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Abbreviation	
WP	Work Package
SWOT	Strengths, Weaknesses, Opportunities, Threats
RRI	Responsible Research and Innovation
ELSA	Ethical, Legal, and Societal Aspects
HEFRC	Higher Education, Funding and Research Centres
R&I	Research and Innovation

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• • • • 1. Introduction

Introduction



In this report we carry out an analysis of the strengths, weaknesses, opportunities, and threats (SWOT-analysis) of current and future HEFRC RRI initiatives. This analysis is based on and refers to the ETHNA "Report on the state of the art and best practices" (Moan et al. 2021), that reports from a review of the state of the art in seminal documents and best practice institutionalisations of HEFRC RRI, and from status and foresight interviews with stakeholders and experts.

The six central types of RRI approaches and corresponding implementations identified by the ETHNA WP2 study are analysed in this report. The SWOT-analyses presented should bring out the lessons learned in previous and ongoing RRI and ELSA approaches, and the anticipated contributions and challenges ahead for contemporary and future HEFRC RRI efforts. A SWOT-analysis of the ETHNA Office architecture and recommendations drawn from these conclude this report.

The motto of this report is inspired by George Santayana's classic quote "Those who do not know history's mistakes are doomed to repeat them":

Those who do not guide their RRI efforts by SWOT analyses of best practices will walk in the valley of their shadows.

SWOT analyses of 6 HEFRC RRI approaches

In this this section we will perform a SWOT analysis of each of the 6 HEFRC RRI approaches identified in chapter 2 in the ETHNA "Report on the state of the art and best practices" (Moan et al., 2021). A summary of each approach will follow. References and more in-depth descriptions and analyses of these approaches are found in the abovementioned report by Moan et al.

A. Self-regulation

In this approach, the permissions and prohibitions articulated in society's norms and laws regulating scientific activity and scientific standards are the key concerns of RRI. The norms and permissions in question include avoiding scientific fraud and enabling open science, respecting the integrity and autonomy of human research participants, and securing the welfare of animal research objects.

The aim of these types of HEFRC RRI approaches is self-regulation of scientific activity, by, for and with scientists. The paradigmatic governance mechanisms are research integrity committees, and ethics committees and state agencies, such as national research councils.

Strengths

Able to adhere to permissions and prohibitions articulated in society's norms, laws, and scientific standards of conduct.

Maintaining the relative autonomy of science to define and pursue the problems identified by the scientific community, in exchange for delivering new scientific knowledge and technology.

Weaknesses

Not ideally suited to accommodate dialogue on ethical questions related to broader, societal issues.

Limited possibility for public engagement and societal needs alignment.

Opportunities

Can be positioned to set the rules of the game and encourage and facilitate reflection, by setting up temporary or permanent national fora for debate on issues of general interest, that can stimulate academic and public reflection on ethical questions and dilemmas.

A comprehensive and quite rigid ethics committee system can still be set up in a way that is effective and dynamic by having stratified process criteria that make the assessment process tailored to the needs of every case.

Threats

If limited to top-down monitoring activity, can lead to check-box ethics among stakeholders, transformation of ethics into law, and reduced ethical responsibility and awareness among researchers.

B. Risk governance

In this approach, RRI is about handling and mitigating unacceptable or harmful risk to society or the environment by technology development. The governance of risk here draws on a mix of external regulatory mechanisms, relying heavily on technical expertise, and the undertaking of costbenefit analyses based on various tools of prediction.

The aim of these types of HEFRC RRI approaches is governance of risks. The paradigmatic governance mechanisms are external review involving technical expertise, ethics review involving stakeholders, and self-governance mechanisms, such as voluntary foresight exercises.

Strengths

Suited to handling and mitigating potential risk related to new technology development, and the related question of how one can best alleviate or avoid a product deemed harmful

Weaknesses

Vulnerable to limitations of perspectives among involved expertise and stakeholders.

Opportunities

The fundamental RRI elements of inclusivity, participation, anticipation, social desirability, and ethical acceptability can be made an integral part of all projects of a research institution.

RRI training programmes can be anchored at all levels (not just top-down) within the HEFRC organisation, increasing the motivation among the staff to follow the programme.

Threats

Lost opportunities to do ground-breaking R&I because of too much focus on down-stream risk management, at the cost of leaving out or weakening up-stream analyses of societal needs and alternative trajectories.

C. Anticipatory R&I

In this approach, responsible research and innovation is about anticipating potential negative social, environmental, and economic consequences of new technology (biotechnology, nanotechnology, nuclear research, information technology). The aim of these types of HEFRC RRI approaches is to promote anticipatory R&I through soft law mechanisms that facilitate self-governance. The paradigmatic governance mechanisms are collectively agreed codes of conduct, guidelines, agreed sets of indicators, and deliberative assessment processes and ethics review.

Strengths

Fit to anticipate potential negative social, environmental, and economic consequences of new technology.

Guidelines, indicators, codes, etc. are easy to consult and discuss, stimulating awareness, reflection, and progress.

Weaknesses

Shortcomings in the deliberative process of making codes, guidelines, indicators, etc.

Solutions to past and current problems might not fit or be fruitful faced with unforeseen problems of the future.

Opportunities

Potential to make R&I more reflexive, thus enabling the disclosure of present and future harmful scenarios, as well as feasible alternative and less harmful R&I trajectories.

Threats

Collingridge dilemma: impacts cannot be anticipated until the technology is developed and disseminated, and they are clear but difficult to control or change when the technology is already entrenched and it is too late to go alternative ways.

D. Representative co-construction

In this approach, RRI means democratising research and innovation. Stakeholders should be heavily involved in the framing of the problems and questions to be researched. Including stakeholders is here an end in itself, and not a means to achieve a given end.

The aim of these types of HEFRC RRI approaches is representative co-construction of science. The paradigmatic governance mechanisms are citizen juries, advisory committees, consensus conferences, focus groups, and surveys.

Strengths

Democratizing research and innovation, by involving and empowering stakeholders.

Those affected by new technologies are enabled to debate and shape their future living conditions.

Weaknesses

Lack of expert knowledge, understanding, and experience.

Low level of knowledge might imply reduced ability to discern biased from unbiased information.

Opportunities

Bringing in an "ethics of responsibility", in Hans Jonas' sense of the term (Jonas 1979).

Provide opportunities for producing high impact research outputs.

Threats

The failure to construct good processes of inclusion in R&I; that is, processes which secure a broad variety of perspectives in the framing of problems, as well as in the evaluation of the possible and actual outcomes of R&I.

E. Needs alignment

In this approach, RRI means aligning science with the needs and expectations of society at large. Technologies should be socially, ethically, and environmentally desirable. Involving the public is important also in this approach, but as a means, not a goal. This entails that the aim of aligning science with the needs and expectations of society at large can also be achieved by other, or complementary means.

The aim of these types of HEFRC RRI approaches is to align science with the needs of society. The paradigmatic governance mechanisms are to facilitate, coordinate and steer network interaction, mixing self-regulatory and state-regulatory modes of governance, captured by the concepts of co-regulation, co-creation and co-production.

Aligning science with the needs and expectations of society at large. Based on the debateable presumption that science can be steered to solve societal problems. Threats Creating technologies that are not harmful, but moreover also good, in the sense that they can be said to be socially, ethically, and environmentally desirable, and therefore socially acceptable. Weaknesses Based on the debateable presumption that science can be steered to solve societal problems. Threats Inefficiency: lack of real influence on scientific decision-making and research ethics assessments.

F. Trust in science

In this approach, RRI means re-establishing public trust in science by improving involvement, collaboration and communication through democratizing risk assessment and risk management. The paradigmatic governance mechanisms seek to improve involvement, collaboration and communication through co-regulation and public deliberation.

Strengths	Weaknesses	
Able to reestablish public trust in science. Able to promote scientific literacy and source criticism.	Failure to communicate with the public in an understandable and context-sensitive way.	
Opportunities	Threats	

Recommendations from the HEFRC RRI SWOT analyses



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The ETHNA System should, as argued by Moan et al., be guided by the criteria of being "ethical" and "effective" (Moan et al., 2021). These criteria are defined thus:

"an ethical governance system is defined here as one that promotes and facilitates (i) the inclusion of those immediately affected by it (i.e. R&I actors) in processes of discursive justification of the way in which the governance system is organised, and (ii) the inclusion of stakeholders (citizens, end-users, nongovernmental organisations, business representatives, policy makers) in processes of critical examination and discursive justification of possible scenarios and potential impacts generated by research and innovation processes [and] effective insofar as it not only accommodates, but draws on the diversity, complexity and dynamics of R&I networks; for instance the deliberative potential of networks, their potential for broadly inclusive processes, their tendency to approach problems in an inter- or transdisciplinary way, and their ability to change the direction of a project swiftly in accordance with new information or new insight" (Moan et al, 2021:33)

In order to meet these criteria, we can extract the following two main recommendations from our SWOT analyses of the six different but partly compatible RRI approaches (A-F above):

- To facilitate and coordinate stakeholder network interaction to align science with the needs and expectations of society at large, thus be positioned to create technologies that are not harmful, and moreover also socially beneficial.
- 2- To make R&I more reflexive and anticipate potential negative social, environmental, and economic consequences of new technology through soft law mechanisms that facilitate self-governance, like codes of conduct, guidelines, sets of indicators, etc.

ETHNA System SWOT analysis

The aim of the ETHNA Office is to implement and enforce an internal management and procedural system of HEFRC RRI. The basic governance mechanisms are an ethical code, an ethics committee, an ethical hotline, and progress indicators to report on RRI. See figure 1.

Figure 1: The ETHNA Office

ETHNA Office (management RRI)

TOOLS

Ethical Code (Good Practices in RRI)

Ethical Guideline to the HERCs and funding organisation on RRI issues

Ethics Committee

- Promote RRI in the organisation: through the students curricula and statt training as weil as by institutionalising strategies.
- Investigate alleged breaches of the ethical code in an independent, fair and credible way.
- Channel the suggestions, alerts or complaints of the ethicalline so that they receive a response from the institutions.
- → Issuing reports on the ethics of research and innovation whenever required by the organization or its members.

Ethical Hotline

Communication channel to express suggestions, alets, and complaints on Ethical Code (good practices in RRI) that arrive to the Ethics Committee

Progress Indicators to report on RRI

Monitor and control the fulfilment of the ethical code elaborated by the Ethics Committee

Strengths

Ethical code: Suited to handling and mitigating potential risk related to new technology development, and the related question of how one can best alleviate or avoid a product deemed harmful.

Ethics committee: Able to adhere to permissions and prohibitions articulated in society's norms, laws, and scientific standards of conduct.

RRI training programmes can be anchored at all levels (not just top-down) within the HEFRC organisation, increasing the motivation among the staff to follow the programme.

Ethical hotline: Easy for individuals to report and be heard. Easy for institution to be aware of problems and to solve issues.

Indicators: Fit to anticipate potential negative social, environmental, and economic consequences of new technology.

Weaknesses

Ethical code: Might not be ideally suited to accommodate dialogue on ethical questions related to broader, societal issues.

Ethics committee: Limited possibility for public engagement and societal needs alignment.

Vulnerable to limitations of perspectives among involved expertise and stakeholders.

Ethical hotline: Increases possibility of illegitimate and baseless claims that might harm individuals and institution

Indicators: Shortcomings in the deliberative process of making codes, guideline etc.

Solutions to past and current problems might not fit or be fruitful faced with novel problems of the future.

Opportunities

Ethical code: The fundamental RRI elements of inclusivity, participation, anticipation, social desirability, and ethical acceptability can be made an integral part of all projects of a research institution.

Can be positioned to set the rules of the game and encourage and facilitate reflection, through institutional fora for debate on issues of general interest, which raise reflection on ethical questions and dilemmas.

Ethics committee: A comprehensive and quite rigid ethics committee system can still be set up in a way that is effective and dynamic by having stratified process criteria that make the assessment process tailored to the needs of every case.

Ethical hotline: Increases the opportunity to be a just and learning organisation.

Indicators: Potential to make R&I more reflexive, thus enabling the disclosure of present and future harmful scenarios, as well as feasible alternative and less harmful R&I trajectories.

Threats

Ethical code: If limited to top-down monitoring activity, can lead to check-box ethics among stakeholders, transformation of ethics into law, and reduced ethical responsibility and awareness among researchers.

Ethics committee: Lost opportunities to do groundbreaking R&I because of too much focus on downstream risk management, at the cost of leaving out or weakening up-stream analyses of societal needs and alternative trajectories.

The failure to construct good processes of inclusion in R&I; that is, processes which secure a broad variety of perspectives in the framing of problems, as well as in the evaluation of the possible and actual outcomes of R&I.

Ethical hotline: Inadequate set-up of hotline that prevents all or certain types of problems from being reported.

Indicators: Collingridge dilemma making anticipation too vague early on when alternatives are still present, and clear but useless when it is too late to go alternative ways.

Recommendations from the ETHNA System SWOT analysis



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Based on the recommendations in section 3, and the analysis in section 4, we arrive at these two main recommendations based on the ETHNA System criteria of good governance:

- 1. An ethical code should be suited to accommodate dialogue on ethical questions related to broader, societal issues, and the institutionalisation of an ethics committee should involve the possibility for public engagement and societal needs alignment.
- 2. An ethical hotline must be adequately designed to include all kinds of legitimate reports, and indicators must avoid shortcomings in the inclusion of stakeholders in the deliberative process of arriving at the indicators.

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Conclusion



The main findings from the SWOT analyses of the identified RRI appoaches and the ETHNA Office are fourfold: Firstly, to facilitate and coordinate stakeholder network interaction to align science with the needs and expectations of society at large, and thus be positioned to create technologies that are not harmful, but moreover also socially beneficial.

Secondly, to make R&I more reflexive and anticipate potential negative social, environmental, and economic consequences of new technology through soft law mechanisms that facilitate self-governance, like codes of conduct, guidelines, sets of indicators, etc.

Thirdly, the ethical code of ETHNA should be suited to accommodate dialogue on ethical questions related to broader, societal issues, and the institutionalisation of an ETHNA ethics committee should involve the possibility for public engagement and societal needs alignment.

Fourthly, an ETHNA ethical hotline should be adequately designed to include all kinds of legitimate reports, and ETHNA indicators should avoid shortcomings in the inclusion of stakeholders in the deliberative process of arriving at the indicators.

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References



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