the researchers are aware of the need to better equip citizens with the necessary knowledge and skills and to motivate students towards scientific careers. "*The activities that we are managing and addressing for the society are outreaching. We are trying to spread the work for that we are doing here and specially for different communities, let's say we have around one hundred outreaching activities each year, we have visitors from schools and different players (politicians) to explain them what we are doing here, to explain them the type of research that we are developing.*" (Ricardo Pires, Portugal)

  "*The institute organises information evenings to address important food topics and hot issues. It furthermore aims to discuss information published on internet sites that shouldn't be trusted like blogs for example. The institute organises events to help consumers make better choices and have more critical thinking. It also organises science fairs and workshops to help children and parents recognise a better understanding of food and food science. It also participates in TV shows.*" (Milica Pojić, Serbia)
- **Open Access**: "*The project participates in the Open Research Data Pilot and according to the Grand Agreement all papers and articles are uploaded to the platform. The rest of the materials that are not uploaded to the OpenAIR are uploaded to the website."* (Claudia Martins, Romania)

- **Gender:** In general all interviewed participants agree that Gender is not considered a problem in their projects and institutions. Few of them are aware of the Gender dimension in research. "*It is even desirable to have more male colleagues in the institute because it is*

mainly a female team. Food technology is a female science field in general." (Milica Pojić, Serbia)

- **Ethics:** Most participants agree that they do not have to deal with ethical issues in their research. Their understanding of the concept of Ethics is limited and does not include the RRI perspective such as research integrity and the prevention of unacceptable research and research practices, the ethical acceptability of scientific and technological developments in society, etc.: *"We have a lot of ethical issues (...) we are also using primary cells which are from human tissues. We have agreements with hospitals with the clinics and we have our protocols that they are of course scrutinised by ethical committees and so on. There are a lot of procedures for patients. " (Ricardo Pires, Portugal)*

- **Governance:** This "horizontal dimension" is poorly understood and implemented by the interviewed organisations: *"The University doesn't have RRI or Ethics Governance structures, or committees related to societal challenges."* (Claudia Martins, Romania)

6.4.3.2. Assessment of RRI based on interviews

The vast majority of participants in the interviews and in the discussions show a limited awareness (Level C) of the RRI concept. Some participants are more familiar with specific keys or dimensions of RRI like Public Engagement and Science Education. During the event with NCPs, only one of the NCPs had previous knowledge about RRI.

6.4.4. Case briefs

So far we have successfully implemented the following pilot activities:

- May 30th, Madrid, Seminar on RRI at IMDEA Networks, 25 participants. Target group: IMDEA Networks stakeholders.
- May 31st, Prague, training on RRI in Twinning proposal preparation, organised by our social Lab participant Anna Vosečková, NCP Widening Czech Republic.
- July 3rd, Innsbruck, Austria, NCP_WIDE.NET Workshops on Responsible Research and Innovation, entire day, 17 participants. Target group: NCPs of the Spreading Excellence and Widening Participation Programme.
- June 25th, Novi Sad, Serbia. Meeting with the RRI Unit at the University of Novi Sad, Serbia, created as a result of the Social Lab in Madrid.
- June 26th, Novi Sad, Serbia. Presentation on "Responsible Research and Innovation (RRI) concept and application" during the Symposium on Advances on Meteorological application to Agriculture, "H2020 Twinning - Serbia for Excell final workshop".
- July 10th, Sofia, Bulgaria, 18 Participants. Seminar on RRI at the Institute of Plant Physiology and Genetics (IPPG) of the Bulgarian Academy of Sciences (BAS).

6.5. Conclusions

In most Widening countries the visibility of RRI is limited. The concept of RRI is poorly understood and adopted in the "Spreading Excellence and Widening Participation" programme. There is a lack of awareness even among the NCPs.

The Widening countries experience difficulties to access Horizon 2020 funding, especially the less developed countries in South-Eastern Europe. This makes it particularly difficult for them to prepare

for the requirements of RRI. In many of the organisations analysed and in their national context conditions for successful RRI work are not provided and in many cases RRI keys are supported from committed individuals.

There is a big disparity among the analysed institutions/countries, and in some parts of the Widening area we are dealing with poor countries with weak R&D and scientific structures, while in others there are relatively well functioning and economically stable democracies with vibrant R&D institutions, empowered universities and societies. In the context of the Widening programme, there is an enormous difference in the economic development and innovation performance of the beneficiaries that has to be considered in this analysis. In the framework of the NewHoRRIzon Social Labs, we are dealing with organisations like IMDEA Networks (Spain), which is a top international research centre, and at the same time the Institute of Plant Physiology and Genetics (IPPG) of the Bulgarian Academy of Sciences (BAS), which is struggling to survive and integrate in the EU scientific community.

As a result of the analysis, some of the obstacles for embedding RRI in the Widening countries can be summarised as follows:

- **No specific national actions or instruments developed** for tackling social issues
- **Low capacity** of universities and research organisations for engaging with civil society
- **Weak accountability mechanisms** in R&D
- Lack of culture of **responsiveness to the needs of society**
- Insufficient use of **deliberative approaches** in science and Governance
- **Insufficient R&D investment**
- **Information barriers and lack of synergies with RRI projects in "advanced countries"**

The state of the art of RRI in the most Widening countries can be illustrated and explained by Maslow's hierarchy of needs and the posterior research of many other authors that linked these needs to countries and organisations. The first four levels are often referred to as deficiency needs (D-needs), and the top level is known as growth or being needs (B-needs). Carroll[35] considers that in organisational terms economic, legal and ethical needs have to be met in order to reach the level of "Philanthropic responsibilities", where concepts such as Corporate Social Responsibility and Responsible Research and Innovation can be placed. This explains why the requirement of RRI is inadequate for some low-performing countries as Bulgaria and Serbia when it comes to scientific organisations struggling for economic survival. The logical point here is that sensitivity to RRI, responsibility in general and concern for the well-being of society increase with the level of development. When researchers and their organisations do not have enough funding for scientific work, basic utilities or international travels, RRI and the three O´s are not a priority yet. If responsibility is imposed externally as evaluation criteria, without understanding these stages in the development of countries and societies, RRI can only be adopted "artificially", without true commitment to the social outcome.

[35] Carroll, A. B. (1991). The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organizational Stakeholders. Business Horizons, 34, p. 39-48.

6.6. Appendix

6.6.1. List of interviewees

Interview 1	March, 8, 2018	Beneficiary
Interview 2	March, 8, 2018	NCP
Interview 3	March 02, 2018	NCP
Interview 4	February 26, 2018	Beneficiary
Interview 5	July 18, 2018	NCP
Interview 6	March 2, 2018	NCP
Interview 7	January 25, 2018	Beneficiary
Interview 8	January 26, 2018	Beneficiary
Interview 9	March 6, 2018	Beneficiary
Interview 10	June 19, 2018	Beneficiary

6.6.2. List of references

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EC, Horizon Work Programme 2014 – 2015 https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-sewp_en.pdf

EC, Horizon Work Programme 2016 – 2017 http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-sewp_en.pdf

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Von Schomberg R. (2011), Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields, Luxembourg: Publications Office of the European Union http://ec.europa.eu/research/science-society/document_library/pdf_06/mep-rapport-2011_en.pdf

7. Annex New HoRRIzon Diagnosis Report, Social Lab 16 EIT

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7.1. Executive Summary

The European Institute of Innovation and Technology (EIT) was established in 2008 as an independent funding body with a budget of 308.7 million euros from 2008-2013. In 2013 EIT was consolidated as an EU entity under the principles and legal framework of Horizon 2020 and received an increased budget of 2.7 billion euros towards 2020 (European Institute of Innovation and Technology, 2013; European Commission, 2013). The primary aim of EIT is to increase the innovation capacity of Europe by educating a new generation of entrepreneurs and by developing new products and services leading to strengthened competitiveness, economic growth, and job creation (Reillon, 2016). The EIT funds Knowledge and Innovation Communities (KICs); networks with collaborations between private companies, universities, and research organisations.

In order to comprehend how RRI (keys, O's, and beyond) is understood, prioritised, and sought advanced in the EIT, we have conducted a document analysis at the policy-, scoping-, work programme-, call-, project-, proposal template-, and evaluation level of the EIT as well as executed 14 interviews with EIT and KIC staff, governing board members, and partners. This report presents the results of this analysis.

Contributing to solving societal challenges, sharing knowledge and disseminating results, and including stakeholders in an Open Innovation process are the dominant RRI-related principles permeating the European Institute of Innovation and Technology. However, the six keys of RRI are not traceable as a vision or strategic priority throughout the EIT, though; some keys appear sporadically in documents and in the activities of the KICs like requiring applicants to consider Gender aspects of proposed projects or Science Education activities for primary school pupils. Even though Open Innovation; with collaboration between innovators, researchers and educators, is given by design in the KIC-model, the user-centric approach in the innovation process is generally not highly prioritised.

7.2. Scope of this document

This report is not an official Deliverable. It is for internal use for me and the Consortium. It should provide us with the necessary information for diagnosis in order to run the Social Lab and should provide a sort of baseline for evaluation. It should provide the members of Consortium with research input and data, which is collected in a systematic way and therefore comparable.

7.3. Methods

This diagnosis consisted of three steps; getting an overview of the programme line, locating and analysing relevant documents, and identifying and interviewing key actors and analysing their statements.

The European Institute of Innovation and Technology (EIT) is an independent EU body and is thus structured differently than other funding lines under Horizon 2020. EIT makes large general calls for Knowledge and Innovation Communities (KICs), which are partnerships between companies, research organisations, and universities in co-location centres across Europe. The (currently) six operating KICs are quite autonomous and they make calls for more specific projects between their partners. These projects are not registered in CORDIS, like other EU-funded research, and there is no existing overview of all KIC-activities. We have therefore chosen to assess Responsible Research and Innovation at the EIT-level, partly because this is more feasible, partly because it is interesting – in an organisational view – to see whether EIT encourages RRI and whether it "trickles down" through the system into the KICs, when interviewing KIC staff and partners, or whether it is in fact approached bottom-up.

We have primarily located the relevant documents on the EIT website (eit.europa.eu), retrieved in October and November of 2017. It is important to note that the number of calls, proposal templates etc. is rather limited. The table below depict the available documents (marked by an X). We will treat these levels of analysis separately, but please keep this limited scope in mind when reading the report.

Table 18: Overview of available documents for analysis

	2010 call Climate-KIC, EIT Digital, and InnoEnergy	**2014 call EIT Health and EIT RawMaterials**	**2016 call EIT Food and EIT Manufacturing**	**2018 call EIT Urban Mobility and EIT Manufacturing**
Call text		X	X	X (Preliminary introduction)
Proposal template			X	
Evaluation criteria			X	X
Evaluation form			X	
Winning proposal				

We requested access to the winning proposals but EIT Legal informed us that in order to protect commercial interests and intellectual property of the winning consortia, no such access could be granted. They instead referred to online available fact sheets and press releases regarding the winning teams of the 2014 and 2016 calls, which we used instead.

When reading the documents in question, we copied text excerpts related to RRI into a display to get an overview of the presence of RRI related ideas in documents at all levels. This related both to the six keys of RRI, three O's, or a broader understanding of RRI as "*aligning research and innovation to the values, needs, and expectations of society*" (Italian Presidency of the Council of the European Union, 2014) such as a focus on solving societal challenges, social impact, or values like transparency, diversity, or inclusion. We thus applied a broad understanding of RRI in the analysis. These displays were then further analysed, categorised, and condensed.

We conducted 14 interviews with key actors in the EIT; board members and staff at both the EIT headquarter (HQ) and KIC-level, KIC-partners from industry, universities, and research foundations and one external expert. We located the interviewees using the EIT main website and the website of the KICs. If some of the people we approached were unavailable for an interview, we asked them to refer us to a colleague who might be interested in participating. EIT Digital is the only KIC from which we did not manage to recruit an interviewee and is thus, unfortunately, not represented in the interview study. We recorded all interviews, summarised or transcribed them before using NVivo to code recurring understandings of RRI (keys, O's, and beyond), tools used to further these principles, and perceived difficulties of this work.

7.3.1. General scope of the programme

The European Institute of Innovation and Technology (EIT) was established in 2008 as an independent funding body with a budget of 308.7 million euros from 2008-2013. In 2013 EIT was consolidated as an EU entity under the principles and legal framework of Horizon 2020 and received an increased budget of 2.7 billion euros towards 2020. This amounts to 3.5% of the total 80 billion euro EU budget for research and innovation (European Institute of Innovation and Technology, 2013; European Commission, 2013).

The EIT is organised with a governing board (GB), which is the principle governing body of the EIT. Its 12 members set the directions for the activities initiated at the EIT headquarter in Budapest. The interim director, who is supported by the staff at the EIT headquarter, is responsible for the organisations operational management. The EIT also has an internal auditing function, which advises the GB and director on financial management and the control structure of EIT. In 2013, EIT established a stakeholder forum, which enables contact between national, regional, and local authorities across Europe and the EIT (Reillon, 2016).

The original idea with the EIT was to address the so-called "European Paradox": the perceived inability of European countries to turn academic research and discoveries into commercial opportunities and marketable products (ibid). The aim thus was, and still is, to strengthen "*sustainable growth and competitiveness by reinforcing the innovation capacity of the EU"* (European Commission, n.d.). The EIT seeks to achieve this goal by bringing together industry, researchers and educators in Knowledge and Innovations Communities also known as KICs. The KICs are networks between private companies, universities, research centres, funding organisations and labs, which work together – in various research fields – to develop new products and services, establish start-up companies, and train future entrepreneurs through a variety of educational programmes. As such, the KICs are innovation communities or networks but also physical innovation hubs located across Europe.

The KICs run as single legal entities with a great degree of autonomy; making the EIT a highly de-centralised organisation. Each KIC is led by a CEO who receives and distributes the EIT funding among partners, prepares the annual business plan of the KIC and reports on activities of the KIC (Reillon, 2016). EIT assesses the performance of the KICs according to their business plan and Key Performance Indicators (KPIs) and host an annual hearing where the EIT GB can issue strategic recommendations on areas that need to be improved. Given the independence of the KICs, this

takes the form of general encouragements not detailed regulation[36]. Each KIC is set up for a minimum of seven years but is expected to be self-sufficient after 15 years. Each KIC can finance and manage up to seven co-locations centres across Europe (Reillon, 2016).

Each KIC is designed to address a major societal challenge as defined by the European Commission. Three KICs were established in 2010; EIT Climate, EIT InnoEnergy, and EIT Digital, two were established in 2014; EIT Health and EIT Raw Materials, and one was established in 2016; EIT Food (European Institute of Innovation and Technology, n.d.a). A second KIC, called EIT Manufacturing, was also announced in 2016, but no project was initiated, as the proposals did not meet the standards of excellence. Two KICs are scheduled in 2018; the EIT Manufacturing will be re-called together with a KIC on Urban Mobility (European Institute of Innovation and Technology, n.d.b). The EIT's financial contribution to the KICs does not exceed 25% of expenditures; the collaborating parties must find the remaining 75 % - or 7.5 billion euros - from other public and private sources (European Commission, 2013a; European Commission, 2013b). The KICs are presented with key descriptors in the table below.

Table 19: Basic information on KICs

	Climate KIC	**EIT InnoEnergy**	**EIT Digital**	**EIT Health**	**EIT Raw Materials**	**EIT Food**
Year	2010	2010	2010	2014	2014	2016
Numbers of applications	Information unavailable	Information unavailable	Information unavailable	Information unavailable	Information unavailable	Information unavailable
Innovation themes or ambitions	1) Urban Transitions 2) Sustainable production systems 3) Decision metrics and finance 4) Sustainable land use[1]	1) **Clean coal and gas technologies** **2) Energy Storage** **3) Energy Efficiency** **4) Energy from chemical fluids** **5) Renewable energies** **6) Smart and efficient buildings and cities** **7) Sustainable nuclear and renewable convergence**[3]	1) Digital Wellbeing: prevention and coping 2) Digital Industry: individualized goods at mass production costs 3) Digital City: urban quality of life for informed citizens 4) Digital Infrastructure: high-performing, secure digital infrastructures[4]	1) Promote healthy living 2) support active ageing 3) Improve healthcare[5]	1) Exploration and raw materials resource assessment 2) Mining in challenging environments 3) Increased resource efficiency in mineral and metallurgical processes 4) Substitution of critical and toxic materials in products and substitutions for optimised performance 5) Recycling and	1) Overcome low consumer trust 2) Create consumer valued food for healthier nutrition 3) Build a consumer-centric connected food system 4) Enhance sustainability through resource stewardship 5) Educate to engage, innovate and advance 6) Catalyse food entrepreneur-ship and

[36] Information from interview with GB member

					materials chain optimisation of end-of-life products 6) Design of products and services for the circular economy[6]	innovation[8]
Legal structure	Private company owned by an association[2]	European company[2]	Non-for-profit association[2]	Information unavailable	Information unavailable	Information unavailable
Geography	Headquarter in London, 13 co-location centres[1]	Headquarter in Eindhoven, Six co-location centres[3]	Headquarter in Brussels, 11 co-location centres[4]	Headquarter in Munich, seven co-location centres.[5]	Headquarter in Berlin, Six co-location centres[7]	Headquarter in Leuven, four co-location centres[9]
Public partners	52[2]	57[2]	38[2]	59[2]	59[2]	20[10]
Private partners	88[2]	175[2]	59[2]	58[2]	41[2]	30[10]
2015 EIT contribution (million euros)	86,7[2]	68[2]	66.8[2]	3.3[2]	3.8[2]	Information unavailable
External investments raised	Information unavailable	55[3]	68[4]	Information unavailable	Information unavailable	Information unavailable

Sources
1: https://eit.europa.eu/eit-community/eit-climate-kic
2: Reillon, 2016
3: https://eit.europa.eu/eit-community/eit-innoenergy
4: https://eit.europa.eu/eit-community/eit-digital
5: https://eit.europa.eu/eit-community/eit-health
6: https://eitrawmaterials.eu/innovation-themes/
7: https://eit.europa.eu/eit-community/eit-raw-materials
8: https://www.eitfood.eu/about-us/our-ambition/
9: https://eit.europa.eu/eit-community/eit-food
10: assessed from the list at https://www.eitfood.eu/our-partners/

According to the EIT website, the operating KICs include a total of 578 companies, 199 higher education institutions, 152 research centres, and 83 cities, regions, and NGOs

7.4. Current situation of RRI in the programme

7.4.1. RRI in brief

Before turning to the desktop findings, this section briefly reflects on the potential relevance of RRI in the EIT. We presume that the broad understanding of RRI, i.e. contributing to solving societal challenges, is most important in the EIT as the KICs are designed to address specific challenges. Likewise, Open Innovation is inherent in the model of the KICs with the collaboration in the

knowledge triangle between industry, research, and education. We primarily expect to find references to these aspects of responsibility.

7.4.2. Desktop findings

7.4.2.1. Role of RRI on...

Policy document level

Table 20: RRI awareness at policy level

Yes: some awareness	Keys: The documents refer to principles of Gender Equality a few times, whereas Governance, Science Education, Open Access, Ethics, and Public Engagement are brought up only once or twice. O's: Principles of Open Innovation and Open to the World are prevalent throughout the documents; Open Science is only brought up once. Implicit: Contributing to solving societal challenges, knowledge sharing/dissemination/outreach activities, and stakeholder inclusion are dominant principles in the policy documents. Transparency is mentioned several times, diversity once.
Explanation/elaboration	
The policy documents in this analysis include the decision of the EU commission to establish EIT, the legal framework of EIT, and the Strategic Innovation Agenda. None of these documents explicitly mention the concept of RRI, though; several keys, O's, and broader understandings of responsibility emerge in the analysis. Concern for societal impact and for addressing the major societal challenges defined in the Horizon 2020 framework is dominant throughout the documents. Innovation is seen as "*the process by which new ideas respond to societal or economic needs and demand and generate new products, services or business and organisational models that are successfully introduced into an existing market or that are able to create new markets and that provide value to society."* (European Commission, 2013b) The societal challenges are, for the most part, unspecified in the documents, though, sustainable economic growth, job creation, ageing, health, demographic challenges, wellbeing, improving life-quality, security, protecting natural environment, resource and energy efficiency, greener, inclusive, and safer urban mobility systems, as well as mitigating climate change are mentioned. The purpose of EIT is primarily to contribute to economic growth, which is perceived as a prerequisite for the secondary aim of solving societally challenges. The KIC-model is a tool to achieve these goals: "*The EIT's mission is to contribute to sustainable European economic growth and competitiveness by reinforcing the innovation capacity of the Member States and the Union in order to address major challenges faced by European society. It shall do this by promoting synergies and cooperation among, and integrating, higher education, research, and innovation of the highest standards, including by fostering entrepreneurship*" (ibid). This leads me to another principal concept; Open Innovation. Open Innovation is given in the design of the KIC model and is prevalent throughout the documents. Researchers, educators, and innovators from different sectors, backgrounds, and disciplines are brought together to work on common projects. This co-creation and collaboration between stakeholders is one of the two main elements in the conception of Open Innovation" (European Commission, 2016: 13). A culture of openness is mentioned several times: "*Active exchange and mutual learning with other initiatives should be a cornerstone of the EIT's efforts in testing out new innovation models. The EIT therefore needs to tap into existing best practices and external expertise in order to become the reference body for innovation it aspires to. (..) By embracing a culture of*	

openness and external engagement, the EIT can actively promote the take-up and acceptance of new innovations by society at large" (European Commission, 2013a: 908).

Openness towards new partners, external experts and stakeholders like national, regional, and local authorities, as well as partners outside Europe is prioritised. As such, this is highly related to the concept of Open to the World, which is also brought up several times in the documents. The above passage also hints that openness can lead to a greater acceptance of new products and service, and that openness towards outside input can be good business. Despite this, the second element of Open Innovation; the user-centric or citizen-centric approach and the engagement of the public in innovation, is conspicuously absent from the documents (European Commission, 2016: 13). Only once is it explicated that it is a goal to engage the end-user, in this case the costumer: "*Through its integrative approach, a KIC in this area [EIT Food] will be able to influence the industry approach to focus more on consumer-driven innovation, thereby benefiting consumer health and quality of life. This will go along with the potential of new business models and market strategies that focus on consumers' needs and trends and build upon enhanced awareness of the food chain, which can have potential to get innovations and technological possibilities in line with consumer interests and thus create new business opportunities"* (European Commission, 2013a: 916). While co-creation and collaboration is embraced, the focus on the end-user, consumer, or simply the citizen is less pronounced.

In line with the principles of openness, the importance of disseminating results, sharing good practices, and exchanging knowledge with the wider innovation community, stakeholders, and decision-makers is highlighted several times in the documents. The EIT has an ambition of building an innovation culture that can be exemplary in Europe and beyond. It is unclear, however, whether there is an ambition to communicate in a manner that is accessible to a general public and engaging the ordinary citizen in discussions about and priorities in research and innovation. In fact, Public Engagement is only mentioned once as a general principle in Horizon 2020; publicly funded research must be brought to the attention of the general public as "*This will generate better public understanding, engagement and debate"* (European Commission, 2011: 13). While the priority of Public Engagement is questionable, stakeholder inclusion is mentioned several times, as it is a strong principle in the policy documents that EIT should "*directly engage with national and regional representatives and other stakeholders from across the innovation chain, generating beneficial effects on both sides. In order to render such dialogue and exchange more systematic, an EIT Stakeholder Forum should be established, bringing together the wider community of stakeholders around horizontal issues*" (European Commission. 2013b: 174). This platform is also open to organised interests and civil society organisations, offering an opening to engage a general public.

Now we turn to the minor themes. Principles of openness and transparency are mentioned a few times mostly in terms of choosing new KICs and new governing board members, which shall happen in an open and transparent procedure. The focus on RRI-keys is not very strong, though, Gender Equality is mentioned a few times both in relation to a broader principle of diversity in partnerships of the KICs that have to be geographically balanced and open to new partners of different sectors, ages, and career-levels. Gender Equality is also part of the general Horizon 2020 framework, which also apply to the EIT: "*The Commission is committed to reaching the target of 40% female participation in its advisory structures and it will ensure that Gender differences are reflected in the content of calls for proposals, and in evaluation processes, where appropriate. Increased female participation will improve the quality of research and innovation while helping to address the existing deficit of highly qualified and experienced scientists necessary for enhanced European competitiveness and economic growth*"(European Commission, 2011: 13).

Though, there is a great focus on contributing to solving societal challenges through Open Innovation, with all it entails of stakeholder inclusion and knowledge sharing, we have deemed this only "some awareness". This is due to the limited focus on user-driven innovation and Public Engagement despite the priority of Open Innovation and the fact that there is hardly a strategic focus on the six keys of RRI.

Scoping level

Table 21: RRI awareness at the scoping level

No: No mention of EIT in relation to RRI-aspects, limited reference to EIT in general.

Work programme level

Table 22: RRI awareness at the work programme level

Yes: Some awareness	Keys: Science Education and Governance are mentioned several times, Ethics/fairness, Public Engagement, and Gender Equality is mentioned two or three times. Open Access is not addressed. O's: Open Innovation and Open to the World are important principles throughout the documents. Open Science is not brought up. Implicit: Stakeholder inclusion, contributing to solving societal challenges and knowledge sharing/dissemination/outreach activities are dominant throughout the documents. Transparency is mentioned several times.
Explanation/elaboration	
The documents on the work programme level include the triennial work programmes and annual work programmes of EIT, principles for financing, monitoring, and evaluating KIC activities, and an impact study from 2010 to 2016. None of these documents explicitly mention RRI. Stakeholder inclusion is a dominant principle, prevalent throughout the documents. EIT "*seek continuous feedback to further refine its strategies through a structured dialogue with its stakeholders*" (European Institute of Innovation and Technology, n.d.c: 29). This relates to the exchange of good practices with stakeholders at EU-, national-, and regional level that is decision-makers, member state bodies and authorities, business association, research and academia. They seek input for strategic documents, such as the rolling triennial work programmes, for identifying the challenges that new KICs should address, as well as feedback on events such roundtables at the innovation forum, INNOVEIT. Engagement and co-operation are keywords and it is a strategic priority that this happens in a systematic manner. The annual stakeholder forum is a way to achieve this, which aims to "*get more detailed and regular input and guidance on EIT activities*" (European Institute of Innovation and Technology, 2010: 35). Another tool mentioned is to create a more participative website, which was an aim of the 2011-2013 triennial work programme, as well as developing a social media newsroom, multi-user blogs, groups on Facebook and LinkedIn, and a closed groups for KIC partners to discuss. It is evident that stakeholder inclusion is seen as a tool to increase the visibility, quality, and impact of EIT. Stakeholder inclusion is highly related to the general principle of knowledge sharing, dissemination, and outreach activities, which, contrary to the active exchange of ideas with stakeholders, is one-way communication. This is an important principle throughout the documents and always refers to sharing expertise, lessons learned, and good practices with external stakeholders, policy makers, and (occasionally) the wider public. This can be on the EIT labelled education, knowledge transfer, and co-location for instance in papers, reports, or through traditional media and serves the purpose of awareness raising and attracting new talents. "*The EIT will consolidate its role as an institute that acts as a 'networked hotspot' for gathering expertise and experience of knowledge triangle policies*	

and practices during the course of 2014 to 2016. An important role will be codifying and disseminating good practices and lessons learnt across Europe and beyond, notably based on the expertise and experience of its KICs, in line with its objective of attracting and nurturing top talent" (European Institute of Innovation and Technology, n.d.c: 28). It is important to note that while stakeholder inclusion and knowledge-sharing are related to the concept of Public Engagement, there is no clear expressed ambition or priority to involve end-users, costumers, or a wider public in the documents. The only example of an engaging activity is the Climathon; a global 24 hour climate change hackathon arranged by the Climate KIC. This has reached 59 cities and 16.8 million people across the Globe in 2016 to address the challenges these cities face (European Institute of Innovation and Technology, 2017: 35).
Contributing to solving societal challenges, more specifically the six grand challenges identified in the EU 2020 strategy and Horizon 2020 is also dominant on this level of analysis. We will not elaborate extensively on this as it is much the same as on the policy level, however, it is specified that the choice of KICs will be based on their ability to demonstrate a probable positive societal impact, which their performance will also be assessed on. It is important to emphasise again, that solving societal challenges is not necessarily the primary goal: "*The EIT is about creating a new European way to deliver economic growth through addressing major global and societal challenges, such as people-friendly communication, a sustainable supply of energy and a habitable environment. Innovative approaches that will help existing European industries and SMEs to prosper, whilst also generating new businesses, updating skills, creating new jobs and developing exciting new entrepreneurial talent. The current economic crisis only serves to reinforce the timeliness of this initiative"* (European Institute of Innovation and Technology, 2010: 11).

Open to the World and Open Innovation are important principles throughout the documents, they are explicitly mentioned, and used in much the same manner as at the policy level i.e. Open Innovation is seen as the heart of the KIC-model and the KICs are open to international partners.

There are, however, more concrete examples of their application at the work programme level. An example: "*In 2014-2016, EIT ICT Labs [now EIT Digital] will continue and expand its systematic outreach operations in Eastern Europe. The KIC commenced short-listing of candidate sites and partners outside Europe, especially Silicon Valley/Bay Area (Stanford, Berkeley) and Boston area (MIT) in the USA and various actors in the BRIC countries (Brazil, Russia, India, China). During 2014-2016, some of these initial contacts are likely to become operational in areas such as joint innovation actions, experiments and field studies, technology transfer, educational outreach, and student and teacher exchange"* (European Institute of Innovation and Technology, n.d.c*, 14-15).* Another example is developing new joint EIT labelled master and PhD degrees, training modules, intensives courses, e-learning, Open Educational Resources. Continuing Professional Development Courses, and mentoring activities in international co-operation between academia and business. It is important to note again that while the collaboration between stakeholders is pivotal, the user-centric approach is absent in the sections regarding Open Innovation.

Some of the smaller themes are transparency, which is mentioned a few times in relation to the evaluation of proposals and choice of new KICs, which has to happen in "*a fully transparent and fair process, including a careful selection of independent experts*" (ibid: 7). Similarly, the work of the EIT staff has to be conducted "*in an open and transparent manner and meeting the expected high level of professional and ethical standards*" (European Institute of Innovation and Technology, 2016: 11). Ethics are only mentioned in this relation; as a sense of fairness and non-discrimination, and not at any point as ethical standards for the innovation, research, or teaching activities of the EIT or the KICs.

One of the sides in the knowledge triangle of the KICs is education, which means there is great focus

on educational activities and specifically on teaching entrepreneurial skills to students at master and PhD-level. We do not see this as Science Education, which should rather be aimed a broader population outside academia; equipping the public to understand and take part in discussions about science and innovation. There are several mentions of this primarily in relation to Massive Online Open courses (MOOCs), but also for training trainers, and executive training.
Governance principles for science and innovation are obviously underlying many of the above examples. A more explicit example is the Climate KIC, which, in addition to creating innovative products and services in this field for a technology push, acknowledges that a pull is necessary for change: "*Climate-KIC's vision is to create opportunities for innovators to address climate change and shape the world's next economy. Addressing the related societal challenges requires drastic transitions in the way we produce and live, which in return require citizens and companies to become agents of change. They cannot be addressed only by technology-push innovations but very importantly need also to pull measures that require the involvement of policy and law makers, economists and finance experts. Creating innovative products or services is therefore only half Climate-KIC's task. To be effective, Climate-KIC wish to trigger and implement transitions and this is the reason of the involvement in cities, regions and policy makers*" (European Institute of Innovation and Technology, n.d.c: 10).

Call level

Table 23: RRI awareness at the call level

Yes: some awareness	Keys: Governance is brought up once. Ethics and Gender Equality are brought up once or twice but not in direct relation to the KIC-call. e.g. as requirements for the proposal and project. Open Access, Science Education, and Public Engagement are not addressed. O's: Open Innovation, as part of the KIC-model, is mentioned several times. Open to the World is hardly addressed. Implicit: Contributing to solving societal challenges is prime and mentioned many times throughout the documents. Knowledge sharing/dissemination/outreach activities is mentioned several times whereas transparency is brought up only a few times and diversity once.
Explanation/elaboration	
The analysis on this level is based on the call texts and the accompanying Strategic Innovation Agenda thematic fact sheets accompanying the calls for the 2014 KICs; Health and RawMaterials, the 2016 KICs; Food and Manufacturing and a preliminary presentation (from 2017) for each of the two 2018 calls; Urban Mobility and the re-call for Manufacturing. None of these documents explicitly use the RRI term. The call texts have a general, introductional, and short format. An illustrative example is looking at the contribution to solving societal challenges, which is again the most dominant RRI-related principle. *"A KIC is a highly autonomous partnership of top-class higher education institutions, research organisations, companies and other stakeholders in the innovation process that tackles societal challenges through the development of products, services and processes and also by nurturing innovative, entrepreneurial people"* (European Institute of Innovation and Technology, 2014: 2). The fact sheets compliment the call texts with more elaborate specification of these challenges. The assessment of EIT Food proposals will for instance be based on their ability to address "*a major economic and societal relevant challenge (the need to ensure a resilient and sustainable food system while meeting the increasing food demand within the constraints of*	

*available land, protecting the natural environment and safeguarding human health" (*European Institute of Innovation and Technology, 2015: 4)

Open Innovation is brought up several times and in much the same manner as at the other levels: Given by design with the collaboration between partners in the KIC-model. It is specified, though, why this is valuable: "*Disruptive innovation comes from the collaboration between people, institutions and organisations with different cultures and backgrounds which challenge traditional collaborative models. Therefore, diversity in KIC partnerships, the governing bodies and leadership teams in terms of composition and approaches towards innovation, is essential in creating new value chains"* (European Institute of Innovation and Technology, 2014: 4). This also introduces diversity as something to strive for. There are a few subtle references to the user-centric approach as part of the Open Innovation concept e.g. in the factsheet for Manufacturing: "*One possible answer to address these challenges is the development of a "high value (or added-value) manufacturing" industry. This concept defines an integrated system including the whole cycle of production, distribution and end-of-life treatment of goods and products/services applying a customer/user driven innovation system*" (European Institute of Innovation and Technology, 2016a: 6). It is unclear, though, if a consumer or user driven innovation system entails actually involving consumers in the innovation process and hearing their needs and interests or that innovators merely contemplate on these.

Again, the knowledge sharing and dissemination activities are quite important, and the proposal must include a communication strategy and an outreach and dissemination plan. "*A KIC's strategy will include specific outreach initiatives in order to bring benefits to the whole of the European Union. A KIC's outreach activities are an opportunity to establish a mutually enriching engagement with areas and stakeholders beyond the KIC's community and partners*." (Ibid: 5).

Transparency is mentioned a few times regarding the managements of the KICs that have to guarantee transparency and the choice of independent experts, which have to be chosen in a transparent process. Ethics appear in this relation, as the external experts have to abide by a code of conduct for external experts. Ethics is otherwise only brought up once in a very general sense: "*Gender and Ethical principles are governed in accordance to the provisions laid down in Horizon 2020 - The Framework Programme for Research and Innovation*" (European Institute of Innovation and Technology, 2014: 12)

Governance is the only RRI key brought up as a requirement for the Food KIC, which is expected to contribute to a better Governance framework for innovation in the food sector. "*The major risks associated to the success of a KIC under this theme are mainly related to the necessary accompanying innovation framework conditions, which KICs are not directly addressing. For increasing sustainability throughout the food supply chain, some changes in regulation may be needed in order, for example, to internalise food production costs. Therefore, the KICs need to liaise with ongoing Union and national innovation and policy activities on these matters"* (European Institute of Innovation and Technology, 2016a: 4).

All this adds up to some awareness at the call-level. It seems that the intentions at the policy and work-programme level do not find its way into the calls. The calls barely set requirements, or even encouragements, in terms of RRI (keys, O's, or beyond) to grant funding, and is as such quite unambitious.

Project level

Table 24: RRI awareness at the project level

Yes: Limited awareness	Keys: No reference to the six keys of RRI O's: Only a subtle reference to Open Innovation. Implicit: Only the contribution to solving societal challenges is mentioned.
Explanation/elaboration	
In lack of access to the winning proposals of EIT Health, RawMaterials, and Food, we have instead looked at the press releases announcing the winning teams and the factsheets about the consortia, which were available online. None of these explicitly or implicitly refer to RRI, its keys, or the three O's. The contribution to solving societal challenges is again a consistent goal and an important evaluation criterion in the selection of winning consortia. It is interesting to note, though, how this in most cases is mentioned in relation to aims of economic growth, competitiveness, and creation of start-ups, which seem to be the primary goals: "*RawMatTERS – winner of EIT Raw Materials (sustainable exploration, extraction, processing, recycling and substitution) – brings together more than 100 partners from 20 EU Member States, (…) Prof. Jens Gutzmer from Helmholtz-Zentrum Dresden-Rossendorf, the key coordinating partner said: 'The EIT will enable our partnership to make a real societal change and to turn the challenge of raw materials dependence into a strategic strength for Europe. Our goal is to boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship. We want to focus on sustainable growth and job creation by boosting start-ups, SMEs and education; and we are the strongest consortium ever created in the raw materials field. By 2022, we are aiming to create, among others, 64 start-ups and 5 new primary/secondary sources of critical raw materials (CRM)'.*" (European Institute of Innovation and Technology, 2014a). In the factsheet about the winning consortium for EIT Food, FoodConnects, they specified six strategic goals including number 3: "*Build a consumer centric connected food system develops a digital food supply network with consumers and industry as equal partners"* (European Institute of Innovation and Technology, 2016b: 1). Hinting that the EIT Food is more concerned about the user-centric approach of Open Innovation and maybe even engaging the public in their work.	

Proposal Template level

Table 25: RRI awareness at the proposal template level

No: No awareness	
Yes:	**Keys:** No reference to the six keys of RRI **O's:** No reference to the three O's. **Implicit:** Knowledge sharing/dissemination/outreach activities are the only aspect addressed.
Explanation/elaboration	
There is only one available proposal template, which is for the 2016 KIC calls. It does not use the RRI concept. The only related aspect is a section on communication, outreach, and dissemination stating that "*Communication must be an intrinsic part of the KIC's strategy. Applicants should present the key goals and assumptions of the KIC's communication strategy, dissemination and outreach plans, including plans to implement the EIT's Regional Innovation Scheme (RIS)*" (The European Institute of Innovation and Technology, 2015a: 5).	

Societal impact also has its own section. Applicants are expected to describe the measurable outcomes they wish to achieve and indicate tools for this measurement. This is, however, related to human capital, job creation, and economic growth and it is thus unclear whether this is supposed to benefit wider society – and be aligned to the needs of the public – or whether it is primarily in the interests of businesses. It is too vague to categorize as an RRI aspect.

Evaluation level

Table 26: RRI awareness at the evaluation level

Yes: limited awareness	Keys: No reference to the six keys of RRI O's: Open Innovation is addressed. Implicit: Contributing to solving societal challenges, stakeholder inclusion, and knowledge sharing/dissemination/outreach activities are mentioned.
Explanation/elaboration	
This analysis is based on the evaluation criteria of the 2016 and 2018 calls as well as the evaluation form of the 2016 call. There are three evaluation criteria of the 2016 call that are (more or less) relevant to this analysis, though, they are vaguely defined: 1) How specific and relevant the strategy to apply the KIC-model for addressing the societal challenges defined in Horizon 2020 is 2) The quality of the partners and their ability to create a strong, diverse, and collaborative partnership 3) The quality and relevance of the communication strategy including sharing good practices with various stakeholders These add up to a total of 35 point of 100 in the assessment of the proposals. These are generic criteria and much the same was specified for the 2018 evaluation. In addition, the evaluation form includes a guiding question about stakeholder inclusion: "*Does the proposal build on existing, excellent initiatives and engage the relevant target groups and stakeholders*?" and a subtle Openness to the World: "*Does the proposal demonstrate readiness to establish concrete synergies and complementarities with EU and other relevant global initiatives? Is a list of potential synergies provided in the proposal?"* (The European Institute of Innovation and Technology, 2015b: 3). Again the contribution to societal challenges, stakeholder inclusion, knowledge-sharing, and Open Innovation (without explicitly including the user-centric approach) are the key-words, and these are part of the proposal evaluation. Naturally, as the calls do not involve RRI requirements, there is no mention of any of the keys at the evaluation level. That is why this is deemed only "limited awareness".	

7.4.2.2. General use of RRI, RRI beyond the keys and Theoretical framework of RRI applied in the programme line

In this section, we summarise and critically discuss the results of the above analysis. We will not draw new examples.

Contributing to solving societal challenges is a dominant principle throughout the documents. The challenges that the KICs are expected to address are defined in the Horizon 2020 framework and Europe 2020 strategy and are, for the most part, quite vaguely presented in the texts. There are, however, examples of winning consortia incorporating these in more specific strategic goals (e.g. EIT Food). The principle of contributing to societal challenges often appear together with the economic

goals of strengthening competitiveness of European businesses, increasing economic growth, creating jobs, new products and services, and new start-ups. Indeed the collaboration between researchers, educators and innovators is seen as a tool to increase the innovation capacity of Europe, which is the primary goal, and a prerequisite for solving societal challenges, which is a secondary goal. While the economic goals are not necessarily opposed to finding innovative solutions that benefit greater society, it can be. Increasing economic growth and introducing new products meanwhile aiming to drastically reduce carbon emission can be conflicting aims, creating digital solutions for health care e.g. monitoring the health of senior citizens can compromise patient privacy and data protection, securing a plentiful, safe and affordable food supply can be difficult meanwhile protecting natural environments like forests, streams, and wildlife. There is no sign of ethically weighing these potentially conflicting concerns or even reflect on them. Likewise, long-term financial sustainability is required of the KICs, which means that products and services that are not marketable and/or profitable might be taken off the drawing board event though they could be a great help in addressing pressing challenges. For this reason, it is pivotal to have a critical view on the aim of contributing to solving societal challenges; is this merely used to legitimize other concerns in the strategic documents or is it an internalized goal in the work of project partners? It is impossible to say from this analysis.

Open Innovation, and to some degree also Open to the World, are also dominant throughout the documents and are given in the KIC-model with its extensive collaboration between research institutions, universities, and private companies in co-location centres across Europe. While there is no doubt about the importance ascribed to stakeholder inclusion and collaboration across sectors, it is less clear what role the end-user, costumer, or general public play in this equation. Will their interests be heard and considered? Are they to be actively involved in the innovation process and in that case when and how? And what is the perceived benefit of engaging the public; is it a democratic principle with intrinsic value or merely operational; to create a better, more profitable product? This is generally unclear. While the user-centric approach and Public Engagement are mentioned a few times, it does not appear to be a consistent priority at any level, and it is not clearly required or encouraged in strategic documents. There is one exception; in the Climate KIC it is acknowledge that a technology pull is needed to mitigate climate change and that it is necessary to engage cities, citizens, and companies as agents of change.

Knowledge-sharing, dissemination, and outreach activities are also clearly emphasised in the analysed documents. This relates to sharing experiences with the innovation model of the KICs and to spread good innovation practices across Europe. There is thus an inherent goal to nurture good Governance principles and practices in the innovation scene of Europe. This is not directly related to the keys of RRI but to openness in general (Open Innovation and Open Research), and we believe it is a precondition for engagement of stakeholders and a broader public. This is why we have highlighted it in this report.

RRI is not traceable as a clear vision in the programme line; the six keys are not persistently present throughout the document levels, they are not strategic priorities, and they are generally not required of the KICs nor even encouraged. Some of the keys do, however, sporadically appear, like Science Education (MOOCs) or Gender Equality (in management and advisory structures).

7.4.2.3. Overall assessment of RRI in the programme line (based on desktop research)

There is some awareness (B) of RRI (keys, O's, and beyond) in the programme line.

While the focus on RRI keys is rather limited, the Governance structure reflects some level of societal embeddedness with a focus on solving societal challenges for the good of a general public, there is a strong focus on stakeholder inclusion and collaboration, and for sharing knowledge which is in line with principles of Open Innovation.

7.5. Conclusions

The above analysis revealed that contributing to solving societal challenges, sharing knowledge, good practices, and results, and including stakeholders from diverse backgrounds in Open Innovation networks are the dominant RRI-related principles permeating the European Institute of Innovation and Technology.

Much of this is given in the "design" or "DNA" of EIT, as some interviewees put it. Each KIC is established to address a specific societal challenge – as defined in the Horizon 2020 framework and Europe 2020 strategy – and the perceived ability of such a contribution is an important criterion for selecting winning consortia, just as the operating KICs are expected to deliver such solutions and are evaluated on their ability to do so. It is important to mention, though, that while this is emphasised as key, so is contribution to economic growth, European competitiveness, job creation, development of marketable products and services, and the establishment of new companies. Increasing innovation capacity in Europe is indeed the primary purpose, and long term financial sustainability of the KICs is fundamental, while solving societal challenges is secondary. The KIC-model, with its co-location centres and collaboration between multiple partners from industry, research, and education, is seen as the tool to increase innovation capacity, which is perceived as a prerequisite for addressing societal challenges. A few of the interviewees stressed that there is an inherent conflict between some of the long-term goals of societal impact (e.g. reducing carbon emission) and the short-term financial goals (e.g. developing and marketing new products), just as funding and Key Performance Indicators (KPI) primarily focus on the latter, which takes time and focus from the long term solutions and makes this work harder.

Open Innovation is also given in the KIC-model and consistently encouraged and emphasised throughout the documents and in the interviews. An important part of this is stakeholder inclusion; the KICs are innovation communities between hundreds of partners from multiple backgrounds, these communities are always open to new partners, and diversity in these partnerships are valued. This is in terms of sector, age, Gender, and career-level. It is important to note, that these stakeholder collaborations are just one aspect of Open Innovation. The other is having the end-user as the centre of the innovation process which is less clear in EIT. EIT Food and EIT Health have plans to involve the consumer and patients in their work, but this is still in early phases. Stakeholder inclusion is highly related to the general principle of widely sharing knowledge, best practices, and result in the innovation communities and to regional-, national-, and EU-policymakers and authorities. This is also an important principle, primarily highlighted in the analysed documents. Publishing results in reports and papers, in traditional and social media, hosting an interactive website and a stakeholder forum are some of the tools used to further openness, knowledge sharing, and stakeholder inclusion. Likewise, it is a requirement that proposals for new KICs include a communication strategy and an outreach and dissemination plan. The interview study revealed that

several KICs experience a permanent conflict between openly sharing their work and involving business partners who are concerned about protecting their intellectual property and thus profit. They struggle to find a balance and to get businesses involved despite this e.g. by working with problems that businesses cannot solve themselves but are dependent on collaboration with universities and research centres to address.

The six key of RRI are not traceable as a vision or strategy throughout EIT. While some keys are mentioned in strategic documents at the policy-level (e.g. Gender Equality at management levels), these are not substantially brought into calls nor the evaluation criteria for proposals. Some initiatives seem to come more bottom-up, though, as several KICs have initiated activities to further RRI-related aspects. Public Engagement seems to be the most important key where EIT Health offer funding for Living Labs and EIT Food collaborate with consumer groups and local ambassadors like restaurants and chefs to involve consumers in their work. Likewise, the case briefs revealed that the project Moabit West under Climate KIC has strong dimensions of citizen involvement just as the Climathon event, even though, the interviewee from this KIC found Public Engagement less relevant. There are also examples of Science Education e.g. the RawMaterials training programme for primary school pupils in Italy.

The primary challenge to further RRI is a lack of financial resources to allocate to this work, as this is not a core task of EIT. This is not to say that RRI is considered unimportant. Some interviewees do express an urgency of these matters and a willingness to address them. It is this foundation that our Social Labs should build on. Based on the above analysis, we could build the Social Lab on existing initiatives of Public Engagement in EIT Food and Health and their enthusiasm to develop this further. We could also raise issues of Gender Equality, which is a strategic goal in the EIT Governing Board who has in 2016 issued a strategic recommendation for more Gender Equality in the KICs. The KICs, however, find this less important. Some interviewee's also requested and Open Access framework for the KICs, which we could also seek to work on. In the end, this is up to the participants to decide.

7.6. Relevant stakeholders

7.6.1. Who are relevant applicants/actors/stakeholders?

The methods section described the process of identifying stakeholders, within the EIT organisation, for interviews. We identified Social Lab participants in the same way.

7.7. Literature, links, and resources

EIT Climate (n.d). Microalgea Biorefinery 2.0. http://www.climate-kic.org/success-stories/microalgae-biorefinery/
EIT Climate (n.d.a). Total Recycle Decommissioning (TRD). http://www.climate-kic.org/success-stories/total-recycle-decommissioning-trd/
EIT Climate (n.d.b). Moabit West. http://www.climate-kic.org/success-stories/moabit-west-berlin/
EIT Digital (n.d.) Karens Grigorjancs rocks the music scene with start-up Plugify. https://www.eitdigital.eu/newsroom/success-stories/karens-grigorjancs-rocks-the-music-scene-with-startup-plugify/
EIT Digital (n.d.a) EIT PhD Graduate has 'sixth sense' for innovation. https://www.eitdigital.eu/newsroom/success-stories/eit-digital-phd-graduate-has-sixth-sense-for-innovation/

EIT Digital (n.d.b). Eureka moment during EIT Digital Doctoral School leads to promising start-up. https://www.eitdigital.eu/newsroom/success-stories/eureka-moment-during-eit-digital-doctoral-school-leads-to-promising-startup/

EIT Health (n.d.). EIT Health DPhil/PhD Transitions Fellowship. https://www.eithealth.eu/-/eit-health-dphil-phd-transition-fellowship

EIT Health (n.d.a). COLDPLASMATECH. https://www.eithealth.eu/-/coldplasmatech

EIT Health (n.d.b). CLOSE. https://www.eithealth.eu/-/clo-1

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European Commission (2016). Open Science, Open Innovation, Open to the World – A vision for Europe. Directorate-General for Research and Innovation, Directorate A – Policy Development and Coordination, Unit A1 – Internal and external communication.

European Commission (n.d.). European Institute of Innovation and Technology (EIT). https://ec.europa.eu/programmes/horizon2020/en/h2020-section/european-institute-innovation-and-technology-eit

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European Institute of Innovation and Technology (2013). EIT plans for 2014 to 2020 adopted by European Parliament. Retrieved October 2017: https://eit.europa.eu/newsroom/eit-plans-2014-2020-adopted-european-parliament

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European Institute of Innovation and Technology (2014a). EIT Selects New Strategic Partnerships: Milestone for Europe in the areas of Health and Raw Materials, http://eit.europa.eu

European Institute of Innovation and Technology (2015). SIA thematic factsheets- EIT Strategic Innovation Agenda (SIA) 2014-2020 - EIT 2016 Call for KIC proposals: Factsheet 3: Food4Future and Factsheet 4: Added -Value Manufacturing, EIT: http://eit.europa.eu.

European Institute of Innovation and Technology (2015a). EIT Proposal template 2016 - EIT 2016 Call for KIC proposals. EIT: http://eit.europa.eu

European Institute of Innovation and Technology (2015b). EIT Proposal Evaluation form 2016. EIT: http://eit.europa.eu

European Institute of Innovation and Technology (2016). Consolidated Annual Activity Report – financial year: 2015. EIT: http://eit.europa.eu

The European Institute of Innovation and Technology (2016a). EIT's 2016 Call for Knowledge and Innovation Communities (KIC) Proposals: Food4Future - Sustainable Supply Chain from Resources to Consumers and Added-value Manufacturing. EIT: http://eit.europa.eu
European Institute of Innovation and Technology (2016b). EIT Food Factsheet. EIT: http://eit.europa.eu
European Institute of Innovation and Technology (2017). EIT: Our Impact from 2010 to 2016, EIT, http://eit.europa.eu
European Institute of Innovation and Technology (n.d.a). EIT at a glance. https://eit.europa.eu/eit-community/eit-glance
European Institute of Innovation and Technology (n.d.b). Call for KICs. https://eit.europa.eu/collaborate/2016-call-for-kics
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Italian Presidency of the Council of the European Union (2014). Rome Declaration on Responsible Research and Innovation in Europe. European Commission: http://ec.europa.eu
Reillon, Vincent (2016) Briefing, September 2016: The European Institute of Innovation and Technology. EPRS: European Parliamentary Research Service: http://europarl.europa.eu

7.8. Appendix

7.8.1. Full list of analysed documents

All documents are retrieved online in October and November 2017.

Policy document level

Horizon 2020 Work programme 2014-2015:
http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-intro_en.pdf
Horizon 2020 Work programmes 2016-2017:
http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-intro_en.pdf
Horizon 2020 Work programmes 2018-2020, Strategic Programme Overarching Document:
http://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/stratprog_overarching_version_for_publication.pdf
Council decision for implementing H2020:
https://erc.europa.eu/sites/default/files/document/file/Specific%20Programme%20Horizon%202020_council_decision_establishing_the_specific_programme_implementing_Horizon_2020.pdf
Communication from the European Commission – Horizon 2020 - The Framework Programme for Research and Innovation:
http://ec.europa.eu/research/horizon2020/pdf/proposals/communication_from_the_commission_-_horizon_2020_-_the_framework_programme_for_research_and_innovation.pdf
The Legal framework of EIT: Regulation (EC) No. 294/2008, which was amended by Regulation (EU) No 1292/2013. Both found here: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0174:0184:EN:PDF.
The Strategic Innovation Agenda: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0892:0923:EN:PDF.

Regional Innovation Scheme Leaflet:
https://eit.europa.eu/sites/default/files/eit_community_ris_leaflet.pdf

Scoping level

17 thematic scoping papers for work programme 2018-2012. Can be downloaded here:
http://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/17_thematic_papers.zip
Work programme level
Triennial work programme 2011-2013:
http://archive.erisee.org/sites/default/files/EIT-Rolling%20Triennial%20Work%20Programme%202011-2013.pdf
Triennial work programme 2014-2016:
https://eit.europa.eu/sites/default/files/EIT_Triennial_Work_Programme_2014-2016.pdf
Principles for financing, monitoring, and evaluating KIC activities:
https://eit.europa.eu/interact/bookshelf/eit-principles-financing-monitoring-and-evaluating-kic-activities
EIT monitoring strategy: https://eit.europa.eu/sites/default/files/EIT%20Monitoring%20Strategy.pdf
Annual activity report 2014: https://eit.europa.eu/sites/default/files/EIT%20GB%20Decision%20-%20Annual%20Activity%20Report%202014.pdf
Annual activity report 2015:
https://eit.europa.eu/sites/default/files/eit_annual_activity_report_2015.pdf
Consolidated annual activity report 2016:
https://eit.europa.eu/sites/default/files/eit_gb_decision_15_2017_-_consolidated_annual_activity_report_2016.pdf
Impact study 2010-2016: https://eit.europa.eu/sites/default/files/11983-eit-2017_our_impact_from_2010_to_2016.pdf

Call level

2014 Call (EIT Health and RawMaterials): https://eit.europa.eu/interact/bookshelf/eit-2014-call-kics-proposals
2016 Call (EIT Food and Manufacturing):
https://eit.europa.eu/sites/default/files/EIT%202016%20Call%20for%20KICs%20proposals.pdf
SIA Thematic fact sheet (EIT Food and Manufacturing):
https://eit.europa.eu/sites/default/files/added_value_manufacturing_and_food4future_factsheets.pdf
Preliminary introduction for 2018 call, Manufacturing (will be published in 2018):
https://eit.europa.eu/sites/default/files/presentation_on_the_eits_2018_call_for_kics_-_manufacturing_july_2017.pdf
Preliminary introduction for 2018 call, Urban Mobility (will be published in 2018):
https://eit.europa.eu/sites/default/files/presentation_on_the_eits_2018_call_for_kics_-_urban_mobility_july_2017.pdf

Project level:

EIT Health Factsheet: http://eit.europa.eu/sites/default/files/EIT%20Health%20-%20Factsheet%202014.pdf
EIT Raw Materials factsheet: http://eit.europa.eu/sites/default/files/EIT%20Raw%20Materials%20-%20Factsheet%202014_0.pdf
EIT Food factsheet: https://eit.europa.eu/sites/default/files/eit_food_factsheet_0.pdf
Press release about EIT Health and Raw Materials: http://eit.europa.eu/newsroom/eit-selects-new-strategic-partnerships-milestone-europe-areas-health-and-raw-materials
Press release on FoodConnects (EIT Food winning consortium): https://eit.europa.eu/newsroom/eit-selects-winning-innovation-partnership-food
Proposal template level
Proposal template for 2016 call:
https://eit.europa.eu/sites/default/files/EIT%20Proposal%20template%202016.pdf

Evaluation level

Evaluation criteria 2016:
https://eit.europa.eu/sites/default/files/Evaluation%20criteria%202016%20Call%20for%20KICs%20proposal_FINAL.pdf
Evaluation form 2016:
https://eit.europa.eu/sites/default/files/EIT%20Proposal%20Evaluation%20form%202016.pdf
Evaluation criteria 2018:
https://eit.europa.eu/sites/default/files/evaluation_criteria_call_for_kics_2018.pdf

8. Annex New HoRRIzon Diagnosis Report, Social Lab 17 JRC

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8.1. Executive Summary

This Diagnosis report analyses the Joint Research Centre (JRC) and takes into account the information gathered from the expert interviews[37]. The research revolves around Responsible Research and Innovation (RRI) and its keys (Ethics, Gender, Open Access, Public Engagement, Science Education), as well as the three Os (Open Science, Open Innovation, Open to the World). RRI has a very limited application within JRC; while the concept appears and is recommended in a 2015 evaluation report, it disappears altogether in later documents. This said, however, there are a number of initiatives and processes that fulfil the criteria of "de facto RRI" as used by Rip (2014). **The overall assessment, however, is that RRI cannot be found as an overarching and coherent concept within the JRC while activities that relate to RRI are given across this institution.**

We encountered a situation where some of the RRI-keys and the three O's appear within the different documents, but their scope is often quite limited. The recent restructuring process undertaken by the JRC applies an approach that, again, may be called "de facto RRI" – using a more open, democratic approach to knowledge hierarchies and makes efforts to create spaces for inter- and transdisciplinary research as well as outreach beyond outside researchers and expert communities. Artistic and lay approaches are attempted to be incorporated in the research activities of the JRC, especially in recently established units. Many of these activities can be considered to be early stage.

There is some knowledge about RRI in JRC at various levels of the organisation. Yet, there are also a number of staff members from various hierarchical levels we came across our fieldwork that did not know the concept at all. While there is limited use of RRI as a concept across the JRC (e.g., the term is not used in policy documents), the current transformation process moves several – yet not all – units and activities of JRC closer to ideas related to RRI.

The conclusion of this diagnosis is that RRI-keys and the three O's are implicitly present within the JRC, but they lack a clear strategic (RRI) vision, *depth* and *reflections upon its scope and purpose*.

Therefore, this diagnosis (also) summarises some of the implicit assumptions and associations connected to RRI-relevant terms and concepts within these documents.

[37] Overall, four Work Programmes, two Stakeholder Consultation Documents, four (strategic) Policy Documents and two Scoping Papers have been reviewed. Furthermore, 13 experts have been interviewed.

8.2. Scope of this document

This report provides an analysis of the "Joint Research Centre" (JRC) based on public documents, web content and interviews. Major focus of this document is the Governance structure, its relation to other entities such as other Horizon 2020 Programme Lines or the European Commission (EC), and the ways how the concept of Responsible Research and Innovation (RRI) becomes visible in JRC discourses and beyond.

8.3. Methods

The NewHoRRIzon project partners decided to split JRC activities regarding the work of EURATOM (nuclear energy related topics) and other research agendas of the JRC. This report focuses on activities that are not related to nuclear research. The JRC's 2030 Strategy acknowledges the distinction between these two activities, yet is claims not to demarcate the nuclear and non-nuclear activities: "While DG JRC's nuclear and non-nuclear activities are distinct from one another in certain respects, they should not be viewed as entirely separate. Indeed, they benefit one another"(JRC, 2016, p3). NewHoRRIzon has nevertheless decided to split its Social Labs since much content and funding are in many respects kept separate although there are many overlaps and cooperation.

This document is based on a preliminary version that was based on quantitative document analysis as well as on six expert Interviews with JRC staff. For desktop analysis, approximately 15 available documents on the level of the Working Programme have been coded and analysed by qualitative content analysis using ATLAS.ti. This included, among other documents, the work programmes for JRC from 2014-15, 2016-17 and 2018-20, and the 2030 Strategy. Search keywords were selected deductively from literature on RRI, including the term itself as well as related terms such as the RRI "key aspects" of the EC (Ethics, societal engagement, Gender Equality, Open Access/science and Science Education) and the "3O's", Open Innovation, Open Science, Open to the World (European Commission, 2016). This approach provides a perspective about the *use* of these concepts in the context of public JRC documents. In a first analytical step the documents were auto-coded by these keywords described above, and, in a second step, the context was explored in-depth.

The adaptions and amendments to the first version of this report are based on seven more interviews with JRC staff and other persons professionally engaged with the JRC which makes a total of 13 interviews. Furthermore these are also based on extensive document research of JRC web content, work programmes and evaluation reports. The interviews were documented using a common template provided by NewHoRRIzon partners. The desktop research was aiming to add documents that were not addressed in the first version of this report, such as the external evaluation reports from 2015 and 2017, and additional JRC strategy papers.

8.3.1. General scope of the Joint Research Centre (JRC)

This chapter contains a self-description of JRC that is included in a 2017 JRC Handbook titled "JRC Services: A Handbook for national, regional and local authorities on why and how to engage with the European Commission Science and Knowledge Service". This brief description of JRC was drafted for the audience of local policy makers that aim for cooperation with the JRC. However, it is a summary that reflects the discourses found in many JRC documents about what the JRC "is" and what it is doing:

“For about 60 years now, we have been acting as a science provider and knowledge broker. We contribute to ensuring that policy-makers have the best available evidence when taking important decisions that have an impact on EU citizens' daily lives, whether when preparing policies or implementing them. Our research contributes to jobs and economic growth, a healthy and safe environment, secure energy supplies, sustainable mobility, consumer protection and safety and nuclear safeguards to name but a few areas. We also play a key role in the development of standards that stimulate innovation and competitiveness in Europe. Our aim is to use scientific knowledge to build solutions that are effective, efficient, equitable and sustainable. While most of our scientific work serves the European Commission and the EU citizens by supporting the implementation of EU legislation, we also work with national and local authorities in European countries. We cooperate with the scientific community and with international partners. We collaborate with over a thousand organisations worldwide whose scientists have access to many JRC facilities and capabilities through collaboration agreements. The JRC is predominantly funded by the EU framework programme for research and innovation, Horizon 2020 (2014-2020), and by the EURATOM Research and Training Programme for its nuclear work. We employ about 3000 staff and are located in five Member states: Brussels and Geel in Belgium, Petten in The Netherlands, Karlsruhe in Germany, Ispra in Italy and Seville in Spain. Our Board of Governors represents the Member States and associated countries and contributes to devising the JRC's strategy and work programme.” (JRC, 2017, p2).

The Joint Research Centre (JRC) exists since more than 60 years and has undergone multiple transformations so far. “On 25 March 1957, six countries (Belgium, Germany, France, Italy, Luxembourg and the Netherlands) signed in Rome the Treaty on the European Economic Community and the Treaty on the European Atomic Energy Community (Euratom). The latter established a Joint Nuclear Research Centre (JNRC) and gave it its first 5-year work plan.” (JRC, 2017b, p8). This was the start of the Joint Research Centre (JRC) which has today grown into a significant research body for the European Union. Between 1971 and 1973, it was approved that JRC is to work on non-nuclear issues, whereas in 1989, the Council permitted JRC to do research for third parties including financial compensation or payment. In the 1980es, JRC’s activities became part of the EU Framework Programme for Research. Already in 1998, the Council approved the JRC focus on “policy support” that is still visible in the recent mission and vision (such as the JRC 2030 strategy, see chapter 4.1). The JRC currently is in a phase of intense transformation, as this report shows.

The JRC describes itself in various places as the in-house science service for the European Commission (EC) that provides scientific evidence for policy, just as the quote from the major webpage does:

“The Joint Research Centre is the Commission's science and knowledge service. The JRC employs scientists to carry out research in order to provide independent scientific advice and support to EU policy.”[38].

The non-nuclear activities by JRC are funded by the EU's framework programme for research and innovation (currently H2020). EURATOM Research and Training Programme funds the nuclear work of JRC. The JRC budget amounts to approximate €330 million annually for direct support to EU

[38] https://ec.europa.eu/info/departments/joint-research-centre_en

institutions through scientific and technical advice to policy. “H2020 amounts to €79 billion of funding available over 7 years (2014 - 2020), in addition to the private investment that this money will attract. 2.47% (€1903 million) of the total Horizon 2020 budget will fund JRC’s non-nuclear direct actions” (European Commission, 2012, p1). Further income is generated by the JRC through performing additional work for Commission services, and contract work for third parties such as regional authorities or industry, as indicated by JRC webpage information[39].

There is a great amount of information about the JRC structures and its Governance to be found online and in key documents. It is thus not easy for external observers to understand the Governance structures of this entity. The 2017 external evaluation confirms this observation: “The JRC presents itself in many different structures to the outside world and we have the impression that there are more today than in the past” (Cunningham et al., 2017, 15). Our research suggests that there are multiple valid ways to describe the JRC since this entity performs a large number of activities that are organised towards different structures and sub-entities within the JRC. The following points provide an overview on some ways to frame the JRC structures and the attempts to demarcate the JRC units and actions.

- The JRC is a Directorate General (DG) of the European Commission (EC) and thus repeatedly but not exclusively referred to as “DG JRC”.
- The JRC is financed by the EU Framework Programmes (currently H2020) and can thus also be considered a “Programme Line” of H2020.
- JRC is under the responsibility of Tibor Navracsics, Commissioner for Education, Culture, Youth and Sport, and not in the responsibility of Carlos Moedas, Commissioner for Research, Science and Innovation (see chapter 4.2).
- The JRC is geographically distributed across six sites[40]. Yet, there is also National Contact Points (NCP) for the JRC in each member state of the European Union (EU) established and financed by governments of the 28 EU member states. Besides the six JRC locations there are newer entities such as the “Centre for Advanced Studies”, the “Knowledge and Competence Centres”, or the “EU Policy Lab”, that work somehow across these geographical structures. The JRC is also organised along units, and there is the newer divide of activities regarding knowledge management and knowledge production.

These points listed above provide an overview on different ways of defining and demarcating the JRC, its actions and its sub units. JRC itself acknowledges its hybrid character mainly referring to its activities at the intersection of science and policy: “DG JRC can best be described as a 'boundary organisation' sitting at the intersection of the scientific and policy spheres” (JRC, 2016, p3).

The following chapters elaborate the mission and Governance structures of the JRC in more detail

[39] https://ec.europa.eu/jrc/en/about/organisation
[40] Brussels (BE), Geel (BE), Ispra (IT), Karlsruhe (GER), Petten (NL), Seville (ESP)

8.3.2. The JRC Mission

One key document for the current transformation of the JRC polity and policy is the 2030 Strategy. This document heralds three "basic building blocks":

1) The **vision** of JRC is narrated as follows: "To play a central role in creating, managing and making sense of collective scientific knowledge for better EU policies" (JRC, 2016, p6). This vision demarcates from earlier approaches to Governance since it accentuates the necessity to "manage knowledge" (rather than exclusively to produce it) and since it explicitly refers to "*collective* scientific knowledge" which underlines the trend to open up the JRC towards some external actors and audiences.

2) Within the last decades, the JRC has strengthened its focus towards policy support, as the current **mission statement** emphasises: "As the science and knowledge service of the Commission our mission is to support EU policies with independent evidence throughout the whole policy cycle." (JRC, 2016, p. 7).

3) Finally, the strategy also defines four **values** to guide the actions of JRC and its staff:

   - Accountability: We deliver on our commitments, we take responsibility for the outcomes and we provide thoughtful strategic follow-up. We are accountable to ourselves, our colleagues, to the Commission, and ultimately to Europe's citizens, as represented by the Member States and the European Parliament.

   - Openness: We are committed to a culture of teamwork and collaboration with internal and external partners alike. We value and promote openness of data, information and knowledge.

   - Inclusiveness: We respect people. We are committed to fairness and equality of opportunity and we value all individuals for their diverse backgrounds, experiences, styles, approaches and ideas.

   - Innovation: We study, embrace and promote a spirit of innovation. It is crucial to the continuing success of our organisation in generating maximum value from its results"(JRC, 2016, pp. 8f).¨

Within another key document, the JRC Strategic Plan 2016-2020, JRC activities are said to be focused on the new Commission's strategic policy priorities based on the ten priorities of the Commission President's Agenda for Jobs, Growth, Fairness and Democratic Change, as well as the Commission Work Programme 2016" (European Commission, 2016b, p. 10). According to webpage information, the JRC is "the EC's science and knowledge service which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy"[41]. JRC further states at the main webpage to "create, manage and make sense of knowledge and develop innovative tools and make them available to policy makers", and to "anticipate emerging issues that need to be addressed at EU level". A leaflet states about JRC's working focus that it "helps the European Commission achieve its political priorities in areas such as Jobs, Growth and Investment; Digital

[41] https://ec.europa.eu/jrc/en

Single Market; Security Union and the Energy Union" (JRC, 2017c, p. 1). These statements emphasise the major mission of the JRC: to provide scientific evidence for policy making.

Yet, the 2030 Strategy explicitly emphasises the issue of independence. While JRC "is independent of Member States, industry and other interest groups, DG JRC is part of the Commission, so cannot claim to be independent of it" (...) "However, while DG JRC staff work in close partnership with colleagues in the Commission, they do not take instructions from them regarding the scientific methods they use or the presentation of results" (JRC, 2016, p7). In the very same document, it also says that: "Questions and answers should be generated through co-creation by both DG JRC scientists and their colleagues in policy DGs. In other words, DG JRC will not take instructions from policy DGs, but will rather be an equal partner, working closely with them, while maintaining its scientific independence"(JRC, 2016, p10).

There are JRC goals, actions and aims communicated via diverse channels, such as the JRC webpage:

- As the European Commission's science and knowledge service, the Joint Research Centre (JRC) supports EU policies with independent scientific evidence throughout the whole policy cycle.
- We create, manage and make sense of knowledge and develop innovative tools and make them available to policy makers
- We anticipate emerging issues that need to be addressed at EU level and understand policy environments
- We collaborate with over a thousand organisations worldwide whose scientists have access to many JRC facilities through various collaboration agreements.
- Our work has a direct impact on the lives of citizens by contributing with its research outcomes to a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety.
- We draw on over 50 years of scientific experience and continually build our expertise in knowledge production and knowledge management.
- We host specialist laboratories and unique research facilities and are home to thousands of scientists.[42]

Other EC webpage information lists the major responsibilities as follows:

- create, manage and make sense of knowledge to support European policies with independent evidence
- develop innovative tools and make them available to policy makers
- anticipate emerging issues that need to be addressed at EU level and understand policy environments

[42] https://ec.europa.eu/jrc/en/about/jrc-in-brief

- share know-how with EU countries, the scientific community and international partners
- contributes to the overall objective of Horizon 2020
- conduct Euratom-funded research on nuclear safety and security to contribute to the transition to a carbon-free economy[43]

The recent strategy of the JRC relates to President Juncker's state of the Union Address of 2017 (European Commission, 2017) which includes a strong element of foresight (see more on foresight at the JRC in the description of the Governance structures). The JRC webpage lists the following 9/10 Commission's political priorities, the JRC contributes to: (1) Jobs, growth and investment; (2) Digital single market; (3) Energy union and climate; (4) Internal market; (5) Economic and monetary union; (6) EU-US free trade; (7) Justice and fundamental rights; (8) Migration; and (9) EU as a global actor[44]. The 2018 management plan "high priority goals" are defined as follows:

"In 2018, the JRC will contribute to measures completing the Capital Markets Union and the Security Union, strengthening the Economic and Monetary Union and the Banking Union, and putting in place the Energy Union. It will provide knowledge and tools for combating terrorism, further developing the Digital Single Market, and delivering on the EU agenda on migration. JRC's studies on circular economy and work on the new CO2 standards for cars, vans and heavy duty vehicles will provide valuable science advice to the respective initiatives at all stages of the policy cycle..." (European Commission, 2018b, p. 3).

The 2018 management plan furthermore emphasises the importance of excellence, partnerships, human resources and efficiency.

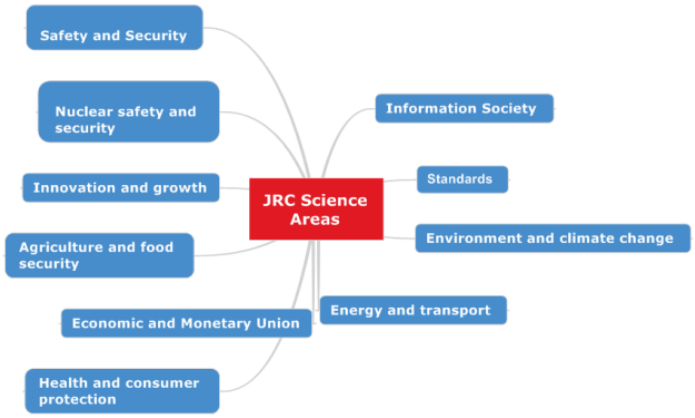
"In 2018, it [the JRC] will continue implementing initiatives to strengthen scientific excellence and the plans and roadmaps drafted in 2017 on strategic partnerships and human resources (HR) management. JRC will carry out top-level scientific research projects within its Centre for Advanced Studies and make efforts towards dedicating 20% of its resources to underpinning and exploratory research in the long-term. JRC will further expand the access to its research infrastructure and facilities and close agreements with higher education institutions within its new Collaborative Doctoral Partnership programme. Engagement with the candidate countries for EU accession, the European Neighbourhood Policy countries, with the African Union and EU's important trading partners will be promoted. Strategic partnerships with think tanks and renowned academic and research organisations will be enhanced. As regards HR management, the JRC will continue aligning staff competences with the Commission requirements and continue work on further developing its talent management and mobility programmes.

In line with the Strategy 2030, the JRC will also continue to work on the infrastructure development across its different sites to maintain an internationally-recognised, modern, safe and secure infrastructure thus creating a positive working environment which is environmentally, cost and resource efficient." (European Commission, 2018b, p. 4).

[43] https://ec.europa.eu/info/departments/joint-research-centre_en
[44] https://ec.europa.eu/info/departments/joint-research-centre_en

The JRC repeatedly refers to 10 science areas relevant for its work, as the following figure displays:

Figure 10: JRC Science Areas



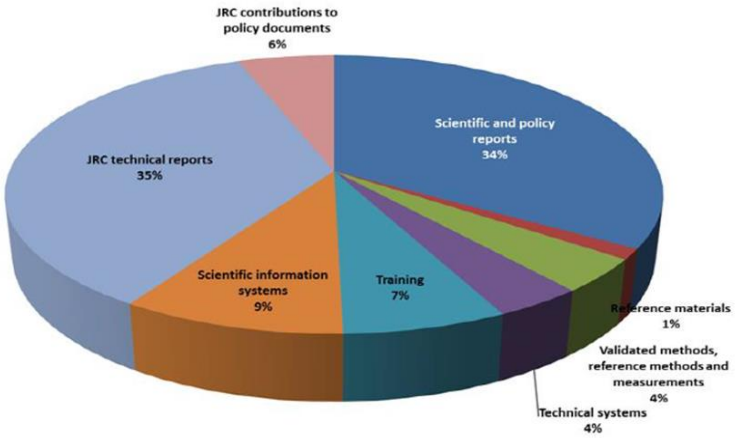
Source: webpage, https://ec.europa.eu/jrc/en/science-areas

A Commission Implementing Decision from 2017 names the major areas of support of the JRC as (1) excellence in science; (2) industrial leadership; and (3) societal challenges (e.g., health, demographic change and wellbeing and secure, clean and efficient energy) (European Commission, 2017b, p. 2).

The policy output by JRC mainly aims to prepare actions by the EC and others. "Overall, just less than 30% of DG JRC's effort in terms of human resources is devoted to the preparation of EU policies and just over 70% to their implementation" (JRC, 2016, p. 3). The JRC-output was evaluated and published in the strategic plan 2016-2020, where most of it was either scientific and policy reports (34%) or technical reports (35%).

Figure 11: Categories of policy-support

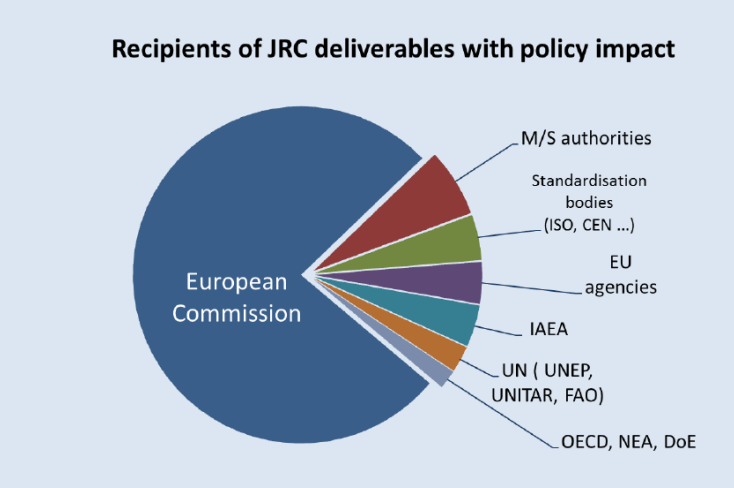
Categories of policy-support	
Science for policy reports	JRC contributions to policy documents
JRC Technical reports	JRC contributions to standards
Reference material	Validated methods, reference methods and measurements
Technical systems	Datasets
Scientific information systems and databases	Training



Source: European Commission, 2016b, p. 9

The EC is the most frequent recipient of JRC output as the following figure visualizes without numbers.

Figure 12: Recipients of deliverables



Source: European Commission, 2016b, p. 10.

Governance Structure

The responsible **Commissioner** for the JRC is **Tibor Navracsics**, responsible also for Education, Culture, Youth & Sport. JRC is not under the responsibility of Carlos Moedas, Commissioner for Research, Science and Innovation. Some research data indicates that the distribution of Commissioners across EU27/28 could be one possible explanation for this allocation of responsibilities, since the Commissioner's portfolio could be considered carrying more political weight having the JRC "on board". With the JRC attached to this Commissioners responsibility, it gains much more relevance within the EU polity landscape.

"The JRC **Board of Governors** assists and advises the Director-General and the Commission on the strategic role of the JRC and its scientific, technical and financial management. Annette Borchsenius is the Chairwoman of the JRC Board of Governors. Its members and participants bring a wealth of experience from their respective countries. Mostly seasoned professionals of the science–policy interface, former ministers and high-ranking civil servants, or eminent academics from renowned universities." (JRC, 2017b, p.28).

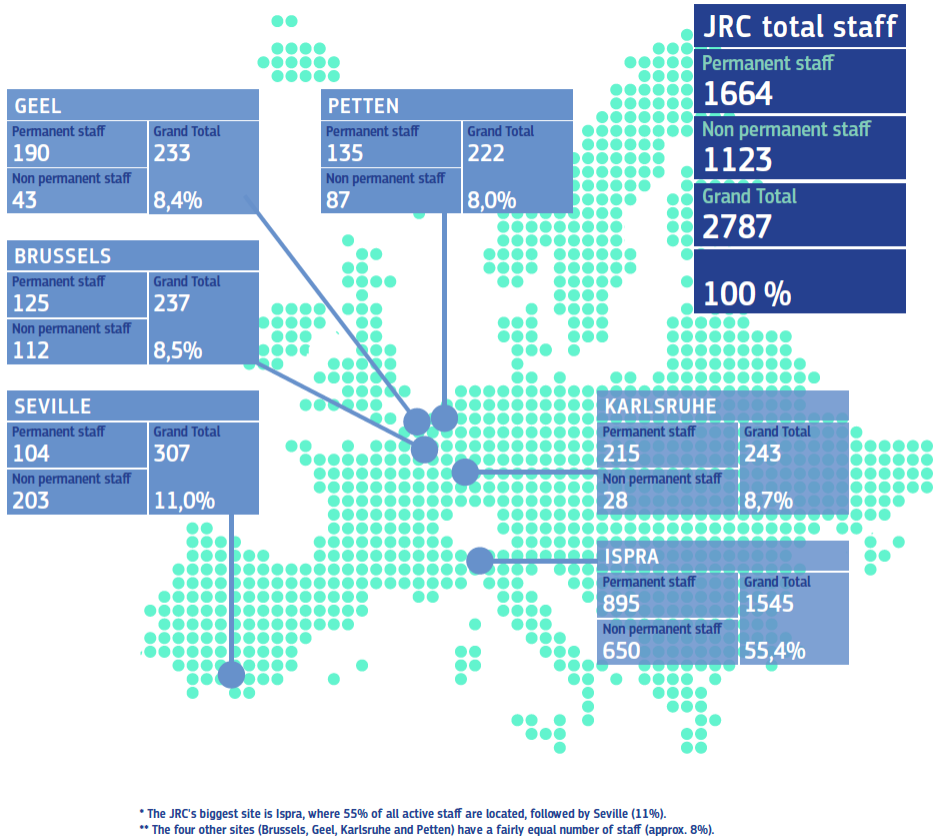
The **Director General, Vladimir Šucha,** recently initiated restructuring efforts at the JRC. He is responsible for Strategy and Coordination at JRC and he has also direct competences in the Knowledge Management of JRC.

The demarcation of Knowledge Management and Knowledge Production is one element in the larger re-structuring process that JRC is currently performing (see chapter 3.5).

The JRC is spread across six sites in five different countries of the EU (Brussels [HQ], Geel, Ispra, Karlsruhe, Petten, Seville) and employs almost 3000 people (European Commission, 2016c). There

are, beyond that, partnerships with various other research institutes and local authorities across Europe and beyond.

Figure 13: JRC staff across sites



Source: JRC 2017b, p70

Brussels hosts the headquarters of JRC including the office of the director-general. The directorate is also responsible for planning and strategy. The overall decisions on finances, scientific and technical management are made in this location, while some activities of the directorate are spread across the five other sites. **Ispra** is the largest JRC site and the third largest Commission site hosting approximate 1850 staff[45]. Due to its size, Ispra is home to multiple research activities of JRC including e.g. the Institute for Health and Consumer Protection (IHCP) and the Institute for the Protection and Security of the Citizen. The Centre for Advanced Studies is located in Ispra as well. The JRC facility in **Geel** was established in 1962 and "brings together multi-disciplinary expertise for developing new measurement methods and tools such as reference materials, promoting standardisation and harmonisation across the European Union to stimulate innovation and to protect consumers and citizens"[46]. Geel hosts for example the Institute for Reference Materials and Measurements. The **Karlsruhe** site hosts the JRC Directorate General for Nuclear Safety and Security and thus responsible for "the implementation of the JRC Euratom Research and Training Programme, the maintenance and dissemination of nuclear competences in Europe to serve both ''nuclear'' and ''non-nuclear''

[45] https://ec.europa.eu/jrc/en/about/jrc-site/ispra
[46] https://ec.europa.eu/jrc/en/about/jrc-site/geel

Member States."[47]. Furthermore there are two more JRC sites, one in **Petten** focusing e.g. on Energy and Transport, and one in **Seville** hosting among others the Institute for Prospective Technological Studies.

8.3.3. The JRC Centre for Advanced Studies (JRC-CAS)

The Centre for Advanced Studies (CAS) is part of the Unit for Scientific Development (Jutta Thielen Del Pozo) and one key element in the restructuring process of the JRC. The CAS launches smaller projects including JRC staff and external scientists and supports them with finances and manpower.

Vladimir Šucha stated regarding the new JRC entity, the Centre of Advanced Studies: "this is where we would like to bring in innovative ideas and fresh talent from outside the organisation in emerging fields where our in-house expertise isn't yet up to speed" (JRC, 2017b, p6). The 2030 strategy describes the CAS as "a single space within DG JRC, where top scientists will be able to create research teams, made up of DG JRC scientists, external scientists or both, to study new, multi-disciplinary scientific fields related to policy" (JRC, 2016, p20).

The JRC webpage provides a description that highlights once more the open character of this Centre and the vision to facilitate new ideas:

"The JRC Centre for Advanced Studies (JRC-CAS) has been established to enhance the JRC's capabilities to meet emerging challenges at the science-policy interface. Within an interdisciplinary environment, the centre collaborates with leading universities and research institutions across the EU and worldwide and performs cutting edge research to explore topics of societal importance. Research is carried out in thematic areas of relevance to EU policy, including areas of a long term strategic nature.

By specifically addressing ideas and knowledge in emerging fields across different scientific and technological disciplines, the centre will become an incubator for activities providing new insights, data, projections and solutions for complex and long-term challenges for the EU and our societies as a whole. Projects are led by a senior scientist with an established reputation in the research area, and have a limited duration of maximum 3 years. Projects may be subsequently integrated in to the JRC's core research activities, if successful. This ensures that the centre remains a stimulating and vibrant space where scientists are exposed to new ideas, a wide and dynamic spectrum of disciplines, allowing out-of-the box thinking for new solutions"[48].

8.3.4. The Policy Lab

The policy lab is linked to the knowledge management activities of JRC and led by Xavier Troussard. It is designed as an open lab where JRC staff end external people can work together. It runs a good number of projects and organises the annual Future-oriented Technology Analysis (FTA) conference. The policy lab is furthermore dedicated to the novel focus on foresight at the JRC, as the webpage information accentuates:

[47] https://ec.europa.eu/jrc/en/about/jrc-site/karlsruhe
[48] https://ec.europa.eu/jrc/en/research/centre-advanced-studies

"The EU Policy Lab is a collaborative and experimental space for innovative policy-making. It is both a physical space and a way of working that combines (1) Foresight, (2) Behavioural Insights, and (3) Design thinking to explore, connect and find solutions for better policies"[49].

The webpage information furthermore accentuates the experimental and inclusive character of this lab. The Policy Lab is the entity within the JRC that most explicitly speaks about involving "the public" or "citizens" in JRC activities.

"By accessing diverse areas of knowledge, we strive to co-create, test and prototype ideas to address complex social problems and to enable collective change. The Lab invites policy-makers to explore scenarios, connect issues and find solutions for better policies, acting as a facilitator and providing a safe-space for open interactions. It delivers insights and works side by side with the services and agencies of the European Institutions, international bodies, public organisations, universities and research centres. The Lab's main fields of practice are foresight, behavioural insights and design-thinking. The lab setting facilitates collaboration between policy-makers and society"[50].

8.3.5. The Knowledge Centres

"In policy making, the problem is no longer that we have too little information and data, but that we have a lot, and making sense of it all is challenging. The Knowledge Centres operated by the Joint Research Centre bring together experts and knowledge from different sources inside and outside the European Commission. They help policy-makers to understand the latest scientific evidence in a transparent, tailored and concise way. The Joint Research Centre operates five Knowledge Centres, with one more scheduled to launch in 2018" (JRC, 2017c, p. 2).

- Food and Nutrition Security
- Food Fraud and Quality
- Territorial Policies
- Migration and Demography
- Disaster Risk Management
- Bioeconomy

"These are virtual entities, bringing together experts and knowledge from different locations inside and outside the European Commission. Their job is to inform policy-makers in a transparent, tailored and concise manner about the status and findings of the latest scientific evidence. They are designed to be a 'one-stop-shop' in their respective areas, and include communities of practice"[51].

"Focus on knowledge management. In support of the Commission's objective of improving the way it manages knowledge, the JRC is running together with relevant Commission services Knowledge Centres for Disaster Risk Management, Bio-economy, Territorial Policy, and Migration and

[49] https://blogs.ec.europa.eu/eupolicylab/
[50] https://blogs.ec.europa.eu/eupolicylab/
[51] https://ec.europa.eu/jrc/en/knowledge

Demography. These bring together expertise from inside and outside the Commission and provide access to relevant data, knowledge and intelligence in a specific policy area. New Knowledge Centres will be planned and set up, including one on Food Fraud and Quality. The JRC also contributes to the Data4Policy group activities handling all aspects related to better use of data and will continue to support the European Semester process" (European Commission, 2018b).

8.3.6. The Competence Centres

The Competence Centres are described at the JRC webpage: "These are centred on analytical tools which can be applied to any policy area, bringing together in one place extensive expertise in this field. They offer training courses in the use of the tools for policy-making, advice on the choice of tools and also work directly with the Commission policy Directorates-General to apply the tools to the policy problems in hand"[52].

There are currently five Competence Centres in the following areas:

- Composite Indicators
- Microeconomic Evaluation
- Text Mining and Analysis
- Modelling
- Foresight – Megatrends Hub

8.3.7. Outreach of the JRC

Although the JRC is in some respects (such as in regard to funding and some of its research activities) a self-contained entity, it does promote exchange with external entities and this outreach is increasing with the recent restructuring process. The JRC has, for example, started a "new Collaborative Doctoral Partnership (CDP) scheme to higher education institutions to benefit from a strategic, win-win collaboration with the JRC"[53], as displayed at the webpage. Furthermore, there is international cooperation such as with the US and other non-European governments and research facilities. On the JRC webpage, it states that:

"...the JRC collaborates with many external organisations. Collaboration and networking with the international research community, national authorities and industry are crucial to carry out JRC's work programme. We encourage such partnerships as a means of sharing competencies, acquiring new knowledge and maintaining high scientific quality through objective benchmarking.

At the same time, our independence from national and commercial interests, our proximity to EU policy-makers and our breadth of expertise enable us to deliver highly valuable contributions to a wide range of joint research activities and make JRC a desirable partner.

The JRC works with some 1000 partners' world-wide, a large majority of which are located in the EU Member States. (...) The JRC has over 200 operational cooperation agreements and is an active

[52] https://ec.europa.eu/jrc/en/knowledge
[53] https://ec.europa.eu/jrc/en/working-with-us/collaborative-doctoral-partnerships

player in the global arena, gathering partners working on a diverse range of scientific fields worldwide. These agreements allow sharing of infrastructure, laboratory equipment, data materials as well as transferring knowledge. (...) Some agreements have a more political profile, for example agreements signed with regional authorities to foster cooperation between the JRC and local organisations, universities and companies. [54]".

There are multiple external entities the JRC cooperates and works for, as the quote above illustrates. The JRC webpage names the following: "The stakeholders, partners and beneficiaries of the JRC include: (i) EU Institutions and agencies, (ii) Member States, Candidate Countries and Associated Countries, (iii) international organisations, (iv) partner organisations from public and private sectors across Europe and the world" (European Commission, 2016b, p. 5). The 2030 Strategy states that "DG JRC has established a dense network of such partnerships, extending across Member States' public authorities, research organisations, the scientific community, industry, third country institutions and international and regional organisations" (JRC, 2016, p15). Beyond that there is exchange with the European Neighborhood Policy countries and with the African Union.

Regarding the question on why local policy makers should engage and cooperate with the JRC, a dedicated report by JRC states that "collaboration with European national and local authorities is mutually beneficial. (...) We offer our science-for-policy expertise as a service that adds value to national science infrastructures and policy makers. (...) We can help smaller administrations with resources and expertise they may lack and larger European countries and regions with European networking, scientific data and analysis in order to account for their situation into the wider EU context" (JRC, 2017, p. 4).

Overall, one can conclude that JRC indeed operates in-house activities, while a good amount of activities includes external partners. According to the information publicly available, cooperation seems to focus scientists and policy makers in most cases. Less-established actors in policy, such as NGO's and citizens are named less often. However, JRC emphasises its ambitions for cooperation, as the following quote demonstrates: "In addition, the JRC uses its scientific competences for cross-cutting and network-building activities in order to leverage and boost engagement of industry, develop new knowledge and skills and build strong partnerships with the Member States and other international stakeholders"(European Commission, 2012).

8.3.8. External Evaluation of the JRC

The JRC has transformed in terms of Governance, structure and research focus in the last years (see chapter 3.5) and also emphasises this transformation in documents and other communication formats. Elements in this process are two evaluations (reports published in 2015 and 2017) by independent external experts that seem to have a share in guiding, shaping and legitimizing this ongoing transformation. These evaluations were both chaired by Patrick Cunningham a Professor for Animal Genetics at the University of Ireland. Also a good share of the team members remained the same for the 2017 report. There is yet not much information about the selection or tendering of these experts. During the evaluation processes, the evaluators were guided by person from the JRC management level. Overall, both reports draw a positive résumé on the JRC and its activities.

[54] https://ec.europa.eu/jrc/en/working-with-us

The “Ex-post Evaluation of the direct actions of the Joint Research Centre under the Seventh Framework Programmes 2007-2013” (Cunningham et al., 2015) starts with an introduction by the chairman that highlights the positive performance of JRC: “In our final report we came to a broadly positive assessment of the performance of the JRC in its functions as the Science Service of the European Commission” (Cunningham et al., 2015, p. 3). However, this introduction also asserts that JRC would benefit from more visibility to the “outside world”.

The 2015 Report itself embraces “the effectiveness of the JRC as the Commission’s Science Service in support of Euratom and EU policies” (Cunningham et al., 2015, p. 5) as well as its scientific output and impact, while it also criticises that achievements are not promoted enough. The panel thus welcomes the JRC’s open-access strategy that was initiated by the time of the evaluation.

The major point of critique in the 2015 document addresses core elements of RRI such as engagement, transparency and Gender Equality. “The Panel recommends the JRC to embrace the Horizon 2020 principles on Responsible Research and Innovation (RRI), which also implies strengthening the involvement of social sciences and better exploiting its large potential for interdisciplinary work” (Cunningham et al., 2015, p. 6). The report assesses that there is “room for improvement” in these areas. The Gender balance within JRC was also named as an area where transformation would be beneficial. The JRC has, in recent years, actively fostered equality in regards to Gender (JRC, 2016). By the time of the report, a respective recruitment strategy was suggested: “The Panel recommends that the JRC should pursue a recruitment policy aimed at achieving an overall Gender balance and diversity of JRC staff, particularly at senior and middle-management level.” (Cunningham et al., 2015, p. 6). There is a dedicated section within the 2015 evaluation report that addresses RRI and suggests how to best implement elements of RRI:

“Integrating RRI concepts for the JRC means that it should be innovative in supporting policy-making: a) through a multidisciplinary approach, i.e., combining or involving several separate disciplines; b) by engaging with all societal stakeholders (researchers, citizens, policy makers, business, civil society organisations, etc.)” (Cunningham et al., 2015, p. 25).

The 2017 JRC implementation review was conducted to evaluate how the recommendations of the previous report were implemented (Cunningham et al., 2017). The introduction by the chairman is positive towards the JRC activities and highlights the speed of transformation, the mission clarity (“science for policy”) and the opening of JRC towards engagement. It is to add here that the JRC’s audience for engagement does not in all fields include actors that are identified as relevant from a RRI perspective, such as publics or NGOs. The 2017 report embraces the strengthened anticipation and foresight culture within the JRC as well as its ambitions to break silos, foster multidisciplinary and involving social sciences and humanities. The panel also acknowledges JRC’s ambitions to improve Gender balance. The renewed mission (“to support EU policies with independent evidence throughout the whole policy cycle”, see chapter 4.1) and the new structure (new entities as described in chapter 4.2 and the divide of knowledge production and management) of the JRC are highlighted as positive development.

The evaluators repeatedly emphasise the impressive speed of transformation within the JRC. According to the evaluation panel, the leading document for JRC transformation (JRC 2030 strategy) was drafted with the involvement of the Commission, JRC staff and the Board of Governors. However, the panel expresses its fear that not all parts and units of JRC follow these: “We know that

such transformations are challenging, demanding and take time to settle down." (...) "Not all directorates have adapted equally quickly and enthusiastically "(Cunningham et al., 2017, 15). An open letter by the trade union R&D Ispra to Mr. Šucha reveals that there is indeed some resistance to these transformations[55]. This letter states that some JRC trade unions are "highly critical" towards the 2030 strategy. Furthermore, the introduction of knowledge management results either in a reduction in the knowledge production sector, or in a situation where staff has to add the management activities to the production work which relates to the widely spread credo: "do more with less" (JRC, 2016, p. 2).

While the term RRI and related aspects is one major recommendation of the 2015 report, this term is not used in the 2017 report at all. While the recent report again relates to RRI-related aspects such as Gender Equality, multidisciplinary and Open Science, the word "Responsible Research and Innovation" as such is not used any more. While the current transformation process of the JRC has moved this DG towards ideals of RRI, there seems to be little political support for RRI as a concept (that emerged from DG R&I).

8.3.9. Recent changes and future perspectives

The European Commission (EC) polities have undergone transformation in recent years. This transformation is, for example, visible in the smaller and more condensed number of EC priorities (see also chapter 4.2). This transformation impacts also the JRC. In 2015, JRC developed "a long-term strategy for how the organisation should evolve in the next 15 years. The need for a new strategy for DG JRC derives from the changing context in which the Commission operates and the need for DG JRC to evolve to be able to provide the best possible support in this dynamic environment" (European Commission, 2016b, p. 6). In the foreword to the 2017 JRC Annual Report, Commissioner Tibor Navracsics said that "2017 was a special year for the JRC. Not only because we celebrated its 60th anniversary but also because it started to reap the benefits from its new strategy and organisation." (JRC, 2017b, p2). This links on the one hand to new governance structures such as the focus on knowledge management and knowledge production (see chapter 4.1), but also to content decisions such as the strengthened focus on cooperation and engagement.

The recent JRC strategy paper, the "JRC Strategy 2030", describes the future vision of the JRC as in line with the transformation of the EC:

- "It must demonstrate its added value by providing knowledge or services which no other source is so well placed to provide.
- It must be a strategic partner which is close to the political heart of the Commission. Rather than acting as some kind of "consultant", responding to ad hoc requests from individual parts of the Commission, its focus should be on the real political priorities, which will often mean working with many different parts of the Commission at the same time.
- It must therefore be able to work across policy silos, which means that its own structure must become more integrated. There must be "one DG JRC", with an integrated management structure, and all parts of the organisation working seamlessly together.

[55] http://www.rdispra.eu/2016/02/jrc-strategy-2030.html

- It must become leaner and more efficient. Like all parts of the Commission, it has to do more with less. It has to use its resources in a smarter way.

- It must be people-centred. It must attract the best professionals and provide them with a stimulating environment to work in." (JRC, 2016, p2)

While some of these points are more general in the way they are narrated, others refer explicitly to matters that relate to ongoing changes within JRC and the EC. One example is the randomly mentioned effort to break silos and to thus launch projects and entities that work across sites and across former units (e.g. the Centre for Advanced Studies)" (JRC, 2016, p. 5).

Another change-driver is the focus on foresight within JRC. The 2030 strategy thus states: "While complexity and uncertainty are growing and a lot of developments cannot be predicted as such, a stronger anticipation culture would strengthen EU preparedness and resilience" (JRC, 2016, p2). The activities labelled "Foresight and Horizon scanning"[56], or the "Competence Centre on Foresight: Megatrends Hub" are manifestations of this discourse[57].

8.4. Current situation of RRI in the JRC

8.4.1. RRI in brief

There is some knowledge about RRI given at the JRC. Yet, there are also a number of staff members from various hierarchical levels we came across our fieldwork that did not know the concept at all. While there is limited use of RRI as a concept across the JRC (e.g., the term is not used in policy documents), the current transformation process moves several – yet not all – units and activities of JRC closer to ideas related to RRI. Thus, the JRC applies an approach of "de facto RRI" (Rip, 2014) while the term and concept itself is missing from JRC policy documents or the JRC culture in general.

8.4.2. Desktop findings

8.4.2.1. The role of RRI on...

Policy document level

General level: some awareness	There is the use of aspects related to RRI and the 3O's but no explicit use of the terms "RRI" or 3O's. Use of RRI-aspects increased since the current restructuring of the JRC and given in particular units and projects. Other parts of JRC show almost no awareness of RRI.
Governance: high awareness	The current restructuring process of the JRC places much attention on Governance issues and this is visible in policy documents such as the 2030 Strategy. With the introduction of "knowledge management" to supplement "knowledge production" it is anticipated to better reach those who need information ("science for policy"). This includes also the idea for a more inclusive knowledge production which has indeed arrived at some places (e.g. the Centre for Advanced Studies or the Policy Lab) but not in others.
Open Science: high	JRC policy documents herald a shift towards Open Science at the JRC.

[56] https://ec.europa.eu/jrc/en/research/crosscutting-activities/foresight
[57] https://ec.europa.eu/knowledge4policy/foresight_en

awareness	Indeed, JRC has launched a number of activities to make JRC knowledge, data and infrastructure available for "the outside world". Open Access is given attention across the JRC as the following statement from a JRC brochure reveals: "The JRC's data policy is driven by transparency with the aim of contributing to innovation. It is a pillar of the development and implementation of scientific knowledge management at the JRC"[58]. The 2030 Strategy acknowledges novel trends in science such as digitalisation or citizen science and thus derives the need for sharing and collaboration: "New technologies mean that scientists across the world can collaborate more easily in a particular field or work together to tackle a complex problem. There is a global shift towards Open Access to research publications and data" (JRC, 2016, p4).
(Public) Engagement: some awareness	Recent efforts to emphasise and strengthen the link of the JRC to the "outside-world" can be observed in JRC narratives across policy documents. While engagement is in some instances foremost targeted towards external experts and scientists, there are also references to engage less-established actors such as patients, publics, and citizens. The latter kinds of engagement activities are typically located in these newer entities such as the Centre for Advanced Studies or the Policy Lab. A 2016 JRC Science for Policy Report titled "Citizen Engagement in Science and Policy-Making Reflections and recommendations across the European Commission" published by Figueiredo Nascimento S, Cuccillato E, Schade S, and Guimarães Pereira A is said to be "the result of a collaborative effort with colleagues with the goal of strengthening the European Commission's agenda for citizen engagement in science and policy-making. (JRC, 2016b, p. 2)". This report understands citizen engagement as "ranging from civic engagement and public participation, to citizen science and Do-It-Yourself practices" (JRC, 2016b, p. 6). Aim of this report is to clarify the various understandings of citizen engagement in science and policy and to promote citizen engagement in the work of the Commission. The authors describe a strong favour of the Commission for matters of citizen engagement. According to this report, "a boost in democratic legitimacy, accountability and transparent Governance can be one of the main positive outcomes, especially for an institution such as the European Commission often seen as not being close to citizens. (...) Citizens' inputs can offer a unique understanding of societal concerns, desires and needs, and thus, a better definition and targeting of European Commission's services. (...) Citizens in certain instances can provide evidence for policy-making and evaluation of policy decisions, while also generating ideas for new policies or services." (JRC, 2016b, p. 3). At the same time, the authors of this report claim that better feedback mechanisms and more inclusive practices should be anticipated by the Commission in a transparent manner. They also claim a lack of clarity about how citizen engagement should be put in place for the various EU institutions. This includes also clarifying "who are the relevant citizens in each case" (JRC, 2016b, p. 4). In regard to the JRC, the report suggests among other points to develop "physical spaces and ways of working to develop and test collaborative, hands-on and experiential approaches with citizens, under a 'lab setting'

[58] https://ec.europa.eu/jrc/en/about/jrc-in-brief/data-policy

	approach pursued for instance through the EU Policy Lab (...) and through the series of workshops and a planned makerspace (within JRC I.1) in partnership with network of museums, makerspaces, living labs and other innovation spaces" (JRC, 2016b, p. 5). Beyond that it is suggested to strengthen the interdisciplinary collaboration at JRC also in regard to social sciences, to include citizen engagement in each JRC projects, and to foster trainings on engagement tools and techniques.
Gender: some awareness	The external evaluation reports were influential for the policy documents at JRC. The 2015 external evaluation report (see chapter 3.4) suggested to pay more attention to Gender balance particular in management positions of the JRC and thus suggested a respective recruitment strategy (Cunningham et al, 2015) .The 2017 implementation review was overall positive on the developments that JRC da achieved by this time (Cunningham et al., 2017). Indeed, according to the organisational chart (see chapter 3.2) there is a good number of female personnel in management positions. While Commissioner and Director General are exercised by males, the head of the Board of Governors and the Deputies are performed by females. JRC has also taken up the topic in their major policy papers since the 2030 Strategy claims that "[b]y 2030, at the latest, 50% of positions in all management categories will be occupied by women" (JRC, 2016, p. 22).
Ethics: some awareness	Ethics plays a comparable minor role at the JRC. This might relate to the European Group on Ethics that has the major responsibility for ethical questions in the EC. JRC's approach to ethics and integrity is defined in the 2030 Strategy. JRC is thus dedicated to the Commissions ethical principles and additional principles defined in this paper: • "Accountability: We deliver on our commitments, we take responsibility for the outcomes and we provide thoughtful strategic follow-up. We are accountable to ourselves, our colleagues, to the Commission, and ultimately to Europe's citizens, as represented by the Member States and the European Parliament. • Openness: We are committed to a culture of teamwork and collaboration with internal and external partners alike. We value and promote openness of data, information and knowledge. • Inclusiveness: We respect people. We are committed to fairness and equality of opportunity and we value all individuals for their diverse backgrounds, experiences, styles, approaches and ideas. • Innovation: We study, embrace and promote a spirit of innovation. It is crucial to the continuing success of our organisation in generating maximum value from its results"(JRC, 2016, p8). Beyond that there is a value statement by JRC: "We are open and honest, innovative and accountable and treat everyone with respect. We offer opportunities for our staff to realise their potential" (JRC, 2016, p9).
Science Literacy and Education	JRC policy documents name the importance of communicating JRC activities and to reach out - science literacy and public education is not mentioned.

3O's and beyond RRI	The 3O's are not mentioned explicitly across the analysed documents. There are, however, implicit actions that relate to RRI and the 3O's. JRC has developed a flexible approach to excellence in its policy papers, yet much of it has not arrived in practice so far. Excellence is named as a key merit of JRC in the 2030 strategy: "DG JRC's commitment to excellence is, and must remain, unwavering. It is the key to achieving its vision and mission". However, the 2030 strategy further acknowledges that "[t]here is a lively debate about what constitutes scientific excellence and how to measure it." and that "traditional metrics have disadvantages, not least the perverse effects they can produce by putting researchers under intense pressure to publish, no matter what"(JRC, 2016, p19). Beyond that it is anticipated to find ways to document new kinds of research output in the future. Thus, excellence is framed as a "moving target" with JRC open for adapting its standards.

Scoping level

Not applicable for JRC

Work programme level

General level: some awareness	The work programme level is in most respects similar to the level of policy papers which is not surprising given that JRC is not a "typical" programme line. Again, RRI neither the 3O's are not used as a term but addressed implicitly. One major difference is that Public Engagement plays a comparably minor role in the work programme level. Engagement is merely focused towards non-JRC scientists and experts (and less towards actors such as NGOs or publics). In these narratives, issues such as increasing quality and pushing excellence are addressed, as the following quote demonstrates: "The JRC shall continue to pursue excellence in research and extensive interaction with research institutions as the basis for credible and robust scientific-technical policy support. To that end, it will strengthen collaboration with European and international partners, inter alia by participation in indirect actions"[59].

Call level

Not applicable for JRC

Project level

General level: some awareness	We see a similar divide across the JRC activities regarding RRI and 3Os in the project level. Again, RRI neither the 3Os are not used as a term but addressed implicitly. However, there are a number of projects that implicitly "use" RRI-related aspects, while others do not refer to these issues at all. Again it is projects launched in the newer units and centres that are closer to RRI.
Public Engagement:	A 2017 paper first authored by Ângela Guimarães Pereira from the JRC

[59] http://cordis.europa.eu/programme/rcn/664511_en.html

limited to some awareness	"suggests how an in-house culture of reflexivity and humility could trigger changes in the existing styles and methods of scientific governance; at the JRC, taken as example, this would mean opening up to the existing plurality of norms and styles of scientific enquiry, and adopting more participatory approaches of knowledge production, assessment and governance" (Pereira, a. G.; Saltelli, A., 2015, p. 2). This perspective reveals that there is much room for establishing citizen engagement across the various JRC units and activities. Another article by JRC staff published in Palgrave Communications claims that the JRC aims to help researchers and policy makers to develop skills in the area of Public Engagement. This is framed as part of the broader strategy to foster knowledge management across the JRC. • "Policy deliberation: Focus on long-range planning perspectives, continuous public consultation, and institutional self-reflection and course correction. • Knowledge co-production: Focus on intentional collaborations in which citizens engage in the research process to generate new knowledge. • Citizen science: Engage citizens in data gathering to incorporate multiple types of knowledge. • Informality: Encourage less structured one-on-one interactions in daily life between researchers and publics" (Topp, L. et al., 2018, pp. 5f).
Science literacy and education: some awareness	A current project randomly cited in JRC documents is named Resonances II and operates at the intersection of art and science[60]. The JRC's Centre of Advanced Studies, together with the Leonardo Da Vinci Museum in Milan and other actors, seeks to find answers to the question of how to build a fair world. This project follows an inclusive strategy and is dedicated to Open Science and addresses questions of science literacy and education. The Project that brings together scientists and artists to find new topics and to generate visibility of JRC activities via exhibitions. JRC hosts a Visitor's Centre at JRC Ispra (Italy) which is open to interested citizens during the week. This exhibition includes interactive elements and aims to explain the many research areas of JRC.
Open Science: some awareness	The JRC Data Catalogue provides access to JRC data of different kind since 2016. "The data catalogue constitutes a growing inventory of data generated by the JRC and scientific partners"[61]. JRC also participates in the EU Open Data Portal. JRC has made an Agreement on Open Access Publications with Elsevier[62] and has their own repository for JRC publications[63]. "The Joint Research Centre (JRC) publishes most scientific publications, providing EU citizens,

[60] https://ec.europa.eu/jrc/en/event/exhibition/resonances-ii-exhibition-fairfear
[61] https://blogs.eui.eu/library/joint-research-centre-data-catalogue-launched-by-the-european-commission-on-15-march/
[62] https://www.elsevier.com/about/open-science/open-access/agreements/joint-research-centre
[63] http://publications.jrc.ec.europa.eu/repository

	governments and businesses with free digital access to official information and data from JRC research."[64].
Training: limited awareness	There is a newly established PHD programme called Collaborative Doctoral Partnership (CDP) that allows students to be co-hosted by universities and the JRC[65]. The idea is to train scientists at the intersection of policy. Beyond that, JRC offers multiple training programmes for other DGs of the EC.
Gender	no specific projects found

8.4.2.2. Proposal Template level

Not applicable for JRC

8.4.2.3. Evaluation level

Not applicable for JRC

8.4.2.4. General use of RRI

The narratives about the JRC in documents and web content draw the following image: A decade ago, the JRC was a much more self-contained DG and work was often performed in silos and not visible from a non-JRC perspective. The recent transformation process aims to work exactly against this older version of the JRC and aims to stimulate exchange across the JRC and with the outside world. This new approach relates much more to ideas related to RRI, yet, as our research suggests, RRI as a concept is not embraced by the JRC.

The JRC-RRI relation links also to broader structures of the EC. The JRC is not in the responsibility of Commissioner Moedas and DG R&I but attached to Commissioner Tibor Navracsics. From a JRC's perspective, RRI can be considered a concept that emerged from another Commissioner since RRI emerged to a good extent from DG R&I. Beyond that, the concept of RRI is recently under pressure. While Carlos Moedas (DG R&I) was long explicit about RRI, he seems to focus the 3O's more recently. Furthermore, the recent impressions on Horizon Europe (FP9) do not include RRI such as H2020 did (European Commission, 2018).

Particularly more recent activities and missions (see part 3) of the JRC have embraced aspects related to RRI, such as Public Engagement, Governance, Gender Equality, and Open Science, while there indeed seems to be room to move further in this direction if this is to be preferred. From a NewHoRRIzon perspective, the spread of RRI would be particularly important for the JRC since it is one key actor in the EU science landscape. Beyond that, JRC cooperates with almost any other DG in the EC and beyond. A more inclusive approach to research and Governance would thus strengthen the democratic character of the EC at a more general level.

Throughout the desktop research almost no use of RRI as a *concept* was found. The term RRI is not used at all in any official documents (e.g., Work Programmes 14-15, 16-17, 18-20 and the JRC Strategy 2030) or the webpage content we included in our analysis. Some of the six EC keys related to RRI (see chapters 4.1.1-4-1.6) were found in the quantitative analysis.

[64] https://ec.europa.eu/jrc/en/publications-list
[65] https://ec.europa.eu/jrc/en/working-with-us/collaborative-doctoral-partnerships

The 2015 external evaluation of the JRC (see chapter 4.4) recommended the implementation of RRI in various parts of the Joint Research Centre, whereas the implementation review of 2017 (see also chapter 4.4) did not refer to RRI anymore. The reviewers highlighted different aspects related to RRI that the JRC has implemented so far (some of them suggested in the 2015 report), but they did not insist on the term RRI anymore.

8.4.3. RRI beyond the keys

Besides the already sketched out activities it is to mention that JRC policy documents give much attention on employees, and how they may evolve within the JRC (see 2030 Strategy).

JRC is confident that its activities have strong output legitimacy towards Europeans: "Its [the JRC's] work has a direct impact on the lives of European citizens through its research on societal challenges such as creating a healthy and safe environment, secure energy supplies or sustainable mobility" (JRC, 2017c, p. 1).

8.4.3.1 Theoretical framework of RRI applied in JRC

While the aspects of RRI are present in policy documents and to a lesser extend also in Working Programmes, these are not visible in many activities of the JRC. At the same time there are indeed units and projects that use aspects related to RRI while term itself is never used within JRC.

8.4.4. Overall assessment of RRI in the JRC

Category	Value	Description
B	Some awareness	• RRI as concept is (implicitly or explicitly) present in some documents; • Some RRI keys and O's are used and referred to in any document; • There is some process of better social embeddedness through Governance or engagement

8.4.5. Interview findings

Since the negotiations with the JRC management regarding the Social Lab Workshop took longer than expected, the workshop is postponed but confirmed for September 24th-25th 2018. We agreed with JRC officials to focus a project that is part of the JRC's Exploratory Research programme and related to the Scientific Development Unit in Ispra, Italy. This will provide access to a current project that includes elements that relate to RRI and that allow generalisation for wider JRC activities.

Preceding this agreement there has been e-mail contact with the Directorate level of JRC as well as two meetings with JRC members in leading positions. The first meeting was held in May 2018 in Brussels and included two persons involved in the management level of JRC and the Policy Lab. The second meeting took place in July 2018 in Vienna and included two different persons involved in the Management level of JRC and the unit for Scientific Development. The Social Lab Workshop was scheduled right after this second meeting.

While the first interviews started already before the negotiations sketched out above, the interview study and its analysis has been stopped until the terms of cooperation were cleared with JRC

officials. The following section thus provides only preliminary findings based on 13 interviews with JRC staff and external actors that cooperate with JRC.

8.4.6. Shared understanding of RRI

Among all interview partners, there is agreement that neither by senior nor by executive JRC staff embraces RRI as a concept, also for "political reasons". There is indeed knowledge about RRI across the JRC members (particular in the management sections of JRC); yet other employees do not know the concept at all. RRI is used more implicitly across JRC. During the interviews, it was widely acknowledged that aspects such as engagement and Open Science gained increasing attention in the last decade across JRC. However, some interview partners mentioned that parts of the JRC do not embrace this trend.

The major challenge described during the interviews is that the JRC is widely “invisible to the outside world” - e.g. other scientists, universities and citizens. There is agreement that JRC would benefit from wider recognition of its work.

8.4.7. Beyond RRI

The current restructuring process which includes a higher emphasis on knowledge management and an opening process towards external actors (academics but also publics) was indeed considered as something related to the vision of RRI. While these developments were not associated to RRI as such, they are seen as part of a novel Governance strategy to make JRC more responsive for its environment. It was also mentioned that not all parts of JRC embrace the current restructuring and that this will probably take more time.

Some interview partners framed the very existence of JRC is an expression of RRI since it addresses policy relevant topics and issues which benefits European citizens. This perspective addresses a very selective aspect of RRI since it does not include engagement and inclusiveness.

8.4.8. Assessment of RRI based on interviews

Category	Value	Description
B	Some awareness	• RRI as concept understood by some stakeholders; • Some RRI keys and O’s are referred to by some stakeholders; • The need for mainstreaming through operationalisation is referred to by some stakeholders

8.5. Conclusions

While the terms RRI and 3O’s are not used at all across JRC, there seems to be an increasing embracement of aspects related to these. Awareness of RRI is given in some areas of JRC while in others it is not given at all. While the JRC aims to be a partner for the EC in terms of research, there is still a high dependency particularly since the EC defines many areas of research - yet not all and there is room for negotiation for the JRC. The absence of RRI in Horizon Europe does not support this ambivalence role of RRI within the JRC. At the same time, it seems that parts of the JRC are struggling with the current restructuring that has also brought the JRC closer to aspects related to RRI. There seem to be actors in favour of the recent developments and also some actors less

satisfied with this trend. Also it seems that some units have already “arrived” at the new structures whereas not all parts of JRC have done so equally by now. RRI as a concept is not embraced by the JRC while aspects related to RRI, such as Open Science, Gender, Governance or engagement indeed become more important.

8.6. Literature, links, resources

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9. Annex New HoRRIzon Diagnosis Report, Social Lab 18 Cross Cutting Activities

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9.1. Executive Summary

In this Diagnosis report, we provide an overview and illustrative examples of the current status of the concept of Responsible Research and Innovation (RRI) and components of RRI in the Horizon 2020 Cross-cutting Activities programme line. We have thoroughly assessed available documents and material in the following three Cross-cutting Activities' focus areas: Internet of Things, Smart and Sustainable Cities, and Industry 2020 in the Circular Economy. In addition to the document analysis, we have conducted an interview study with participants from selected projects in all three focus areas. In combination with the documents assessed, the interview study provides unique insights into the current status and perceptions of RRI in the projects.

As the report shows, with very few exceptions the concept of RRI does not appear to be an integral part of how societal challenges are addressed in the programme line. The Internet of Things, Smart and Sustainable Cities, and Industry 2020 in the Circular Economy focus areas are more concerned with addressing societal challenges in research and innovation activities than with the concept of RRI. Consequently, the findings suggest that there is no evident connection between targeting societal challenges and implementing the concept of RRI. However, the diagnosis report also shows that while the concept of RRI is not well-established in the Cross-cutting Activities programme line, there are components of RRI in several of the focus areas. These components include the three O's (Open Science, Open Innovation, Open to the World) and the six keys (Public Engagement, Ethics, Gender, Science Education, Governance, Open Data and Open Access). The most prevalent RRI components we have identified are Open Innovation and Public Engagement including stakeholder involvement, as well as aspects of Ethics and Governance.

9.2. Scope of this document

The aim of the NewHoRRIzon Diagnosis report is to identify the current status or awareness of RRI, and how these understandings shape the research and innovation (R&I) projects in Horizon2020 (H2020) programme line. In addition, the diagnosis builds the basis for the selection of potential participants for the NewHoRRIzon Social Labs. With inspiration from the diagnosis, Social Lab participants will design and implement new pilot activities with the aim of strengthening the concept or components of RRI in their current projects or organisations. As such, the aim of the diagnosis is to provide illustrative examples of when and how the concept and/or components of RRI appear in the three CCA focus areas Internet of Things, Smart and Sustainable Cities, and Industry 2020 in the Circular Economy as a starting point for further promotion and development of RRI in H2020 activities.

9.3. Methods

We have collected and analysed data for this report in multiple steps. The document analysis pertaining to the policy-level and scope-level indicates very limited attention to RRI aspects in two of the programmes, i.e. Fast Track to Innovation Pilot (FTI) and Smart Cyber-Physical Systems (CPS). Hence, we have decided to restrict the subsequent analysis to proposals funded under the CCA program. Based on the full population of 122 CCA-funded projects registered in CORDIS in November 2017, we have carefully selected 34 projects for document analysis.

We have limited our focus to projects with end dates later than December 2019. We have made this decision to ensure that potential project participants recruited for the social labs will be able to participate in RRI-activities throughout the NewHoRRIzon project. Further, we have decided to only include projects with accessible material and documents that include keys or O's or related RRI-aspects. We have decided to include a majority of projects funded under calls and topics indicating a high level of relevance in an RRI perspective. We have made this decision to ensure that potential interviewees and social lab participants will prone to the notion of RRI, and as such will have a stake in engaging in a dialogue about potentials and limitations to RRI.

For the interview study we have invited a broad variety of informants, including experts, evaluators, project members and stakeholders involved in the CCA program. We have succeeded to carry out interviews with 15 different interviewees, including four H2020 experts in CCA, five interviewees involved in projects funded under the Industry 2020 in the Circular Economy focus area, three interviewees involved in projects funded under the Internet of Things focus area, and three interviewees involved in Smart and Sustainable Cities funded projects. The qualitative analysis of the interview material is based on transcripts.

9.3.1. General scope of the programme

Cross-cutting Activities

The CCA programme includes three focus areas: (i) Industry 2020 in the Circular Economy (IND), (ii) Internet of Things (IoT), and (iii) Smart and Sustainable Cities (SSC). The three-pronged objective of the programme is to: (a) "boost economic growth and renew Europe's industrial capacities in a world of finite resources(…)" by "(…) demonstrating the economic and environmental feasibility of the circular economy approach" (IND); (b) support "the combination of different technologies such as internet, components, big data, cloud or advanced computing and their integration in innovative use cases addressing major societal challenges" (IoT); and (c) bring "together cities, industry and citizens to demonstrate the feasibility of developing (…) successful solutions for smart and sustainable cities in Europe" and "creating urban spaces powered by secure, affordable and clean energy, with smart electro-mobility and showcasing effective, innovative nature-based solutions." (SSC) (Horizon 2020a, accessed 2018). The programme allocates funding for coordination and support actions, R&I projects involving a variety of stakeholders in research, industry, public bodies and civil society organisations (CSOs).

9.3.2. Size and structure of the programme in terms of budget, applications and projects

Cross-cutting activities

The estimated total budget of the CCA programme for 2016 and 2017 extends to 1,053 billion Euros allocated in the following way:

- **Industry 2020 in the Circular Economy:** 41 calls, 678.5 million Euros (estimated)
- **Internet of Things:** Three calls, 141 million Euros (estimated)
- **Smart and Sustainable Cities:** Six calls, 293.5 million Euros (estimated)

Thus far, 1,216 proposals have been submitted under this programme of which 121 projects received funding.

- **Industry 2020 in the Circular Economy:** 909 Proposals, 105 funded projects (in CORDIS)
- **Internet of Things:** 178 proposals, 7 funded projects (in CORDIS)
- **Smart and Sustainable Cities:** 129 proposals, 9 funded projects (in CORDIS)

9.4. Current situation of RRI in the programme

9.4.1. RRI in brief

Given the diversity of focus areas covered by Social Lab No. 18, the CCA programme line, in this section we briefly reflect on the potential relevance of RRI for each focus area.

- **Industry 2020 in the Circular Economy:** The specific commitment to the circular economy approach suggests that major societal challenges such as sustainability in terms of environment, climate and job creation will be high on the agenda in this line of activities.
- **Internet of Things:** The ambition of integrating different internet and data related technologies to address major societal challenges suggests a key emphasis on Open Innovation and societal concerns such as health and well-being, the ageing society, sustainable agriculture, energy and resource efficiency, climate, social inclusion, and security of private rights.
- **Smart and Sustainable Cities:** Given the clear stakeholder perspective and emphasis on sustainability, we expect this line of activities to relate to Open Innovation, Public Engagement, and sustainability in terms of climate and environment.

In this section, we provide examples of components of RRI (the six keys and the three O') addressed in the three focus areas in the CCA programme line.

There are numerous examples of RRI components in the documents assessed. However, even in a careful selection and analysis process there is a risk that the picture presented will be too decoupled or fragmented from the context in which the examples originally appear. For instance, examples of open and inclusive innovation processes (i.e. engaging relevant users and involving various stakeholders) is interpreted and executed in many different ways which cannot all be presented here. In order to get the best possible picture of the various examples of RRI components and how they overlap, it might be useful to consider examples of some RRI components together, these include the following:

- *Public Engagement and stakeholder involvement* and *Open Innovation*

- *Open Science* and *Open Data and Open Access*[66]

The Tables in this section consist of examples retrieved from available documents in the three focus areas. The section does not provide an exhaustive list of all identified examples. However, the Tables do provide an overview of the diversity of keys and O's addressed as well as examples of how they are used in the focus areas.

9.4.1.1. The role of RRI on different levels

In this section we provide a brief overview of main components of RRI addressed in the CCA program. Only notable examples are included here. For a fuller picture of the role of RRI on different levels including specific descriptions and additional examples of RRI components in each of the three focus areas.

Policy document level

Table 27: The role of RRI in policy documents

Some awareness Policy documents in the three focus areas reveal different levels of awareness of RRI components. Some focus areas include more components than others, and the understandings as well as the details of the components also vary between focus areas.	**Keys:** Public Engagement O's: Open Innovation **Societal Challenges:** Environmental sustainability (climate, energy, transport, and resources), reduce energy use pollution and waste), job creation **Implicit:** Open Data, open science
Public Engagement and stakeholder involvement: Involvement of multiple stakeholders and users is emphasised as key activities in all three focus areas. In the policy documents, these activities are closely linked to ideas about Open Innovation and Public Engagement. **Open Data and Open Access:** The concepts of Open Data and Open Science are linked to discussions of digitisation (including IoT) in a "tick box" manner. **The three O's (Open Innovation, Open Science, Open to the World):** Little attention is paid to Open Science and openness to the world in the policy documents. We have incorporated examples of Open Innovation under *Public Engagement and stakeholder involvement*. **Societal Challenges:** Considerations regarding key societal challenges are highlighted for all three focus areas. The primary focus is on environmental sustainability.	

Scoping level

Table 28: The role of RRI in scoping documents

Some awareness Some focus areas include more RRI components than others and the understandings as well as the details of the components also vary in the in the	**Keys:** Public Engagement, Ethics, Gender, Governance O's: Open Innovation **Societal challenges:** Sustainability (climate, environment), Food Security, Well-being, Health, Ageing Society, Job-generation, social Inclusion.

[66] In addition, issues relating to e.g. data security might be considered together with RRI components such as openness (the three O's), open data and/or open access, ethics and Governance.

scoping documents.	**Implicit:** Open Data, Open Science

Public Engagement and stakeholder involvement: Stakeholder and user involvement is emphasised as a key activity in two of the focus areas (IoT and SSC). These activities are closely linked to ideas about Open Innovation and Public Engagement.
Ethics: Ethics-related issues, specifically concerning privacy, are raised in relation to IoT, where it concerns the use of open and big data, individual rights, and privacy (European Commission, 2017a, p. 8).
Gender: Gender is briefly touched upon in a reflection on the consequences of emerging technologies, but with no further specification.
Governance: Governance is emphasised in discussions of how to support the transition towards the circular economy in the IND focus area.
Open Data and Open Access: As in the policy documents, the concept of Open Data is linked to discussions of digitisation (including IoT) in a "tick box" manner.
The three Os: Little attention is paid to open science and openness to the world in the scoping documents. (For examples of Open Innovation, see *Public Engagement and stakeholder involvement* in (see appendix)
Societal challenges: Societal challenges are highlighted in the discussions of the three focus areas cover "the Silver Economy" or the ageing society (IoT), "the Energy Challenge" (SSC), and the Circular Economy (IND).

Work programme level

Table 29: The role of RRI in work programme documents

Some awareness Work programme documents in the three focus areas reveal different levels of awareness of RRI components with variations in the number of RRI components as well as in the details of the components included.	**Keys:** Public Engagement, Open Data/Open Access, Gender, Ethics Governance **O's:** Open Innovation, Open to the World Societal Challenges: Sustainability (environment and climate), Job creation, Citizen benefits, educational needs, health, well-being, social and cultural benefits, social cohesion

Interestingly, RRI is directly mentioned in the IND work program:
"This systemic approach to innovation is in line with Horizon 2020's Responsible Research and Innovation (RRI) cross-cutting objective, engaging society, integrating the Gender and ethical dimensions and ensuring access to research outcomes." (European Commission, 2016a, p. 73).
Public Engagement and stakeholder involvement: Stakeholder and user involvement is emphasised as a key activity in all three focus areas. These activities are represented as closely linked to ideas about Public Engagement as well as Open Innovation.
Ethics: Ethical issues are raised in discussions of IoT and IND, primarily with respect to safeguarding Ethics and privacy rights.
Gender: Gender is briefly touched upon as a potential social barrier of relevance to the co-creation of smart and sustainable cities and communities (European Commission, 2016a, p. 114), and as a dimension of consideration in the development of user-driven business models under IND.
Governance: Legal and regulatory issues pertaining to the Governance category are emphasised in all three focus areas, but most clearly in SSC. Here, Governance not only refers to the societal challenges addressed but also to components of RRI, e.g. Public Engagement and Open Innovation:
"To enable the systemic integration of these [nature-based, ed.] solutions into a sustainable urban planning, new Governance, business, financing models and partnerships are needed allowing for their co-designing, co-development and co-implementation by all stakeholders and societal actors, and leveraging of investments and synergies between private and public action" (European Commission, 2016a, p. 117).
Dissimilarly, for IND an imperative has been formulated in which governance is perceived from a business

perspective:
"Imperative here is to remove regulatory bottlenecks to allow these flows and avoid double punishment of the companies. Future research and innovation should increase the performance and cost effectiveness of the above mentioned cross-cutting technologies, demonstrate them in real life, so as to remove the barriers and ensure they are widely deployed across all sectors" (European Commission, 2016a, p. 71).
Open Data and Open Access: The provision of open service platforms, open standardised Application Platform Interfaces (API), Open Data and interoperability is highlighted as key focus points in the IoT focus area and in SSC (European Commission, 2016a, p. 92).
The three Os: Little attention is paid to Open Science and openness to the world in the work programmes. Reflections on how to make innovation activities more Open to the World is emphasised in SSC, while in IND openness to the world is pursued with the aim of penetration of new markets worldwide (European Commission, 2016a, p. 12).
Societal challenges: Broad reflections on major societal challenges including the environment and climate (IoT; SSC; IND); social impacts such as social cohesion (SSC); health and quality of life (SSC); citizen benefits (IoT; SSC); and jobs creation (IoT; IND) are highlighted as key concerns related to the activities within the three focus areas (European Commission, 2016a, pp. 6, 97, 105).

Call level

IoT calls consist of Large Scale Pilots (LSP), IoT Horizontal Activities, and R&I on *IoT Integration and Platforms*, SSC calls include *Sustainable Cities through Nature-based Solutions*, and *Smart Cities and Communities*. Finally, IND consists of the general H2020-IND-CE-2016-2017 call with four underlying call-topics: SPIRE (*Sustainable Process Industries*), FOF (*ICT for Factories of the Future*), CIRC (*Circular Economy*), and *PILOTS*.

Table 30:The role of RRI in call documents

Some awareness Calls in the three focus areas reveal different levels of awareness of RRI components with variations in the number of RRI components as well as in the details of the components included.	**Keys:** Public Engagement, Ethics, Science Education, Governance, Open Data and Open Access **O's:** Open Innovation, Open to the World Societal challenges: life quality, health and career opportunities of an ageing European population (IoT); Nature-based solutions, green cities, Sustainable Development Goals (poverty, inequality (SSC); Economic growth, climate and environmentally friendly innovations and industrial solutions, Security, privacy and knowledge (protection in digital solutions, pollution risks and waste optimisation); health and well-being (IND) **Implicit:** Open Science, Gender
Public Engagement and stakeholder involvement: On call level, examples of Public Engagement and stakeholder involvement can be found in all three focus areas with numerous examples in IND call documents.[67] In IoT, Public Engagement and stakeholder involvement (and Open Innovation) concerns developing activities for engaging citizens, users and stakeholders. In SSC, several kinds of	

[67] Please note that in the documents assessed, examples of *Public engagement* overlap with examples of *Open innovation*. For instance, public engagement is frequently mentioned together with stakeholder involvement, which is one of the main components of open innovation. Therefore, we have incorporated examples of open innovation under the RRI key *Public engagement and stakeholder involvement*.

co-engagement (co-development, co-design, and co-implementation) are key to public and stakeholder involvement. Similarly to IoT, IND focuses on methods for engaging societal stakeholders including civil society, public authorities, and other professional/industry stakeholders including the following: Small and Medium-sized Enterprises (SME), Research and Technology Development (RTD) stakeholders, innovation hubs, etc. Similarly to SSC, IND calls emphasise co-creation and co-delivering together with all relevant actors as a key priority.
Interestingly, addressing societal challenges through the circular economy approach is connected to RRI components such as Public Engagement and stakeholder involvement in IND calls.
Ethics: Ethics receives limited attention in SSC call, some attention in IND and high awareness in IoT calls.
Gender: The attention to Gender-related issues is limited in the calls of the three focus areas.
Science Education: Only few calls in the CCA programme highlight aspects of Science Education.
Governance: Calls in the IND focus area contain several examples of Governance for supporting the circular economy approach. Governance receives limited attention in the other two CCA focus areas (IoT and SSC).
Open Data and Open Access: SSC calls are concerned with Open Data, Open Access, common long term data collection systems, interoperability along data infrastructures, a common footprint calculation methodology and a continuous building up of the 'knowledge portfolio' (European Commission, 2016b; European Commission, 2015a).
The three O's: The three O's of RRI appear to some degree in the CCA focus areas. RRI inspired ideas of Open Science do not appear in any of the calls, but there are examples of multi-disciplinary approaches in IoT and IND calls. Open Innovation is more prevalent, and includes examples of stakeholder platforms in IoT, social innovation (European Commission, 2015b) and other ways of stakeholder involvement (IND) (see also Public Engagement and stakeholder involvement above). Examples of being Open to the World include international collaboration between stakeholders (IoT and SSC); developing solutions that can be used on a global market (SSC); and transferability of technologies across Borders (IND). For instance, aspects of being Open to the World can be identified in call objectives, fostering international cooperation through IoT integration and IoT platforms (European Commission, 2015c; European Commission, 2015d). However, these aims and examples in the IoT calls do not appear to be associated with RRI. Rather, the main goal appears to be gaining additional market shares which might not necessarily benefit 'the world' outside Europe.
Societal challenges: Most calls in the CCA programme are characterized by a clear emphasis on steering R&I activities towards current societal challenges

Project level

Table 31: The role of RRI in project documents

Some awareness Project documents in the three focus areas reveal different levels of awareness of RRI components with variations in the number of RRI components as well as in the details of the components included.[68]	**Keys:** Public Engagement, Governance, Ethics, Gender, Open Data/Open Access **O's:** Open Science, Open Innovation, Open to the World Societal challenges: (data) security and trust, environmental sustainability (nature-based solutions, waste and energy) **Implicit:** Science Education
Overall, some diversity of RRI components are identified in most IoT projects, while in SSC projects span from having wide diversity of RRI components included to projects with very limited RRI	

[68] When reading the results presented in this section, it should be kept in mind that several projects have just recently received funding, and as such might not have had sufficient time to develop and share details on how they plan to address the different key elements of responsible research and innovation.

diversity. Similarly, some IND project documents reveals a limited diversity of RRI components in some projects, while there are no components of RRI in other IND projects.

Public Engagement and stakeholder involvement[69]: Several projects in the three focus areas provide concrete examples of relevant stakeholders and how to engage them. Projects in the SSC focus area strongly emphasise the importance of Public Engagement and stakeholder involvement (especially UNaLab, GrowGreen, Nature4Cities, CONNECTING Nature and NATURVATION). In projects funded under IND and IoT, with a few exceptions, Public Engagement and stakeholder involvement receives less emphasis.

Ethics: In general, we find a limited level of attention to Ethics-related concerns in the 34 projects.

Gender Equality: The state of awareness in relation to Gender varies across the focus areas and their respective projects. A Gender *dimension* in the knowledge or subject of R&I activities is hardly present in any of the projects (except for in CONNECTING Nature and IoF2020).

Science Education: The general analysis of IND, SSC, and IoT projects indicate low to limited awareness of Science Education with a few exceptions of projects that include some educational elements.

Governance:[70] While the IND projects have "some (level of) awareness" with respect to Governance, projects in IoT and SSC show relatively high levels of Governance awareness. Governance is rarely directly related to RRI keys' or O's. Instead, examples of Governance are most frequently related to the societal challenges addressed or referred to e.g. compliance with legal regulations. For instance, in IoT the awareness of Governance is particularly high in CREATE-IoT (including U4IoT and IoF2020). But the conception of Governance also goes beyond the question of Governance linked to societal challenges: CREATE-IoT will operate within different frameworks which, besides the *Trust Management Frameworks*, includes an *IoT policy framework*, an *IoT Engagement Framework*, and an *IoT Privacy Framework* (Vermesan O. , et al., 2017a; Vermesan O. , et al., 2017b).

"Engagement in this case calls the entities assigned with the relevant responsibilities to go beyond the "mere box ticking" exercise of compliance and take all necessary action required in the context of responsible Governance." (Vermesan O. , et al., 2017b, p. 22).

Not only General Data Protection Regulation (GDPR) but also Governance in relation to Ethics, Public Engagement and societal challenges are all priorities in the Trust Management Frameworks of CREATE-IoT (Vermesan O. , et al., 2017a).

In SSC, awareness of Governance in relation to addressing societal challenges is high in all projects and especially in the CONNECTING Nature project. This might be explained by the general focus of the SSC focus area (sustainability and nature-based solutions) that gives the projects a more clear-cut focus on assessing societal challenges and making actual changes through Governance-related activities.

Open Access and Open Data: Overall, there is some awareness of aspects linked to Open Access and Open Data in the projects assessed with high awareness in CONNECTING Nature (SSC) and in SYSTEMIC (IND). Projects in all three focus areas are concerned with issues regarding data protection.[71] Concerns related to data protection indirectly address limitations of the RRI aspects of openness in the respective projects (e.g. Open Data).

The three O's: In general, the focus areas' awareness of Open Innovation and Open Science in the project documents assessed is limited. The O's and especially Open Science receives limited

[69] Examples of Public engagement and stakeholder involvement within the CREATE-IoT presented here are selected from the ACTIVAGE, IoF2020 and U4IoT projects (as CREATE-IoT is a coordinating project, examples are provided from the projects own respective documents as well as from CREATE-IoT documents).

[70] When assessing 'Governance', it might be fruitful to also encounter findings on open data and/or open access.

[71] Note that examples of Open data and open access and Governance overlap in some projects (this is for instance the case in some IoT-projects).

attention in IND and IoT projects, while SSC funded projects show some level of awareness with respect to the three O's (especially to Open Innovation and openness towards the world).[72] In several projects, being Open to the World does not appear to be a prioritised goal in itself, and often only covers e.g. making selected project information and findings openly accessible/available online. As these are EU projects, having some level of an international approach or element (at least in the project consortium composition) can be expected. This is reflected in our labelling of low to some state of awareness in the IoT and IND projects, and some awareness of openness towards the world in the SSC projects (however, with high awareness in Urban GreenUP as well as in GrowGreen). There is an interesting example in the SSC project documents. Here, openness to the world is exemplified by the variety of international collaborations in the projects as well as developing solutions which can be used at sites in several countries. For instance, UNaLab also collaborates with non-European cities. These cities are expected to learn from the European NBS approach (UNaLab, Urban nature labs, accessed 2018). Urban GreenUP also includes non-European cities (European Commission, 2017b). However, these appear mainly to be involved for business purposes, i.e. "to identify the market opportunities for European companies out of Europe and fostering the European leadership in NBS implementation at global level." (European Commission, 2017b).

Societal challenges: The projects in funded in the three focus areas address a variety of societal challenges. In projects funded under the IoT focus area, the challenges taken into concern are trust and data security as well as environmental sustainability. SSC project documents are mainly centred on environmental challenges and sustainability, e.g. promoting nature-based solutions (NBS). And finally, projects in IND also address environmental sustainability issues (e.g. waste and energy).

Proposal Template level

Table 32: The role of RRI in proposal template documents

Some awareness Proposal Template documents are quite standardised. They include a limited amount of RRI components, frequently phrased in the exact same wordings, and pay very limited attention to societal challenges.	**Keys:** Ethics, public/societal engagement, Open Data/Open Access **O's:** **Societal challenges:** Environment, health and safety Implicit: openness
Proposal templates in the Cross-cutting Activities programme line all include a section on Ethics covering use of humans (stem cells, etc.) or animals, personal data, third countries, environment, health and safety issues, misuse, etc. Moreover, all proposal template documents have an open section on call specific questions, including an "extended open research data pilot in Horizon 2020" and some proposal templates include a Data Management Plan (DMP) for balancing Open Data (European Commission, 2017c; European Commission, 2017d) as well as communication activity measures including some degree of public or societal engagement ("(…) or the public at large being receptive to your results.") (European Commission, 2017c; European Commission, 2017d)	

[72] For examples of Open innovation, please see the description of Public engagement and stakeholder involvement above.

Evaluation level

Table 33: The role of RRI in evaluation template documents

Some awareness Evaluation documents are more or less standardised. They include a limited amount of RRI components, phrased in very similar wordings, and pay very limited attention to societal challenges.	**Keys:** Ethics, Gender **O's:** Open to the World **Societal challenges:** climate change, environment Implicit: openness (transparency, trans-national funding, dissemination/communication), "other societal benefits" (unspecified)
In CCA, evaluation level documents include different evaluation aspects or components for innovation actions as well as for coordination and support actions (components for self-evaluation). These include Excellence, Impact (including contribution at the European and International level, and addressing environmental issues or contributing with other societally/socially important benefits and impacts), and Quality and efficiency of the implementation (European Commission, 2014a; European Commission, 2015e; European Commission, 2017e). **Evaluation Templates** are more or less standardised, but one notable addition is identified in the H2020 2018-2020 Self-evaluation form: Here, the idea of excellence is broadened to also cover the "use of stakeholder knowledge and Gender dimension in research and innovation content" where relevant (European Commission, 2017e). **The EC's Grants Manuals'** section on proposal submission (version 1.4, May 2015) and the Horizon 2020 Work Programme 2016-2017 general annexes on Evaluation rules both include the same components an stated above (Excellence, Impact, and Quality and efficiency of the implementation) and an aspect of 2	

9.4.1.2. General use of RRI

Societal challenges and the ways in which the projects target the respective societal challenges, do not reflect the concept of RRI. Even though the societal challenges addressed overlap in some cases (e.g. several focus areas target sustainability issues), there are some variations in the focus areas' approaches of addressing these challenges. Documents in all three focus areas (IoT, SSC and IND) contain examples where Public Engagement and stakeholder involvement (and/or Open Innovation) are prioritised. This is usually the case in projects aiming at changing public attitudes towards an issue as well as in projects where ensuring user acceptance in the uptake of an output is key. The most clearly defined and perhaps also most ambitious aim of approaching societal challenges is found in the SSC focus area. Here, ensuring solutions related to environmental sustainability is the main overall goal of the R&I activities. However, RRI as a *concept* only appears in a few cases in SSC, and is not explored or explained in much detail. In general, we have only identified 'intended connections' between addressing societal challenges and components of RRI (e.g. openness) in few of the focus areas.[73] Overall, the CCA programme line does not appear to reflect visions of the concept of RRI. Though the overall awareness of the concept of RRI in IoT, SSC and IND is limited, there is a great variety of RRI components addressed in the three focus areas and their respective projects. Besides addressing societal challenges and Governance in relation to societal challenges, Open Innovation, Public Engagement and stakeholder involvement are the components of RRI that appear most frequently in the documents. Several documents and projects also include components related to Ethics, Open Data and Open Access, openness towards the world and Governance. I.e.,

[73] However, this diagnosis does present some examples of the RRI component *Governance*. E.g. some projects (especially in the SSC focus areas) are intentionally steered towards goals of e.g. stakeholder involvement or developing solutions to the societal challenges addressed.

the Governance component can include Governance in relation to RRI components and/or Governance in relation to societal challenges. The RRI components receiving the least amount of attention are Science Education and Gender (as well as Open Science, if transdisciplinary approaches are not considered Open Science). Furthermore, the document analysis as well as the interview study reveals that in practice, examples of e.g. Public Engagement and Open Innovation overlap. This is for instance the case when involving different types of stakeholders and users. In most cases, these RRI components appear to be interrelated.

9.4.1.3. RRI beyond the keys

RRI as a concept is rarely mentioned in any of the focus areas. As such, the documents do not reveal an "RRI method" or any similar structured or detailed understandings of RRI in the focus areas. As demonstrated in section 9.4.1.1. The role of RRI on different levels, Open Science as a concept is not present in the documents. However, examples of transdisciplinary approaches and the inclusion of social sciences and humanities (SSH) in R&I are identified in several documents. This suggests that current ideas of Open Science might be broadened, or that transdisciplinary approaches and inclusion of SSH might be added when assessing RRI.

There is another interesting finding with respect to Gender. In the SSC focus area; there are examples of inclusion and diversity in a more broad perspective where it is not necessarily related to Gender. These include questions of equal access as well as benefits and limits related to identity markers such as ethnicity or social group etc. (NATURVATION project).

9.4.1.4. Theoretical framework of RRI applied in the programme line

In this section, we analyse the implicit assumptions about R&I underpinning the priorities and objectives of the CCA program. Four analytical perspectives (Bacchi 2006, Martin & Freeman 2004, Rip 2014, and Jasanoff 2015) guide the analysis here. The main goal of the theoretical analysis is to obtain a closer understanding of *how* the R&I process is tied to ethical and societal considerations.

The analysis is structured in three parts. First, we analyse the interplay between addressing societal challenges and operating from a business perspective in R&I activities in the three focus areas. Second, we analyse the innovative visions presented in the focus areas and how these aim at steering R&I activities towards desirable futures for European societies. Finally, we analyse the 'language of responsibility' and statements supporting upstream deliberation including co-creation, public participation, and Open Innovation.

9.4.1.5. Addressing societal challenges as well as including a 'business perspective

In IoT, the objective of integrating different internet and data related technologies to address major societal challenges indicates a key emphasis on societal concerns in Europe such as health and well-being, the ageing society, sustainable agriculture, energy and resource efficiency, social inclusion, and security of private rights. Yet, the objectives of this focus area are also underpinned by more utilitarian policy motivations (European Commission, working document a, p. 4).

As in the case of IND and IoT, commercial relevance and market potential are seen as crucial factors in ensuring long-term societal impact of SSC investments (European Commission, 2014b, pp. 23-24). Technological advancement is seen as both determined by and determining societal progress. Investments in SSC are also driven by more market-focused motivations. But the strong emphasis on Public Engagement and close interaction between cities, industry, and citizens suggests that societal

needs and concerns play a more important role than in IoT and IND (European Commission, 2017f, p. 10).[74]

INDs' specific commitment to the vision of the circular economy suggests that this funding area is driven by concerns about key societal challenges such as pollution and climate change. Yet, these motivations are also accompanied by more utilitarian objectives aimed at reducing costs and increasing productivity in the industrial sector through the efficient use of natural resources (including reuse of waste and by-products). The success of the IND focus area is contingent on efforts to strengthen both efficiency and sustainability. In other words, utilitarian and civic considerations are closely integrated in the focus area.

9.4.1.6. Innovative visions and steering European societies towards desirable futures

The technological advancements spurred by investments in IoT are seen as both determined by and determining societal progress (European Commission 2, accessed 2018, p. 9). The key objective is to harness "the full transformative potential of digitisation" through demand-driven innovation activities addressing pertinent societal needs (European Commission 2, accessed 2018, p. 16).The underlying sociotechnical imaginary is one of technological optimism. As in the case of IoT, , technological advancements related to big data and digitisation are represented as instrumental to addressing societal challenges improving the health, well-being, agriculture, resource efficiency, and social inclusion of the European societies. The potential security threats and privacy concerns (including safeguarding individual rights and privacy) accompanied by the reliance on open and big data for new and advanced purposes is built into this imaginary (European Commission, 2017a, s. 8) (European Commission, 2016a, pp. 93, 95, 98); (European Commission, 2015c; European Commission, 2015d).[75]

The underlying sociotechnical imaginary in SSC is one of cooperative and democratic urban development aiming to harness the possibilities of emerging digitised technologies in making European cities greener, more resilient, intelligent, open and socially inclusive. In IND, R&I is represented both as determining and determined by society. Technologies are seen here as evolving in interaction with society. RRI-related concerns inform the key objectives and priorities of the focus area, but the R&I activities funded through IND are at the same time represented as promising technological advancements steering the European societies in a new direction. Again, the underlying sociotechnical imaginary in IND is one of technological optimism. Here, new disruptive innovations, stimulated by societal needs, will serve as the main "fix" to overcome pertinent challenges brought along by existing (more primitive) technologies (e.g. climate change and water and air pollution). Competing sociotechnical imaginaries, such as the narrative of "de-growth" (Guimaraes Pereira, Saltelli, & Tarantola, 2015) are left unnoticed in the IND framework. The primary objective of the funded IND projects is to spur eco-friendly technological innovations, while mitigating the legal and institutional "bottlenecks" delaying the introduction of such innovations into

[74] According to the H2020 General Work Program, "the Smart and Sustainable Cities call aims to bring together cities, industry and citizens to improve urban socio-economic functioning through sustainable integrated energy and transport solutions" (European Commission, 2017f, s. 10).

[75] Indeed, concerns about how to safeguard individual rights and privacy are present in the descriptions of IoT at both the scoping level, work programme level, call-level and project level (European Commission, 2017a).

market. Here, the circular economy approach is represented as a key strategy for increasing the growth and competitive edge in Europe (European Commission, 2016a, p. 12).

9.4.1.7. Upstream deliberation and language of responsibility

The language of responsibility illustrated in the IoT focus area emphasises the importance of upstream deliberation in the form of co-creation, public participation and Open Innovation. This is a key component at both policy, call, and project levels (see examples in section 9.4.1.1. The role of RRI on different levels).

Along the lines of IoT, the "language of responsibility" in SSC is characterized by upstream deliberative engagement. As noted in documents at the work programme and call level, the funded activities "should be co-designed, co-developed and co-implemented in a trans-disciplinary, multi-stakeholder and participatory context and systemically embedded in an integrated urban and land use planning" (European Commission, 2016a, p. 113; European Commission, 2015a). The document analysis also indicates a strong emphasis on user-driven Open Innovation in the projects funded under this focus area. Contrary to IoT and SSC, the language of responsibility adopted in the IND focus area is primarily characterized by top-down policy-priorities and downstream deliberation. Main societal concerns about the climate and environment, emphasised in the Europe 2020 strategy, are placed at the forefront of the innovation agenda in IND. Yet, public involvement is primarily highlighted as a strategy to ensure public acceptance of the envisioned technological advancements and provide favourable environments for investment. Upstream deliberation is also emphasised as a key objective at the IND programme level (European Commission, 2016a, pp. 6, 75). However, the document analysis of funded projects indicates that such activities typically occur relatively late in the innovation process (e.g. to ensure project impact, showcase new technologies to potential end users, and validate new technologies in pilot settings), or limit their focus to assessments of commercial feasibility and consumer acceptance.

9.4.1.8. Overall assessment of RRI in the programme line (based on desktop research)

Table 34: Assessment of RRI in the programme line documents

Category	Value	Description
B	**Some awareness**	The desktop research of documents on all levels (from policy documents to project documents and evaluation templates) reveals a limited awareness of RRI as a concept in the CCA programme line.[76] The assessment shows that there are different levels of awareness of RRI components (keys and O's) in the three focus areas (IoT, SSC and IND). Some focus areas include more RRI components than others, and the understandings as well as the details of the components also vary between focus areas. For instance, some focus areas and projects do not (or hardly) touch on RRI components. In other documents assessed, a few lines on aspects that can be related to ideas of Open Innovation or Public Engagement (e.g. involving users), Governance or Ethics (e.g. data protection) are included, but without explicating whether this is a priority or how it is to be achieved. On project level, some documents address components of RRI where the intention of e.g. actually engaging civic and other relevant stakeholders is more clear-

[76] In a few projects RRI is mentioned and related to SSH (the inclusion of social sciences and humanities) in R&I projects.

		cut. And again other project documents contain more developed examples and a more 'intentional' use of RRI components.

9.5. Conclusions

This diagnosis presents selected findings for illustrating the current awareness and status of Responsible Research and Innovation in the Horizon 2020 *Cross-cutting Activities* programme line. The CCA programme has three main objectives:

- Renewing Europe's industrial capacities and boosting economic through the circular economy approach (Focus area: *Industry 2020 in the Circular Economy*)
- Addressing societal challenges by supporting the combination of different technologies (e.g. internet) and the integration hereof in innovative use cases (Focus area: *Internet of Things*)
- Bringing together relevant stakeholders such as cities, citizens, and industry for the development of smart and sustainable city solutions in Europe as well as creating urban spaces showcasing innovative nature-based solutions (Focus area: *Smart and Sustainable Cities*)

There are components of RRI (keys and O's) in all three focus areas, even if the understandings as well as the details of the components vary between focus areas and projects. Some focus area documents and projects only integrate RRI components to a very limited extent without explicating whether these components are actually prioritised or how they are to be achieved. In others, Public Engagement and stakeholder involvement appear to be integral methods in the projects. The most prioritised or frequently used RRI components are Open Innovation and Public Engagement (e.g. involving users and relevant stakeholders), as well as Governance, and Ethics (e.g. data protection). As the concept of RRI does not permeate the CCA programme as such, the keys and O's of RRI are interpreted in various ways by project participants and stakeholders; i.e. we find that understandings of key components and aspects of Openness overlap. For instance, we find that Public Engagement is closely related to stakeholder involvement (i.e. to Open Innovation).

The SSC focus area stands out in this diagnosis, as we find an 'intentional' use of RRI components. In SSC projects, we find that methods for addressing societal challenges involve Open Innovation, Public Engagement and involvement of relevant stakeholders in general. Here, openness, Public Engagement and stakeholder involvement is not just tick-boxed in official documents, but are integral to the project work (i.e. methods for developing societal solutions are carried out closely to and often in direct collaboration with the relevant societal stakeholders including civic stakeholders). This strong involvement with RRI components in SSC might be explained by the focus areas' strongly intended or imbedded priority of addressing societal challenges which requires goodwill and public acceptance.

Even so, with very few exceptions in most of the focus areas RRI as a *concept* is not present. Overall, the diagnosis reveals that addressing societal challenges in R&I activities receives more awareness than the concept of RRI. As such, we find that there is no evident connection between targeting societal challenges and implementing the concept of RRI (even if projects in the SSC focus area connect the two to some degree).

9.6. Relevant stakeholders

9.6.1. Who are relevant applicants/actors/stakeholders?

In this section we briefly present our selection of interviewees and potential Social Lab participants.

Interviewees were chosen from selected projects. Criteria in our project selection method include the following:

- Only projects with accessible relevant documents
- Projects with different awareness of RRI and diversity in RRI components included
- Projects with at least some level of diversity in RRI approaches

Based on the material available, we identified potential interviewees, including project leaders, authors and co-authors of project reports and other project material, and by identifying partners and stakeholders involved. We also used snowballing methods. I.e. in the invitation letter for the interview study, we stated that we are grateful for any suggestions of other relevant people involved in the project activities, (including project participants as well as other stakeholders e.g. form the industry/private companies, academia, public authorities, NGOs, civil society or interest organisations, etc.).

9.7. Literature, links, and resources

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10. Annex New HoRRIzon Diagnosis Report, Social Lab 19 EURATOM

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10.1. Executive Summary

Amongst the H2020 programme lines EURATOM has a special position. First, EURATOM exists since the foundation of the European Union and is based on one of the three Founding Treaties. The EURATOM Treaty writes down the establishment of a research centre, the so called Joint Research Centre (JRC) which today carries out nuclear and non-nuclear actions. Therefore, EURATOM is rather an institution than a programme line.

Interviewees of the study on RRI within EURATOM were to some extent aware of the concept of RRI. However, neither RRI nor the three O's[77] are explicitly mentioned on any level of EURATOM documents. Still, some RRI keys are touched upon.

Amongst the six keys, Open Access was not only considered important in EURATOM documents and interviews. Also Gender Equality, Science Education, research Ethics and Public Engagement were present in EURATOM documents and interviews. Only the Governance key was not mentioned. The same applies to the concept of the three O's. The terms "Open to the World" and "Open Science" were touched upon in documents and interviews. Open Innovation was not mentioned.

The importance of the RRI key's and the way they were used varied. Open Access was mentioned as recognised standard with established practices. Gender Equality was mainly understood as Gender balance in research teams. Public Engagement was perceived rather as informing the public than involving it. Research Ethics in most cases was defined as safety. Science Education was rather addressed at future junior researchers than to the public. Being Open to the World was defined as setting global standards and seeking international competition. Open Science measures called for deeper integration of researchers and scholars from the social sciences and humanities in EURATOM research.

A main challenge for RRI in EURATOM is the stressed relationship between nuclear energy experts and parts of the public in some Member States, as well as frictions on European level about the future of nuclear energy. Many informants pointed at the perceived general public's lack of knowledge in nuclear physics as an obstacle for Public Engagement. They also stressed that large parts of the public would have negative attitudes towards EURATOM, mainly because of what they assumed as limited knowledge about facts.

[77] The EC concept of the "Three O's" refers to "Open Innovation", "Open Science" and "Open to the World". For more see European Commission (2016): https://ec.europa.eu/digital-single-market/en/news/open-innovation-open-science-open-world-vision-europe

10.2. Scope of this document

This diagnosis provides an overview of the objectives, bodies and activities of EURATOM. In addition, it analyses the status quo, potentials and obstacles of RRI in this programme line.

10.3. Methods

Methods applied were desktop research (literature reviews and document analysis) and expert interviews.

In total ten interviews were conducted with experts from different EURATOM stakeholder groups. To get a first insight into the programme line five National Contact Points (NCP's) were interviewed. Thereafter, interviews with four researchers and one representative of a Civil Society Organisation (CSO) were done. Interviewees were balanced in term of Gender (five female, five male interviewees) and covered different levels of seniority. Documents and expert interviews were analysed by qualitative content analysis. Qualitative analysis was supported by the software tool ATLAS.ti.

Our research faced several difficulties. First, we did not receive access to grant proposals for reasons of confidentiality. Second, evaluators are not permitted to provide information about their work for at least five years after evaluation. Because of this clause it was impossible to interview evaluators since H2020 started only in 2014. Third, supporting material for evaluators is not publically available.

10.3.1. General scope of EURATOM

The following section introduces into the objectives and legal foundations of EURATOM.

10.3.2. Objectives

In its preamble, the EURATOM Treaty defines the purpose of the European Atomic Energy Community[78] as creating the necessary conditions for the development of a powerful European nuclear industry. In order to achieve this goal the Community shall peruse the following goals of EURATOM:[79]

- promote research and ensure the dissemination of technical information;
- establish uniform safety standards to protect the health of workers and of the general public and ensure that they are applied;
- facilitate investment and ensure, particularly by encouraging ventures on the part of undertakings, the establishment of the basic installations necessary for the development of nuclear energy in the Community;
- ensure that all users in the Community receive a regular and equitable supply of ores and nuclear fuels;

[78] As defined in §1 of the EURATOM treaty the EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM) will be founded.
[79] European Parliament (2017): http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608665/EPRS_BRI(2017)608665_EN.pdf

- make certain, by appropriate supervision, that nuclear materials are not diverted to purposes other than those for which they are intended;
- exercise the right of ownership conferred upon it with respect to special fissile materials;
- ensure wide commercial outlets and access to the best technical facilities by the Nuclear energy in Europe;
- ensure wide commercial outlets and access to the best technical facilities by the creation of a common market in specialised materials and equipment, by the free movement of capital for investment in the field of nuclear energy and by freed om of employment for specialists within the Community;
- establish with other countries and international organisations such relations as will foster progress in the peaceful uses of nuclear energy.[80]

The JRC "EURATOM Research and Training Programme" has the following specific objectives:[81]

- support safety of nuclear systems;
- contribute to the development of safe longer term solutions for the management of ultimate radioactive waste;
- support the development and sustainability of nuclear expertise and excellence in the European Union;
- support radiation protection and development of medical applications of radiation, including, inter alia, the secure and safe supply and use of radioisotopes;
- move toward demonstration of feasibility of fusion as a power source by exploiting existing and future fusion facilities;
- lay the foundations for future fusion power plants by developing materials, technologies and conceptual design;
- promote innovation and industrial competitiveness;
- ensure availability and use of research infrastructures of pan-European relevance.

The work programme for 2016-2017 states:

"The EURATOM Research and Training Programme (2014- 18) complements Horizon 2020 in the field of nuclear research and training. Its general objective is to support nuclear research and training activities with an emphasis on continually improving nuclear safety and radiation protection, notably to contribute to the wellbeing of EU citizens by participating in the development of a safe and low carbon energy system at European level, in both the short and longer term, whilst also addressing

[80] See EURATOM Treaty §2f
[81] EURATOM (2018b):

other beneficial applications of ionising radiation in the medical and industrial sectors."[82] By contributing to these objectives, the EURATOM Programme

- reinforces outcomes under the three priorities of Horizon 2020 (excellent science, industrial leadership, and societal challenges), and
- supports the development of the Energy Union, one of the main objectives laid down in the 'Strategic Agenda for Jobs, Growth, Fairness and Democratic Change' presented by President Juncker in July 2014[83].

10.3.3. Legal Foundation

The EURATOM Treaty is one of the three main Founding Treaties of the European Union. The two other founding Treaties are the Treaty establishing the European Coal and Steel Community (1951) and the European Economic Community Treaty (1957).The EURATOM Treaty (Article 4.1) states that the European Commission will facilitate nuclear research.[84] To do so, Belgium, France, Germany, Italy, Luxembourg and the Netherlands created the European Atomic Energy Community in 1957. The Directorate General Energy describes EURATOM in its mission statement the following way:

"The EURATOM Treaty is a lex specialis in relation to the TFEU, which applies to the nuclear energy sector. It covers all policy aspects relevant for the civil use of nuclear energy, such as nuclear safety, safeguards, radiation protection, radioactive waste management, external relations and security of supply of ores and nuclear materials.[85]*"*

EURATOM was established to tackle the shortage of "conventional" energy. In addition, in the 1950s the political goal of advancing European integration through a nuclear energy community was attractive.

In order to streamline the European governance framework, all three Treaties were merged to the 1965 Brussels Treaty (also called the Merger Treaty), which created one Commission and Council to serve these three European Communities. While the other two treaties had either expired or been substantially amended, the EURATOM Treaty is largely unchanged.

10.3.4. Responsibilities within the European Commission (EC)

In the European Commission (EC), EURATOM is based in the Directorate General (DG) Energy. Within DG Energy responsibilities are distributed between "Directorate D Nuclear energy, safety and ITER" and "Directorate E EURATOM Safeguards":

- Directorate D supervises the subunits "EURATOM co-ordination and legal matters", "Nuclear energy, nuclear waste and decommissioning", "ITER", and "radiation protection".

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[82] EURATOM (2017): http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/euratom/h2020-wp1820-euratom_en.pdf

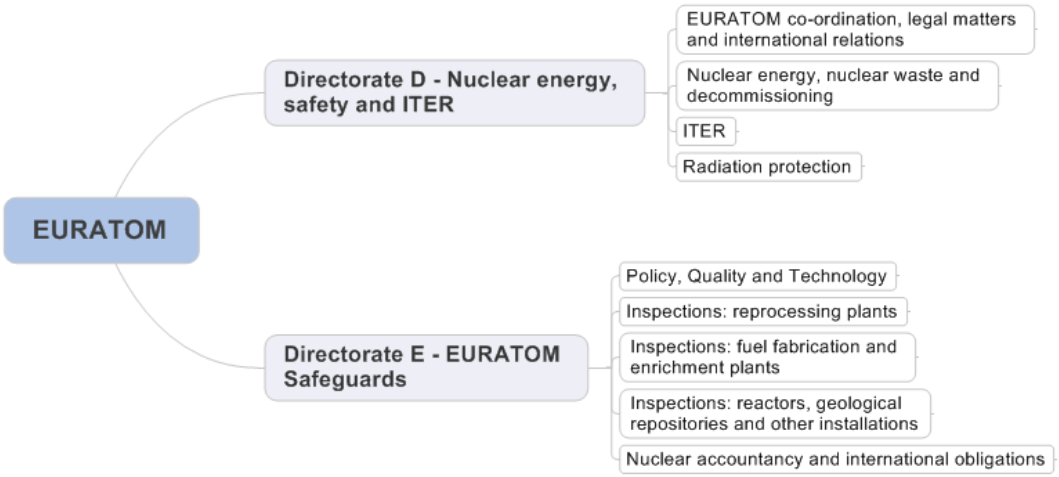
[83] European Commission (2018b): https://ec.europa.eu/commission/publications/president-junckers-political-guidelines_en

[84] EURATOM (2018): http://europa.eu/legislation_summaries/institutional_affairs/treaties/treaties_EURATOM_de.htm

[85] Directorate General Energy (2016): https://ec.europa.eu/info/sites/info/files/strategic-plan-2016-2020-dg-ener_may2016_en.pdf

- Directorate E has the following units: “Policy, Quality, Technology”, “Inspections: reprocessing plants”, “Inspections: fuel fabrication and enrichment plants”, “Inspections: reactors, geological repositories and other installations”, “Nuclear accountancy and international obligations”. Directorate E is responsible for all safety activities of EURATOM, such as “inspections” and “international obligations”.[86].

Figure 14: EURATOM embedded DG Energy



10.3.5. Direct Actions/Indirect Actions

EURATOM distinguishes in H2020 into so called Direct and Indirect Actions (see Figure 2)[87]:

- Direct Actions are carried out by the JRC itself;
- Indirect Actions are open for application by consortia.

In addition to this distinction, there are two main research areas within EURATOM, .i.e. fission[88] and fusion[89] research. The division of direct and indirect actions on the one hand and fission and fusion research on the other creates a complex structure.

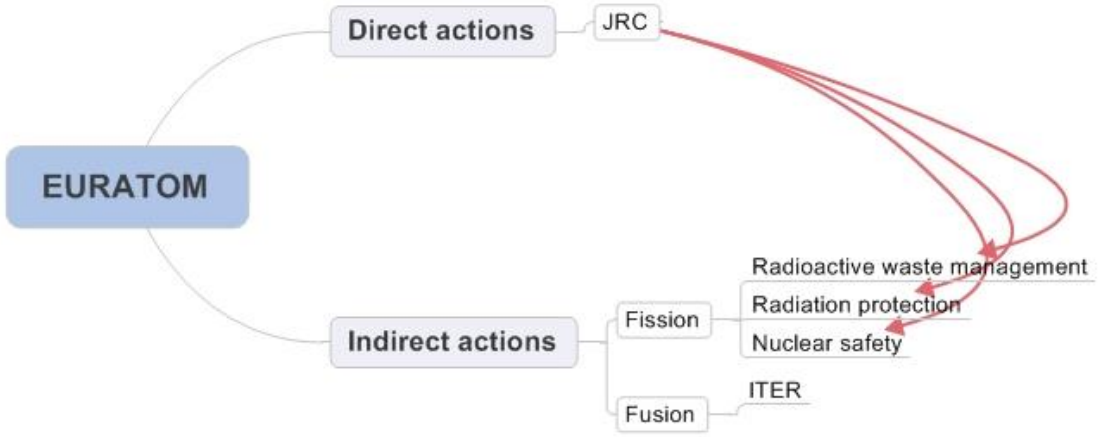
[86] S. Abousahl (2014): https://www.iaea.org/safeguards/symposium/2014/home/eproceedings/sg2014-slides/000174.pdf

[87] For the division between direct and indirect actions of EURATOM see JRC (2017): http://publications.jrc.ec.europa.eu/repository/bitstream/JRC107504/kjna28722enn.pdf

[88] Nuclear fission is a process where a nucleus is divided into two or more fragments. During this process neutrons and energy are released.

[89] Fusion is a process where two light atoms bond or fuse together, resulting in a heavier one. Again during this process, energy is released.

Figure 15: Direct and Indirect actions in EURATOM



Indirect Actions focus on two areas, fusion and fission [90]:

- Nuclear fission and radiation protection. EURATOM aims to pursue nuclear research and training activities with an emphasis on improving nuclear safety, security and radiation protection as well as radioactive waste management. Within this area open calls are used for tender of projects. These are open for different stakeholders. Fission is gradually developing from actual nuclear research to research on radioactive waste management, radiation protection and nuclear safety. However, as can be seen from Figure 2, direct and indirect actions come together in fission research. Fission research activities are carried out as direct and indirect actions.

- Fusion research is aiming at developing magnetic confinement fusion as an energy source. For pursuing the fusion activities the EUROFUSION consortium was founded. It carries out EU fusion research and represents the EU within the ITER[91] project. Fusion is centred on the ITER project and similar DEMO reactors. Within the fusion part of EURATOM there are no open calls, instead the EUROFUSION consortium is in charge of the research.

Having nuclear security as one of their main competencies, the JRC receives direct funding ("direct actions") from the EURATOM budget to carry out research without applying to calls of H2020.

JRC can also participate in indirect actions, by being a member of a consortium. For the fusion part the JRC can act as subcontractor.

As has been shown, there is still a deep and complex connection between the direct and indirect actions of EURATOM. The JRC is having a major role as it carries out direct actions of EURATOM on radioactive waste management, radiation protection and nuclear safety. A closer look on how funds are distributed offers an insight on the current priorities within EURATOM.

[90] EURATOM (2018b): https://ec.europa.eu/programmes/horizon2020/en/h2020-section/euratom
[91] ITER is short for "International Thermonuclear Experimental Reactor", a test reactor for fusion energy. More information can be retrieved at https://www.iter.org/

Table 35: EURATOM Budget in detail

Programme Part[92]	Share in %	Total Share in M. €[93]
Fusion indirect actions	45.42%	728
Fission indirect actions	19.68%	316
Nuclear direct actions of the JRC	34.90%	560

Although Fusion and Fission are put together in the indirect actions of EURATOM, Fusion research is mostly organised through the EUROFUSION[94] consortium. EUROFUSION is not established for a limited period of time or has to apply for funding via H2020. Still, Table 1 points out the EC's current priorities as Fusion and the JRC's action are receiving more than two-thirds of the total funds. Still, considering the absolute number of funds, EURATOM [95]is at the bottom end of H2020. Despite to that, chances of receiving funding are rather high at 44.2 %.

Table 36: Funded projects in H2020

	Member states
Funded projects	47
Involved partners	882
Contribution	645.787.452m
Coordinations	47
Chances of Success	44,2%

Source: FFG, 2018[96]

For fusion research, the Programme calls for a substantial reorganisation that will support a shift from pure, academic research to scientific questions of designing, building and operating future facilities such as ITER. According to the EC, fusion should be ready to produce electricity by around the middle of the century (see EUROFUSION, 2018).

Different Member States organised their responsible NCP in different ways. While some have separate National Contact Points (NCPs) for Fusion and Fission, others have one NCP covering both areas. In addition, some countries merged NCP's responsibilities for EURATOM with the ENGERY programme line, meaning that the respective NCP deals with Fusion, Fission and ENERGY.

10.3.6. Nuclear power: a subject of public concern

Currently 14 EU Member States operate 140 nuclear reactors.[97] Since the peak of use of nuclear power for energy supply in the 1960ies and 70ies, Europe perceives a number of different developments in the use of nuclear power.

[92] European Commission (2013) : https://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf
[93] European Parliament (2015): http://www.europarl.europa.eu/RegData/etudes/IDAN/2015/571312/EPRS_IDA%282015%29571312_EN.pdf
[94] EUROFUSION (2018): https://www.euro-fusion.org/
[95] European Commission (2013): https://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf
[96] FFG (2018): https://eu-pm.ffg.at, last updated June 1st, 2018. These numbers differ slightly from Table 1 because a different closing date was used.

The average lifetime of reactors is approaching 30 years, and questions about long-term functioning and/or replacement of existing capacities are becoming increasingly important for Member States and national safety authorities. Some reactors are being decommissioned, the working lives of others are being extended and several new units are either planned or under construction.[98] The EC forecasts a decline in EU nuclear capacity up to 2025, followed by a levelling out to 2050 about 80 to 88 % of current capacity[99].

In the aftermath of the 2011 Fukushima nuclear disaster, major safety upgrades were implemented in European nuclear plants, resulting in cost increases of 5 to 25 %. Member States react differently to this development. Austria opted against the use of nuclear power already in 1978. Italy decided in the 1980s to stop nuclear energy. Germany in the aftermath of Fukushima opted to phase out until 2022. In contrast, Sweden stopped its phase out policy and increased its efforts to maintain nuclear power plants.[100] Confliction Member State policies also create friction on European level.[101]

Nuclear power is controversial in Europe. The most recent EUROBAROMETER survey of 2010 states that, "European public opinion accepts the value of nuclear energy to some extent primarily as a mean of decreasing energy dependence, but continues to consider that the current share of nuclear energy in the energy mix should be maintained or reduced[102]. On closer look, huge differences between Member States exist with regard to acceptance on different aspects of nuclear power. When asked if nuclear energy helps to limit climate change, Scandinavian countries show a very high level of support (Sweden 73%, Finland 67% and Denmark 61%); however, people in other countries show little support, e.g., Austria (29%), Portugal (30%) and Spain (34%) (Eurobarometer 2010: 15). Asked about if a lifetime extension can be done if plants safety continues to satisfy national and international requirements are met, there is a similar picture. Again the Scandinavian Countries (Denmark 63%, Sweden 62% and Finland 61%) show high approval rates, while the UK finds itself in the middle (45%) and Germany (35%), Spain (29%), Austria (22%) and Portugal (19%) are stating low approval rates (Eurobarometer, 2010).

The 2010 Eurobarometer showed similar findings like an EC report from 2007[103.] In these two years no major shifts occurred, apart from a slight decrease in support for nuclear energy.

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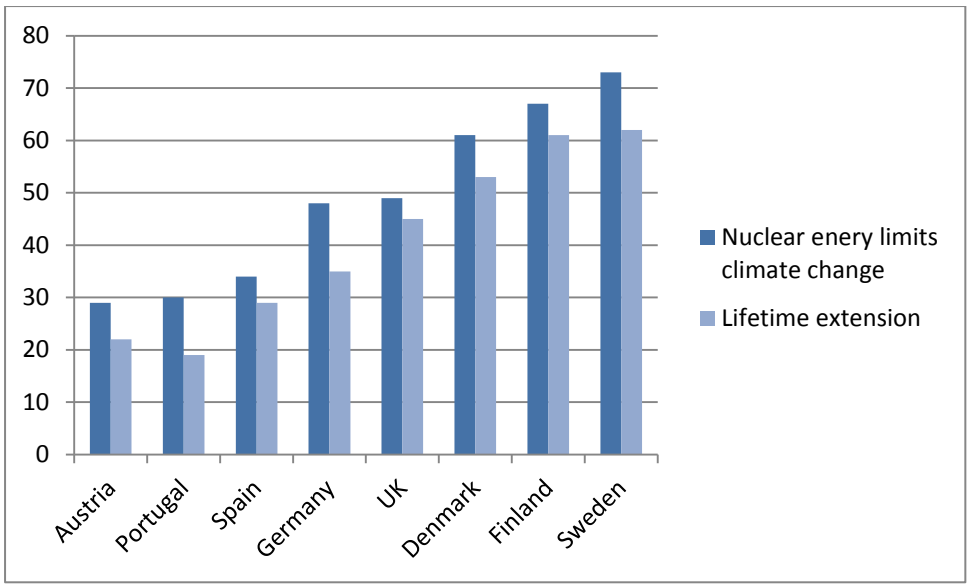
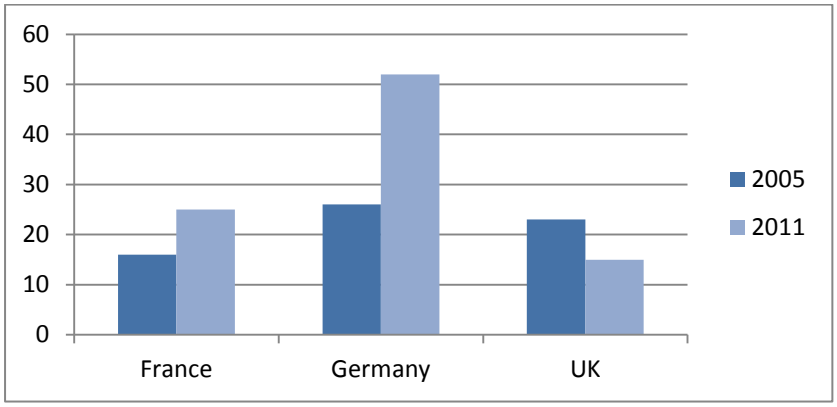
[97] JRC (2018): https://ec.europa.eu/jrc/en/research-topic/nuclear-energy
[98] EURATOM (2017): http://ec.europa.eu/euratom/ar/ar2017.pdf
[99] European Parliament (2018): http://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608665/EPRS_BRI%282017%29608665_EN.pdf
[100] The Local (2011) https://www.thelocal.se/20110319/32690
[101] Austrian opposition against nuclear power plants in Bohunice (Czech Republic), Mochovce (Slovakia), Paks I and II (Hungary) and Krsko (Slovenia) was not only formed by NGO's but has been on the political agenda of every major Austrian political party. This reflects the rejection of nuclear power by a vast majority of the Austrian population.
[102] European Commission (2010) http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_324_en.pdf
[103] European Commission (2007) http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_271_en.pdf

Figure 16: Value of nuclear energy (Eurobarometer, 2010)



It is unclear to what extent the Fukushima disaster of 2011 shifted public's perception, as no recent EUROBAROMATER data on this question is available. Still, newspaper articles and other studies draw a varying picture. For the UK[104] it shows no impact of the Fukushima disaster in terms of acceptance.

Figure 17: Q: Nuclear Power is dangerous close down all Power Plants as soon as possible



One study conducted by GlobalScan[105] for the BBC shows differences between countries. The percentage of German respondents in favour of closing nuclear power plants doubled between 2005 and 2011 (26% to 52%), France saw an increase from 16% to 25%, while the UK went from down 23% to 15% stating that nuclear power is dangerous.

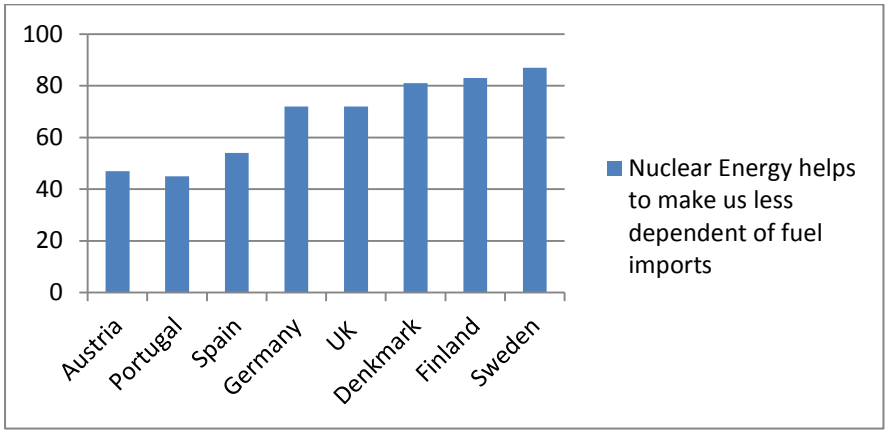
A good example for that were Austria's legal challenges against the subsidies for the British Plant Hinkley Point. This was the result of the negative perception nuclear power has in Austria. Given this fact, the population put pressure on the government to avoid the further investment in nuclear power. In the end they suffered defeat at the ECJ[106].It also showed how tensed the relationship

[104] BBC (2011): https://www.bbc.com/news/science-environment-15864806
[105] Globe Scan (2011): https://globescan.com/opposition-to-nuclear-energy-grows-global-poll/
[106] The Guardian (2015): https://www.theguardian.com/world/2015/jul/06/austria-files-legal-complaint-against-uk-hinkley-point-c-nuclear-plant

between the different EU Member States can be when it comes down to the emotional topic of nuclear energy.

As Figures 4 and 5 point out, there are currently different trends among the member states perception of nuclear energy. Compared to the findings in Figure 3, more Europeans can agree on the question that "Nuclear Energy helps to make us less dependent of fuel imports".

Figure 18: Nuclear Energy helps to get less dependent on fuel imports (Eurobarometer, 2010)



Again we find the "nuclear sceptic" countries like Austria, Portugal and Spain on the bottom end while the Scandinavian countries show very high rates of support (Eurobarometer 2010). Around 50% of the respondents in countries that are cautious towards nuclear energy believe that it could be a way to minimize dependency on fuel imports. This could offer public support for the EC's goal of producing energy with cheap, non - carbon related solutions that provide a feasible way of meeting current and future energy demand.

Resulting of its governing structure and the limited role of the European Parliament to consultation only, EURATOM is often criticised for its democratic deficit that causes controversy in regards of legitimation of EURATOM itself. Even if it might be complicated to initiate public discourse, as different countries, with different traditions in using Nuclear Energy and different attitudes towards it, need to find a suitable common solution, engaging the public more into these processes of setting up goals could result in a higher acceptance as well as in more support for EURATOM.

10.4. Current situation of RRI in EURATOM

RRI is not explicitly mentioned on any level of the EURATOM programme line. In this diagnosis we used two different sources to analyse the impact of RRI in the EURATOM programme line.

First, we looked whether and to what extent the various RRI keys and Three Os were mentioned in the respective documents (e.g. Working Programmes). We analysed the Work Programmes for the periods 2014-2015[107], 2016-2017[108] and 2018-2020[109]. In the second approach, project partner of

[107] EURATOM (2014): http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/euratom/h2020-wp1415-euratom_en.pdf

CWTS of University of Leiden used key word research related to the six keys to identify projects which score high in terms of RRI.

10.4.1. RRI brief

In this part of our report we summarise our assumptions we started with at the beginning of the diagnosis. This should generate a baseline for this diagnosis. We assumed that nuclear energy is a sensible and widely disputed issue in many Member States and that this might be an opening for inclusiveness towards citizens in terms of Public Engagement.

10.4.2. Desktop findings

This section outlines to role of RRI on the different levels of H2020.

10.4.2.1. Policy document level

No traces of the RRI concept or one of the Three O's were explicitly found on in policy document level.

10.4.2.2. Scoping level

Similar to policy document level we did not find any indication of RRI or relation to the three O's on scoping level.

10.4.2.3. Work programme level

No explicit notion of RRI as a concept could be discovered on Working Programme level. However, in contrast to the aforementioned levels, most of the RRI keys (with the exception of Governance) and two of the three Os were explicitly mentioned in EURATOM Work Programmes.

Public Engagement

Although the three Working Programmes mentioned the term *public* 89 times, it never included Public Engagement. The "public interest" is mentioned several times without digging into further details what this could look like. This discrepancy between being aware of the public and their involvement without actively engaging is important.

Gender

The three Working Programmes touched the Gender dimension eight times in total. This frequency of mentions did not change much in the Work Programmes 2014-2015 and 2018-2020. Gender Equality was mostly understood as Gender balance in research teams.

There are indications that the Gender dimension is considered less important in EURATOM. Work Programme 2016-2017 is dealing inter alia with the question how to prioritise proposals with the same score. In these cases the Gender dimension is considered less important than the criterion "size of EURATOM budget allocated to SME's" (Work Programme 2016-2017, p.55).

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[108] EURATOM (2015): http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/EURATOM/h2020-wp1617-EURATOM_en.pdf

[109] EURATOM (2017): http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/euratom/h2020-wp1820-euratom_en.pdf

Science Education

The three Work Programmes mentioned Science Education in total three times. Science Education was understood as training PhD students rather than educating the public.

Open Access

In the Work Programmes Open Access was a prominent RRI key. The topic gained importance in the course of time. It was mentioned three times in the Work Programme 2014-2015, once in Work Programme 2016-2017 and seven times in Work Programme 2018-2020. Open Access meant not only Open Access to data but also to research infrastructure within the European Union. This view was already present in Work Programme 2014-2015 but was more often addressed in Work Programme 2018-2020.

Ethics

Ethics was addressed four times within the three Work Programmes. Work Programme 2014-2015 contained no mention at all while Work Programme 2016-2017 dealt with "Ethics Self-Assessment" (Work Programme 2016-2017, p.50), "ethical principles" (Work Programme 2016-2017, p.49) and "Ethics review" (Work Programme 2016-2017, p.46). Work Programme 2018-2020 suggests to "[include] Ethics checks where appropriate" (Work Programme 2018-2020, p.27). Given its few mentions and the way it is dealt with suggests that Ethics has the status of a tick-box exercise.

Open to the World

The global dimension or the "Open to the World" aspect was dealt with on different levels. It was mentioned eight times in the different Work Programmes, stressing some benefits of being open. These are for example "to develop a stronger innovation and entrepreneurial culture in fusion research" (WP 18-20, p. 26), or "EU safety standards to be adopted worldwide" (WP 16-17, p.10) and "that increased completion through a worldwide contest will stimulate EU research" (WP 16-17, p.26).

Open Science

Open Science was mentioned in the Work Programmes twice. The need to include scholars from Social Sciences and Humanities was stressed twice in Working Programme 2016-2017.

10.4.2.4. Call level

RRI was not mentioned explicitly on call level. *Ethics*, as an issue that needs to be addressed in every proposal seems to have the status of a tick box exercise.

10.4.2.5. Project level

The two trending topics were Public Engagement and Open Access. They have been mentioned five, respectively four times. While *Science Education* was still mentioned two times, *Gender* aspects were only named once while *Ethics* wasn't addressed at all at projects' level.

Project 196907 mentions that "special attention will be paid to the diversity of stakeholders in the Nuclear Fission and Radiation Protection sectors, the Gender dimension [….]". By expressing it this way, it seems like the Gender dimension is not perceived as part of a diverse stakeholder group but rather something that needs to be accomplished by default.

Also the quality of the notion varies. Project 198383 mentions that "the interaction tools already built with the Civil Society Organisations would worth being enlarged to stakeholders outside SITEX

or in educational perspectives" which can be related to an effort towards *Science Education*. Otherwise no similar approach on this RRI key could be found.

Although *Open Access* was mentioned four times, three of the notions refer to project 203753. Here Open Access was seen as a way to provide NCP's information to improve the quality of proposals submitted as well to enable those who are new to the job, to catch up quickly in terms of expertise.

Surprisingly *Public Engagement* has been described as a goal in several projects referring to the debate on nuclear waste. Project 200955 states that "the best way to handle and dispose this material is a topic of broad public debate and concern".

The same project states that "this has impact on the public debate on nuclear waste disposal, also by keeping non-scientific stakeholders involved". Even this might not seem like the eagerness to directly engage people into the research, the influence of the research on public opinion is acknowledged which might be an anchor to spread the seeds of RRI. The rather reserved attitude of EURATOM funded projects continues with project 198045, where they want to "exchange and communicate with all stakeholders" but "the public and media where necessary". Again the public is not seen as a relevant stakeholder to the research but is at least mentioned and therefore part to some awareness.

10.4.2.6. Evaluation

Standard evaluation criteria do not include RRI or any of the RRI keys.[110]

10.4.3. RRI in interviews

Interviews confirmed the results of the document analysis that RRI did not play a significant role in EURATOM as a complete concept, but interviewees were aware to a certain degree of some RRI keys.

10.4.3.1. Ethics

Interviewees were only limited aware of Ethics issues. Most of them considered Ethics already as an integrated part of their work. They emphasised that an Ethics commission is involved whenever a research project needs clearance and that Ethics assessment is an EC requirement in calls. Informants considered this as sufficient to ensure that research is carried out according to ethical requirement.

Some informants were also critical about Ethics. One interviewee mentioned that some researchers might have difficulties to address Ethics properly. They hire specialists to address the Ethics dimension required by the EC. The interviewee described this pragmatic approach (that continues the division between ethical reflection and research): "If you need a plumber you hire a plumber. Sometimes people who are not a plumber can fix it on their own. The same [thing] with Ethics. It's a skill, not scientific work" (IV2). This practice does not address the need for deeper integration of Ethics assessment. The Ethics section in the proposal is rather perceived as a tick box exercise than a useful tool to maintain highest ethical standards.

[110]European Commission (2018a): http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-h-esacrit_en.pdf

One interviewee stated that ethical issues are only addressed if the European Union makes them compulsory (see IV1). In Slovenia applicants are responsible to consider ethical issues on their own, as there is no NCP support available. However, since Ethics is important to get funding, applicants are eager to comply (see IV2). Some interviewees believe that the "administrative burden" to address ethical issues increased in recent years. In addition, they say, adhering to these requirements, takes capacities away from research. If, for example, a deeper Ethics assessment would be compulsory, an increase of bureaucratic burden is feared. Therefore Ethics is of interest but there is little motivation on pursuing active measures to further extend the status of Ethics.

Furthermore there seems to be some kind of imbalance between the social scientists' view on Ethics and the perception of natural scientists /engineers. When the Ethics key was tackled during the interviews, interviewees quickly hustled into a position of defending themselves and their research. "Of course my research is ethical" was in one form or another the common way to go. When this view was challenged by the interviewer, a vast majority of respondents was confused. The fact of being asked about Ethics led them to the conclusion that their research might be considered unethical. As a consequence some of them took a defensive stance with regard to Ethics.[111]

Our analysis shows that Ethics is an important issue for EURATOM stakeholders. However, the interviewees stated that they already achieved this goal within their own work, because their research is only carried out according to high ethical standards. Asking for further elaboration most informants replied that their focus is on making research and nuclear power safe(r), which in their perception is doing ethical research.

10.4.3.2. Gender

Gender, just as Ethics, has not been brought forward by any of the interview partners. When asked about this key, most interviewees perceived Gender imbalance favouring male researcher. The interviewees often stated that Gender balance in research teams is difficult to accomplish, as nuclear research is still a field dominated by men. In contrast to this general impression, one project coordinator mentioned that in one project all important staff (coordination and work package lead) was female (see IV6). The project involved mainly partners from central and eastern European countries where woman traditionally, as she explained, were more encouraged to enter the field of natural sciences and engineering. This explanation was confirmed by another interviewee (see IV1).

10.4.3.3. Science Education

Interviewees raised the topic of Science Education differently. Although respondents did not consider it as a topic of highest importance, interviewed NCPs suggested a number of activities to inform and educate the public. These suggestions included the organisation of an exhibition tent at one of the biggest European music festivals (see IV4), sending out newsletters and organising info days (see IV2). One NCP mentioned that she will dedicate extra attention to Science Education in 2019 by increasing public education and training.

[111] As a consequence RRI advocates might reflect on the emotional charge of ethics. EURATOM stakeholders claim that they already follow high ethical standards in their research. How is it possible to address ethics issues without blaming?

10.4.3.4. Open Access

For most researchers Open Access is already established standard. All respondents mentioned that they try to publish Open Access as much on as possible and stressed the importance of this approach (see IV1, 3). One interviewee portrayed herself as expert in Open Access and stressed several times its importance for the research community (see IV1).One NCP perceived Open Access as a matter of transparency (see IV2); and also stated that in EUROFUSION a publication procedure is established in which publications have to pass an internal Approval Board. Researchers can upload their publications to a pin board, where it is checked and after usually within two weeks a decision on publication is made (IV4).

10.4.3.5. Public Engagement

For most respondents the crucial point about Public Engagement was the question whether and how to include the public into the actual research process.

One (FP7) project consulted small stakeholder groups during the project lifetime. Those varied from politicians to local population (see IV6). Other interviewees also mentioned consulting and informing the public as important aspect (see IV4) - and this was also addressed in some projects (project 200955). One NCP reported about meetings with CSOs a few times a year where possible fears could have been addressed to create shared ground. He emphasised the limits of this approach, because of the differences of interests between nuclear researchers and CSOs (see IV2).

One interviewee reported that the goal in her project of involving the public was to gain support. The coordinator stressed that it was important for them “to engage all relevant stakeholders from the very beginning, by trying to make them understand what the project is all about, get them on their sides and have their support” (IV6). Still it got somehow the notation that this approach was rather used to oppose any possible “not in my backyard” opposition from the local population that frequently happens when a new generation reactor is tested. In turn the coordinator stated that the project itself benefited from the public’s input as well as the people accepted and supported the project even more. They rather expected fears but the opposite was the case and the local population widely supported the project, which made the coordinator happy (see IV6).

However, most interviewees rejected the idea to include the public in the research process. One interviewee made this explicit: He considered nuclear energy as far too complex to involve people from outside research (see IV4). This is referred to by saying that the field of nuclear physics is a complex matter and the public is lacking the specific knowledge to judge on that.

The common notion was that the stakeholders are basically within the scientific community (see IV1) and if the public was considered to have a stake that it rather needs to be informed than engaged in the research and innovation process itself.

As already addressed within the analysis of the different programme levels, Public Engagement or stakeholder engagement literally is the medal with the two sides. On the one side there are attempts to initiate and promote public/stakeholder engagement, while on the other there are seen limitations on it by many people interviewed. This opposition is also shared within the Working Programmes where it is advised to engage the public/stakeholders but rather by giving them transparent information about the research than actually involving them in the R&I process itself.

This was somehow confirmed by one interviewee (see IV1) who stated that the EURATOM community is very well aware of the necessity of informing the public about the activities.

10.4.3.6. Governance

Governance as a key was hardly addressed by any of the interviewees. One interviewee stated that "the Governance perspective was included because it was mandatory in the call" (IV6). They knew from previous projects in which they participated that, that the public will be included sooner or later (by the Project Officers), so one should work transparent and inclusive. Therefore they tried to engage all relevant stakeholders from the very beginning to make them understand the content of the project, and to win them over. The respondent called this approach "inclusive Governance" (see IV6).

10.4.3.7. O's

Interviewees involved in fusion research strongly emphasised the global dimension (Open to the World). They explained it with the small number of fusion researchers. The ITER test reactor works as a major unifier of the global researcher community. Economic reasons are a driving force behind openness of nuclear research to the world. Nuclear safety needs global standards and interviewees stressed the importance of information exchange for generating competitive advantages.

10.4.3.8. Other RRI (societal impact) related concepts

No other concepts were mentioned. One NCP knew the concept of RRI to a very limited extent (see IV3). Another NCP stressed that she heard about RRI but there was no demand for it from her customers' side (see IV1). Some interviewees wanted to know more about RRI but were sceptical about implementing it on a broader scale. None of the informants rejected the idea of RRI completely but most of them perceived limitations, especially when it comes to citizen involvement in research.

10.4.3.9. RRI as approach; method or process

One NCP raised a general interest in RRI as a concept but there was no application visible in any country or level of the programme. RRI as a concept in general was widely unknown among the interviewed stakeholders, nor was it promoted within the Working Programmes.

10.4.3.10. General approach to address a challenge

Most people interviewed have shown at least some awareness towards RRI keys. Open Access was indisputably considered a good way of not only informing the public but also in regards of transparency. Science Education received some attention and was applied in some projects in the way of information tents at big music festivals, inviting them to stakeholder consultations and most common giving lectures on the research. Sometimes this was interacting with attempts of Public Engagement which has been widely important among the interviewees but was covered rather differently. People did apply Public Engagement in some cases because either out of conviction, to seek legitimation for their research, getting support or to simply inform the public about their work.

10.4.4. Theoretical framework of RRI applied in EURATOM

As there was only little or no awareness among the people interviewed, nor any relation to RRI in the official documents, it is assumed that no specific RRI framework is applied in EURATOM.

10.4.5. Overall assessment of RRI in the programme line

Table 37: Overall Assessment of the RRI keys

RRI key	Level of Awareness	Summary
Public Engagement	Some awareness	Working Programmes, project description and interviewees mentioned Public Engagement very often. Some interviewees considered Public Engagement important but also challenging. Main objections against engaging the public, were the assumption that there is a lack of knowledge about the complex field of nuclear physics or that the public would be hostile towards nuclear physics because nuclear energy is a rather emotionally topic in several countries.
Gender	Some awareness	Gender was addressed in documents and interviews in terms of Gender balance. The goal of reaching equal numbers of male and female researchers in research teams was considered important. Interviewees agreed that women should be encouraged to choose careers in nuclear physics and/or engineering.
Science Literacy and Education	Limited awareness	Science Education was perceived to be vital to tackle the knowledge deficits of the public. Interviewees made a number of suggestions to educate the public such as hosting public events, information tents on festivals for popular music or other ways of involving stakeholders. Still, interviewees imagined rather PHDs or potential recruits for a career in the field of nuclear as target groups than the general public. Many interviewees mentioned teaching activities as their contribution to Science Education. However, their teaching activity was not directed towards the public. It was hinted by most interviewee that the general public is not seen as competent enough to deal with the complex challenges of the nuclear field so therefore one must focus on those who have the potential to enrich nuclear research like PhD students.
Open Access	High awareness	Open Access is the most relevant RRI keys in documents and interviews. Not only do all official documents mention the need/preference to publish Open Access; interviewees consider it important for the research community as well. Interviewees criticised that publishing Open Access is expensive and that dedicated funds are rather limited. Therefore some interviewees were in favour of more money for that purpose within the funding. Most interviewees reported that publishing Open Access nevertheless is established routine.

Ethics	Some awareness	All interviewees considered Ethics as integral part of proper research. They considered their work as ethical and were convinced of already applying the highest level of Ethics. Ethics as an RRI key was confused with research integrity. Research Ethics was often described as being cautious and not causing any potential damage. Research Ethics in EURATOM is rather considering the spheres of safe research than it puts emphasis on education and training, stakeholder involvement or the integrity for society. This challenges RRI as the status quo is considered as sufficient. Therefore a first step towards a deeper integration of RRI can only be to show stakeholders a wider concept of research Ethics by also including societal challenges into it.
Governance	No awareness	It played a very limited role in official documents and was never mentioned by any of the interviewees.

10.5. Current status of RRI in EURATOM and its role in the programmes

- Desktop research showed that RRI was not applied as integrated concept on any level. However, analysis of the Working Programmes and projects funded under the EURATOM line show that most of the keys have been addressed in one way or the other.
- In documents, Open Access was the most prominent key; the remaining keys and 3 O's were infrequently mentioned. These findings reflect in interviews.
- Interviewees didn't oppose the idea of RRI altogether. One NCP, e.g., was interested in the concept and its application. However, many interviewees became skeptical after taking a closer look at the concept, particularly when it came to Public Engagement in research and innovation. In general, interviewees did not refuse RRI they don't want it to hinder the progress in R&I.
- Most interviewees agreed on the necessity to inform the public and argued for more transparency.
- The respondents considered doing research in an ethical way as of utmost importance in science. They did not see the need to change current practices which they perceived as sufficient. Most of the informants showed a focus on safe research rather than research Ethics.
- With reference to Gender Equality, both, Working Programmes and interviewees focused on numbers. The question about Gender imbalances in the nuclear sector was hardly ever raised.

- Working Programmes and the interviews focused with regard to Science Education activities mainly on (potential) PhD students.
- Governance as RRI key was never mentioned, neither in documents nor interviews.
- Open Access was an important topic in documents and interviews. Interviewees emphasised that further steps are necessary despite the successes already accomplished.

10.5.1. RRI and other concepts in EURATOM

No other equivalents to RRI could have been found. Additionally to the circumstance that RRI is not a familiar concept to the EURATOM stakeholders, the concept of the three Os is not known at all. One or the other aspects within the desktop research as well as the interviews could be related to the concept but again, there was no explicit mention of it.

The different RRI keys appeared in different settings and were mentioned in various ways. Therefore we conclude that little parts of RRI are present within the EURATOM community. This must not necessary result out of general objection of RRI, as it can be described as a matter of awareness too.

10.5.2. The main challenges for RRI in EURATOM

There are several major challenges for RRI within EURATOM. First, the concept of RRI is little known. While there is clearly sensitiveness for security issues of nuclear energy and therefore a sense of responsibility towards society, knowledge of RRI and its keys is limited. Second, Public Engagement poses a complex challenge. On the one hand interviewees stressed the public's right for information about nuclear research. Many informants were in favour of educating the public on this topic. However, respondents were sceptical about involving the public in bidirectional communication about research for two reasons. They questioned whether lay people can fully grasp and asses the complex area of nuclear physics and its consequences. On the other hand, they pointed out that public perception of nuclear research is not positive and therefore public discussion would not be fruitful. In other words, the informants' openness and readiness towards transparency is curtailed by their assumptions of public's lack of knowledge and scepticism. In this perspective deeper involvement of lay people into research does not make sense, according to many informants. Therefore the challenge for mainstreaming RRI will be, first, to familiarise involved actors with the concept, and second, to explore the hindrances and possibilities of Public Engagement in this area.

10.6. Relevant stakeholders

10.6.1. Who were the relevant applicants/actors/stakeholders?

The question of who is a relevant stakeholder remained a rather vague one for the case of EURATOM. As nuclear energy is a sensitive topic within the general public almost everyone seems to have a stake in that field, especially given the fact that the consequences could affect everyone. To initiate change, the relevant stakeholders or agents of change therefore needed to be identified.

For that we decided to have a mix of different areas dealing with EURATOM in the first Social Lab Workshop. We were happy to get a person from the NGO/CSO side committed, as well as having institutional insight present in the person of one high rank from the JRC dealing with EURATOM research. The other stakeholders were either selected by their involvement in research projects or given their expertise.

The participants of the first Social Lab Workshop represented a diverse group covering all preselected areas. From a practical point this still seemed to be forming the 'nuclear bubble' in the first Social Lab Workshop. For the second Social Lab Workshop we aim to engage more outside perspectives to all of the participants.

According to the table we considered the following aspects important:

Table 38: Stakeholder table

	High	Low	None	Un-known
Level of knowledge about European research funding	X			
Knowledge about H2020/FP7	X			
Knowledge about the specific programme line	X			
Project/Research experience **Involvement in EU funded research as project partner** **Involvement in EU funded research as project manager**	x			
Impacted by EU funded research (assumed)		x		
Assumed Impact on EU funded research				x
Assumed Knowledge/awareness about RRI		x		
Experience with RRI		x		
Experience with social labs			x	

10.7. Conclusions

EURATOM has a special position within H2020. Given its foundation in the basic Treaties of the European Union and its status as institution rather than a funding program, EURATOM is unique in H2020, which makes it hard to compare with other parts of H2020. Furthermore, certain parts of EURATOM (fusion) are almost autonomous from H2020 and organised within EUROFUSION. Other parts (fission) closely interact with JRC and are funded by this body via non-competitive direct actions. Calls that are comparable to other H2020 areas exist only as part of the indirect actions.

Within EURATOM RRI keys and the three O's vary in standing.

There was some awareness for some keys, but they were only narrowly defined and little attention was paid to them. There was some awareness for Ethics but it was considered as already integrated into daily practices and perceived as tick-box exercise. On the Gender dimension, most interviewees stated that the share of woman in this field tends to be low. However, the imbalance was not perceived as problematic. Science Education was considered important but efforts to invest resources into this area were modest.

The Governance key did not have any importance within EURATOM at all.

Two out of three O's were mentioned. The inclusion of more social scientists and scholar from the humanities into EURATOM was seen as a desirable contribution in the Work Programme 2016-2017 to a more Open Science. Being Open to the World is seen important from two reasons. One is to establish European standards in the world, while the other is to increase global competition.

The most challenged key was Public Engagement. Whether, how and to what extend to involve the general public into the research and innovation process in EURATOM is an emotional question. Several arguments against a deep(er) involvement of lay people were stressed. First, the public was seen as potential opposition. Second, it was argued that the general public lacks knowledge on nuclear energy. It was questioned whether the public will be able to form an opinion in a rational way or will rather stick to their guts feeling.

Some informants used the image of the “guy out of the woods” to describe their relationship to the public. The guy out of the woods was considered uneducated and in need of seeing the bigger picture which can only be provided by experts with special training. The use of this metaphor indicates that experts perceive a big gap between the general public and EURATOM experts.

In this perspective, the retreat to the often stressed academic ivory tower and closed circles seems logical. In the interviews it was confirmed several times that most stakeholders in nuclear research are well connected. This can be also pictured in how consortia are set up. Big facilitates like the Jožef Stefan Institute in Slovenia or ÚJV Řež in the Czech Republic are very well connected, as cooperation in many projects prove.

Therefore RRI faces many different hindrances in EURATOM:

It will be challenging

1) to create awareness for the importance of engaging the public beyond informing them about the research projects being done;

2) to stimulate a discussion on the role of Ethics and Gender in research as well as Science Education that goes beyond the tick box exercises and narrow levels;

3) and to bring together these diverse stakeholders to find a common understanding of what goals should be set up for future research in EURATOM and beyond.

In one Interview it was stressed that there are no calls including RRI or Public Engagement elements for EURATOM currently in place, so therefore no funding for mainstreaming RRI does exist.

To do abandon these barriers a dialog between the public and the EURATOM community must be established. On the one hand the community correctly stresses that the topic of nuclear energy is an emotional one, on the other hand the resistance on involving the public beyond offering them information must be tackled. Creating an environment of mutual trust could be the foundation on which the public together with the EURATOM stakeholder can create a shared vision of the future.

By doing so, EURATOM could gain a wider acceptance. A broad range of topics such as Public Engagement where RRI can be reasonably applied were identified. The questions on how to deal with nuclear waste, what kind of research is doable and other ethical questions need to be addressed.

Also projects that already have included the public have proven successful. One project involved the broader public into the research to generate acceptance. As this worked out well it could be a promising way pointing out the importance of the concept of RRI in total.

The three Social Lab Workshops will have to tackle this and the awareness problem and should suggest possible engagement of the broader public. Here it will be important to offer the EURATOM stakeholders potential benefits in doing so, as well as giving precise information on the tools (like RRI). It furthermore seems easier to “digest” for large parts of the EURATOM stakeholders if there is a stringent concept if not a toolbox available. This could not only be a solution for EURATOM but for large parts of the H2020 environment, as the RRI concept was often described as being too vague and abstract. If possible pressure on policy makers should be created to make RRI an evaluation criterion.

These could be first steps to more stakeholder involvement and to engage them in pilot actions mainstreaming RRI. It is highly likely that once people are aware of the benefits of applying RRI, their commitment in including it into their everyday practices increases. Therefore it will also be vital for the aim of mainstreaming RRI in H2020 and beyond to think of ways to engage and get people committed. This could not only be done by promoting RRI as an agent of change but also to provide more options of integration into stakeholders environment by adapting the concept of RRI to this area. Examples already showed that if Public Engagement is taken serious, distrust and objection by the public will decrease.

Summing up the first challenges diagnosed, the most important thing to do is to translate between “the nuclear and the real world” by fostering exchange and communication, taking fears, pointing out the benefits of mutual learning where RRI could be a great tool to use.

10.8. Literature, links, resources

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Interviews

IV1	NCP
IV2	NCP
IV3	NCP
IV4	NCP
IV5	NCP
IV6	Coordinator
IV7	FUSION Researcher
IV8	Researcher
IV9	NGO