Input documents contributing to the final output (D-STIR Method) from academic and business environments

D.4.2.1

RRI.HU

Author:

First Hungarian Responsible
Innovation Association

October, 2017

Project website: www.interreg-danube.eu/d-stir

Identification			
WP	**Activity**	**Deliverable**	**Document**
WP4 – RRI Tools	A. 4.2. Adapting STIR	D. 4.2.1. – Input documents contributing to the final output (D-STIR Method) from academic and business environments	Input documents contributing to the final output (D-STIR Method) from academic and business environments

About this document

This document aims to collect all the documents, information, suggestions, decisions, experiences, etc. that contributes to the development of the D-STIR Method. We have collected information earlier on Methodology Development, and now, from embedded humanists and the TSG meetings from our partners. In summary, this forms the basis of the tailor-made STIR method in the Danube region.

Information collected from:

1. Methodology Development suggested by FHRIA
2. Report on Participative Session of Methodology Development
3. Methodology Development Input Template
4. Motivational Materials added
5. Modifications suggested by Embedded Humanists
6. Report on TSG Meetings (FHRIA, ELI-BEAMS,)

It is seen that we have done great work to develop the method and we consulted the results several times.

Content

1. Starting Step – Motivation

Motivating stakeholder groups in participating in the project is a difficult task. The reason behind is that stakeholder groups do not understand why it is good and advantageous for them to get to know what Responsible Research and Innovation (RRI) is and how to implement it into their daily work. The solution for this problem is to prepare short motivational materials, to make them cooperate with us. In addition, we have to emphasize that D-STIR helps researchers to find better connection between social needs, challenges and their research scope. Hence, D-STIR could facilitate the application of research outputs in the society. Another motivation is valid for the academic sector, i.e., coaching, competitive advantage, EU mandatory topic (horizontal issues). The careful word choice, however, is crucial not to hurt or instruct principal investigators.

A motivation strategy for **companies** to participate in D-STIR could be the following: introducing D-STIR as a *unique* and *free* "coaching service", which was established in the United States and tested in other developed countries. It would be supportive if we could use the contact base of previous projects to familiarize them with this unique service.

We must divide companies into categories based on their size, that is, small and medium-sized enterprises (SMEs) and big international corporations. Location is also a factor that has to be taken into consideration in case of motivation – it has to be adjusted to capital cities, district cities or the countryside. Mostly, SMEs do not have free capacity to involve RRI into their business strategy and customers still prefer mainly the lowest price. Therefore, the public engagement for RRI matters and still a need in underdeveloped countries. The situation of a big company and corporation, however, is different because they have their own company responsibility strategies and many other ways concerning social responsibility (company foundations).

1.1. Institutional motivation

Be a Responsible Innovator, Apply for Grants More Successfully!

International Cooperation for Responsible Innovation!

The conception of Responsible Research and Innovation (RRI) has a high priority in the innovation policy of the EU. Additionally, the possibilities of its practical application raise increasingly important questions worldwide. RRI is introduced in practice in a way that the EU Innovation Framework Program, i.e., H2020, focuses more on financing RRI-containing projects.

It is expected that RRI will be further appreciated in financing innovation projects and – according to experts – it may even become a horizontal aspect.

Let your research group be the leader in applying RRI, learn about RRI and the opportunities of its practical application, in which we are happy to help – free of charge only during the project duration! Act now and cooperate with us! As a responsible innovator, you can gain competitive advantage. Integrating this advantage into your innovative projects, the committee will recognize your application. According to our experiences and track record, these projects are more likely to be supported.

The well-documented Social-Technical Integration Research (STIR) method can help in this issue, as it basically integrates social concerns into the scientific research and the decision-making processes. STIR is a tool that will widen the intellectual perspective of researchers with environmental, economic, psychological, ethical, and other sociological aspects. This sort of complex thinking, which you may consider as **Innovation Process Management,** increases the probability of arriving at responsible R&D&I decisions.

Be a Responsible Researcher, Apply for Grants More Successfully!

International Cooperation for Responsible Innovation!

- Do you have troubles with fully understanding whole R&I chain of your research?
- Do you have troubles with identifying the impact of your research?
- Would you like to receive funds from EU R&I based schemes?

If you answer to any of these questions yes, then you should be aware of the concept of Responsible Research and Innovation (RRI). RRI is on the rise as priority of innovation policy in EU thus making in important during development of successful project proposal.

Scientists often do not fully understand full potential of their research – is it marketable? Is there a societal need for improvement? The well-documented Social-Technical Integration Research (STIR) method can help in this issue, as it basically integrates economic, environmental, and social aspects into the scientific research and the decision-making processes. This sort of complex thinking increases the probability of arriving at responsible R&D&I decisions. Understanding of economic, environmental, and societal aspects of research improves significantly impact part of your research proposals, where you can show that you understand the broader environment of your research from multiple perspectives.

Let your research group be the leader in applying RRI, learn about RRI and the opportunities of its practical application, in which we are happy to help as a responsible innovator, you can gain a competitive advantage by integrating it into your R&I projects. According to our experiences, these projects are more likely to be funded.

Free Innovation Process Management Advisory Services to Your R&D&I Work

For the first time in Eastern Europe, you can try the method, which was tested in 30 countries in the world.

Even more responsible decisions, the recognition of new possibilities (e.g., better understanding of the wider public, decrease of negative effect in early stages, community acceptance etc.), decreasing frame dependency, long-term, complex, and more focused thinking, as well as science marketing. According to the experiences gained, these are the results of the innovation process management method developed at the Arizona State University in the United States of America.

Until now, this method – that maps, analyzes, and manages innovation processes – was only tested in the innovation environment of developed countries. Therefore, its test in Eastern Europe counts as groundbreaking. The well-documented Social-Technical Integration Research (STIR) method integrates social and economic and environmental aspects into scientific research and decision-making processes within a 12-week long interaction. By applying STIR, the intellectual horizon of researchers involved broadens by environmental, economic, psychological, philosophical, ethical, and other sociological aspects. This complex thinking increases the researcher's added value at the level of the researcher, the research group, and the research institute. The talks during the interactions help researchers to collect their thoughts and find critical decision-making points. In this way, the daily work becomes even more systematized and embedded in the socio-economic environment, enabling the utilization of scientific results and further successful applications to additional resources.

1.2. Academic Individuals

Not only the businesses refuse the idea of STIR or social science studies at all. If you ask a natural scientist who is busy with his/her research – and he/she is not "infected" yet with social science way of thinking – the answer is obviously a NO. Since natural scientists only can think by means of mathematical formulae or differential equations, human factor or economic and environmental aspects do not exist for them. Let us think on a laboratory or a procedure! Everything is standardized, errors are minimal, and there is a perfect explanation for every little observation. At this moment, someone (i.e., the embedded humanist) comes in and disturbs the equilibrium with embarrassing questions. The natural scientist is skeptical and suspicious: "How can he/she help without the deep knowledge of mathematical formulae, names of bacteria, nervous system, or photoelectrochemistry?". Scientific results demonstrate that they can, with the careful investigation of personal decisions and via drawing attention on human, time, economic, environmental, etc. factors.

The above-mentioned instances inspired us to create a list of reasons to motivate scientists working in academia, to participate in the D-STIR project.

Be the researcher and/or the innovator of the future!

Reasons to Participate in D-STIR:

1. it **does not require extra time** (i.e., we carry out our study during your routine lab work)
2. your researcher attitude will slightly change because of the acquired knowledge, and equipped with this, you might **apply for grants and awards** more successfully
3. you may attract **more funds or investors** with this knowledge
4. we help you prepare your **elevator speech** (i.e., you will be able to introduce and **explain hard science topics clearly** and promote yourself)
5. we can help the **science popularization, which** is a key task in the presentation of research work to the public, political authorities or laymen (you will be able to approach the community in a simpler way)
6. you will be able to carry out your work even more efficiently if you let us go into your lab and think together about **optimizing the work processes, or the negative/positive effect of the project, research area, etc.**
7. You get the **unique feedback on the functionality of your research team/department** from outside, which allows you to lead and develop your research team more successfully
8. because science becomes increasingly **multidisciplinary and interdisciplinary**, this knowledge you acquire is going to be a **competitive advantage for you**, in addition, an essential skill
9. you will learn a **critical perspective** that only a few scientists have
10. you are going to be a researcher who can answer research questions in a **more complex way**
11. you can **become acquainted** your research project in a way that you have never thought about
12. you will be able to sense the possible **future effects, risks, and unexpected negative results** of your researchyour intellectual horizon widens, therefore you will **recognize completely new research questions**, which can improve the product or the project
13. you will increase the **number of your research outcomes,** which will become into practice or real market

Almost every project participants agreed on that these materials are short, focused, and gives reasonable aspects for motivating people. On the contrary, many of the project partners experienced hesitation from stakeholders. They understand the methodology, but still, do not know how to apply it in their daily work. Additionally, participants expressed their doubts on having more bureaucracy issues via involving responsible innovation in their research. To sum up, they need more motivation; therefore, we need to discuss tools and ways to involve them more intensively. Besides, it is important for them to recognize the direct benefit of the participation in this project.

For one of the project partners, this is a very contradictory theme. "Companies have not seen yet any competitive advantage in the implementation of the RRI method. Information on using RRI in the H2020 or if it is a key issue for the European Commission, is still far from them."

"In our point of view, there could be useful to add this notice: "RRI is not only a solitaire concept, it contains several topics directly related to the research work. For example, topics as open access and ethics have a very strong connection to industrial research, intellectual property right and the strategy of preparing research outputs."

Hereby, I would maybe again emphasize, especially for industry, that STIR significantly decreases chances to waste money on research with inapplicable results, hence saves money and increases the success rate. Industry listens to money talk.

2. Introducing Step Zero

Step Zero supposed to be a training for scientists in post-socialist countries, where the concepts of RRI and social science do not have an adequate representation in the educational system.

2.1. Necessity of the training

Almost every D-STIR project partner agree that there is a real need for this training because the concept of RRI is not directly stated in any national documents and social sciences, they are not essential parts of the educational system in fields of natural sciences. Moreover, scientists need to broaden their way of thinking; which can be done in a form of a training or via some visual materials. These training might raise their awareness on a certain topic. In the context of RRI, it would be great to present international experience, knowledge, and examples of good practices in the implementation of RRI. It would be beneficial to present RRI in connection with European fund focused on RDI.

One of the project partners firmly believe that there is a need for training on a basic level, researchers need to realize that they need someone with different thinking during the establishment of research strategy or composing a research proposal. This partner insisted on that we cannot expect that someone who studied for example economy and received a three-day-long course will be able to realistically help with all fields of social studies, such as ethics, psychology, etc.

2.2. Content of the training

There is a serious lack of knowledge of social sciences among natural scientists. Therefore, this training should contain the *basics of the main social sciences*.

According to the partners, the training material should contain the social science aspects of technology transfer process and research work. D-STIR project participants mentioned that we should give a brief overview and study material on the main social sciences for natural scientists to broaden their knowledge. Moreover, a self-knowledge training would be useful to make them able to take social aspects into consideration instead of their own scientific career, results, or financial benefits.

A D-STIR project participant highlighted that most regions are lack of real outcomes of research. Usually, research is done because there are funds for it, but no one checks whether it is needed, or does it have an output in form of product or service. There is a substantial difference between the scientists' thinking about research and how they should think. In conclusion, only economics and societal fields have any value for natural scientists, other fields deal with these issues only partially or theoretically. Therefore, we need to focus on economics and societal aspects of research.

Concerning RRI, it should be done in a form of a short training as RRI includes the wider social changes. These training should be different for a scientist working in the lab and for an innovative companies and organizations. For the companies, the training should contain the theoretical background of RRI and the specific information on the possibilities for financing the innovative activities under the Horizon2020 (or other) program, as well. Completed with the theory, the training for the companies should offer specific information on the gained advantages for companies if apply RRI. Furthermore, the well-trained embedded humanist should show the example of the STIR implementation rather than talk about the theories.

Other important fields in which researchers have incomplete knowledge are **patent law and commercialization**. Principal investigators are usually afraid of developing products and they stay at the fundamental research level.

2.3. Fields of social sciences included in the training

Depending on the type of the research, the training should cover fields, which address a specific RRI component or all of them. For instance, sociology, psychology, philosophy, ethics, economics (including only business administration, not the economics part) should be part of the training.   Other fields that should be strengthened is the communication basics (how to communicate with the public etc.). For innovative companies, basics of sociology, psychology (how to understand the personal and public opinions etc.), communication skills, and economics would be useful. Some other fields, that is politics and law also could be involved in the training materials.

A D-STIR project participant insisted on that only sociology and economics has real added value. We need to consider that the more disciplines we cover the less effect it has; because our message will be diluted. Unfortunately, we cannot train people in so many fields. Further, there should be included more examples of how STIR functions that theories in sociology etc., and examples of how companies can think on future (ecological or other issues) by using the STIR method.

2.4. Suitable training for the participants

According to D-STIR project partners, the training should be tailor-made for the participants of each country because their basic knowledge regarding social sciences differs. Thus, the embedded humanist can decide, in which fields does the scientist have a lack of education based on the pre-study interview. In the project partner's opinion, the content of the training should depend on the type research. Thus, personalization of the training can be made based on the pre-study interview. This determines the need for those specific fields that have to be covered. Another expressed that this question depends on how many aspects do we take into consideration. It would be suitable for everyone if we could introduce two fields. If we decide to educate 7–8 fields, then it should be based on the interviews. Another project participant stated that they plan to give a seminar or individual talks with every potential candidate (researchers) for implementing STIR. They send them the invitation letter (prepared by FHRIA) and explain the topics where RRI is related to the research work. After these participative talks, they can manage the pre-study interview.

In case of innovative **companies**, we should focus on key messages, for instance: (1) raising awareness on RRI concept; (2) How STIR helps – theory and examples; and (3) advantages for the company from this service, e.g., in project applications etc.

2.5. Timing

Most of the project partners agreed that the training should take place after the pre-study interview since the pre-study interview must present the starting situation – according to its definition. It is an extra step, a completion, thus it does not disturb the 12-week long STIR study.

One partner firmly believes that it is a controversial issue, since if we have the training before the pre-study interview; it will not state the real situation of the country regarding the social sciences knowledge of natural scientists. If we make the training after the pre-study interview, however, it will disturb the 12-week long STIR study. Even so, the project partner agreed with others that the perfect timing for the training is after the pre-study interview.

2.6. Teaching Methods

Most partners voted for e-learning which offers the opportunity to use it when scientists have free time so there is no pressure on them. Classroom education can be expensive and time-consuming. Any other complex solution can be time-consuming, too. E-learning and online seminars could be followed by short summaries, too.

A project partner suggests involving more teaching techniques because in this way the education is quick and effective at the same time. It can be a complex method, that is, we involve all types of teaching techniques and methods. We could teach those materials in classrooms, which require personal contact, while the rest could be done via e-learning. According to another partner, we should let the researcher choose the most suitable method to acquire social aspects.

To sum up, any option we choose should be done an interactive way with some tests (not an exam) at the end to measure the participants' social sensitivity. Otherwise, to develop social sensibility i.e., to make them think about it and be aware of it. The training material should be as modern as possible to attract their attention and make them interested in the subject (for instance training material should contain videos, animations) able to develop the participants' social sensitivity.

In case of **companies**, classroom education is not appropriate since companies do not have time. We should send companies materials for e-learning but the majority of the work should be done in their premises when we visit them for 12 weeks. So yes, we should take a short time from the 12 weeks.

2.7. Language

Project partners agreed that the language of the training depends on the researchers, but in general, it would be better to use the national language, because it is easy to understand for everyone. It would be better to use the national language, but the advantage of using English in adaption of terminology can be more useful later. On the other hand, from the other point of view, everything should be written in English and if partners decide that they need to translate it, they can do so.

2.8. Developing the training material

Properties of the training material what we have to consider:

- style: written text, videos, animation
- form: e.g., a study from the JR project?
- extent

We could make the pre- and the post-study interviews more objective (and easier to evaluate) in the following way: The scientist

1. answers the questions, after that
2. rates the answers (on a scale of 1–7).

For example, we ask the scientist to tell his or her opinion about "considering economic factors in research". He or she verbally explains, then rates its importance on the scale. We ask these questions during the pre- and the post-study interviews and monitor the changes.

Partners mostly agreed that that measurement is needed (before and) after the training. One project participant suggests thinking about "gamification" as a tool during the preparation of the training material. One of the partners suggested recorder presentation with activities that will have key for people to evaluate.

3. Introducing Step Minus One

3.1. Necessity of Step Minus One

Most project partners expressed that some preliminary action should be inserted, in a form of a short material or video. It is important to provide as broad information to researchers as possible. If more education is needed, step minus one also can be integrated before the STIR study and before Step Zero.

We find it important to introduce RRI concept (broader topic) – its objective and positive impact related to technology transfer and research (STEP 1) and then to explain social sciences relation to research and technology transfer – industrial law, ethics of research, economics of technology transfer (STEP 0). Both steps could be fulfilled during one participative session/seminar with potential STIR researchers.

Only one D-STIR project partner stated that he/she does not see any need for Step Minus One so far. Not necessarily in this project, it might be useful in another lifecycle of STIR.

3.2. Content of Step Minus One

It should contain good practices and/or examples on how to use RRI and provide some information about the need of innovation and the benefits of RRI.

It is also important to get some information on the objective and positive impact of RRI related to technology transfer and research (EU funds grant calls, PR of research).

3.3. The Method and Form of Step Minus One

According to the opinion of D-STIR project partners, Step Minus One can be a written text, examples, and a video, too. Besides unidirectional forms, bidirectional ways are also important, therefore participative sessions, talks, and seminars should be organized.

4. Other Suggestions

D-STIR project participants suggested further steps to introduce. Some "worst prac-tice", where negative effect of a research was a bigger than the expected positive one could serve as an example that is worth avoiding. Other suggestion is to prepare a training material about the implementation of RRI in various institutions. For example, how to involve it in ministries, small and medium enterprises, associations, etc. Fur-thermore, it would be useful to indicate what opportunities are available relating RRI in the context of EU funds.

We should prepare a short, written material in a form of flyer (containing the objective of RRI and positive impact related to technology transfer and research (STEP 1) and then to explain social sciences relation to research and technology transfer – industrial law, ethics of research, economics of technology transfer (STEP 0). It would be in-formative to include "worst practice" as well. Additionally, some videos from which they can learn.

5. Raising awareness of Responsible Research and Innovation

5.1. Raising awareness

Raising awareness of RRI is only a unidirectional communication. It cannot substitute STIR. Raising awareness is sharing information about RRI with the wider public. It is a necessary precondition in the project. Some D-STIR project partners stated that RRI – except in context of EU funds – can be a tool for the establishment of cooperation between different institutions and organizations (stakeholders) to transfer research results into practice and the ability to influence / direct scientists to research that will lead to the challenges that society needs. Cooperation can be a tool for raising awareness. According to a project partner, however, raising awareness can reach wider effect, but cannot be as focused as personnel communication (STIR). Both are necessary.

5.2. Target group

Every project partner agreed that the main target group of STIR consists of stakeholders from all sphere of the quadruple helix: universities, companies (SMEs), civil society, ministries, municipalities, research institutions, and everyone belonging to the target group who is involved in the research project. University students and the ministry of education has a prominent role in involving research in the educational system at all levels.

5.3. The use of D-STIR

Via teaching the RRI concept, scientists will recognize that these are important aspects and they should consider them as well. It is expected that after this education, they will let us go into their laboratory and conduct the STIR study.

The goal could be to reach smaller or bigger changes in thinking of the research society and make them feel the responsibility of their role. With understanding and getting to know the RRI concept, scientists will have more insight into the possible effects of their work and become more interested in our project. It would be useful to apply RRI concept in most developed sectors or sector with potential (for instance healthcare, IT, automotive etc.).

5.4. Integration it into Step Zero or Step Minus One

It should run parallel with the whole STIR method, from the beginning till the evaluation phase of the pilot project. Most partners insisted on that we should integrate it into Step Minus One, before the education of scientists, as it would be useful to base the subject and all along the project implementation.

5.5. Timing

Raising awareness of RRI can be started right now or after the Szeged meeting, or maybe at least a few weeks before the education of scientist about social sciences, before STIR implementation.

5.6. Independent actions from the STIR methodology

An independent action is to widely implement D-STIR and RRI concept amongst customers. In case of SMEs, customers need is a low-quality product therefore, we have to shift them towards responsibility and high-quality products, etc. A solution to enhance the social responsibility of the private sector would be to implement the public procurement of innovation concept into tender procedures. These procedures could include the evaluation using the lowest price, the best quality output, and the innovation of the output during the tender itself (tender for innovation).

Another example is the public engagement, that FHRIA uses, namely an online communication channel for this purpose, the RRI facebook page:

https://www.facebook.com/rri.hungary/?fref=ts

Everyone insisted on that D-STIR partners, and other organizations, who have the opportunity should do it. We can also use online communication channel, project web page. Partners can disseminate information and promotional material in their own social media pages and web pages or even organizing some events use other scientific or industrial events to spread the word. We could also send some newsletters with important materials (e.g., presentations, summaries, fact sheets, examples, etc.).

Raising awareness of RRI is a constant process during the project implementation and it should run in parallel with all the project activities. For instance, the first stakeholder

group meeting was used for roundtable discussions on RRI. The same thing should be carried out in our further meetings. The further meetings with stakeholders should be complemented with online communication channels.