MAKE-IT
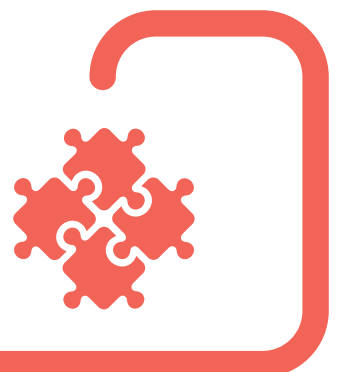
Understanding Collective Awareness Platforms
with the Maker Movement

D1.3
Handbook including quality guidelines and RRI guidelines

MAKE-IT

Understanding Collective Awareness Platforms with the Maker Movement

MAKE-IT

Understanding Collective Awareness Platforms with the Maker Movement

WP1 Management

D1.3 Handbook including quality guidelines and RRI guidelines

Version:	09
Due Date:	31 March 2016
Delivery Date:	31 March 2016
Nature:	Report
Dissemination Level:	Public
Lead partner:	ZSI
Authors:	Barbara Kieslinger, Elisabeth Unterfrauner, Paul Tilanus
Internal reviewers:	Kirstie Yvette Wild, Helin Haga

Credits

Authors' organizations:

ZENTRUM FÜR SOZIALE INNOVATION

CENTRE FOR SOCIAL INNOVATION

ZSI

http://www.zsi.at

TNO innovation for life

Icons:

WP1 icon by Gregor Črešnar

Fonts:

Alegreya by Huerta Tipográfica

Martel by Dan Reynolds

Rubik by Hubert and Fischer

Version Control

Version	Date	Author	Author's Organization	Changes
01	24/01/2016	Barbara Kieslinger, Elisabeth Unterfrauner	ZSI	First outline of the document
02	5/2/2016	Paul Tilanus	TNO	Structure proposed by ZSI transferred to the deliverable template; first content for chapter 2, 3, 4 and 11.
03		Barbara Kieslinger, Elisabeth Unterfrauner	ZSI	Integrated version including initial content on chapter 5,6,7
04	22/2/2016	Helin Haga, Kirstie Yvette Wild	AHHAA, DTI	Feedback on structure
05	23/2/2016	Barbara Kieslinger, Elisabeth Unterfrauner, Christian Voigt / Masimo Menichinelli, Tijs Van de Broek; Jeremy Millard	ZSI / IAAC, TNO, DTI	Data Management Plan contributions
06	23/2/2016	Paul Tilanus	TNO	Response to review comments
07	29/2/2016	Elisabeth Unterfrauner, Barbara Kieslinger	ZSI	Integrated version ready for review
08	24/3/2016	Helin Haga, Kirstie Yvette Wild	AHHAA, DTI	Content review
09	30/03/2016	Elisabeth Unterfrauner, Paul Tilanus	ZSI, TNO	Final version

Annexes

Nº	File Name	Title
I	Annex I	Informed Consent
II	Annex II	Confidentiality Agreement

Details

Deliverable Title	Handbook including Quality and RRI guidelines
Deliverable Number	D1.3
Keywords	Quality, RRI, Cooperation processes

Executive Summary

This Project Handbook describes the internal procedures of the MAKE-IT consortium in terms of management structures, communication and collaboration as well as quality control measures. It also defines the way the partners are dealing with Responsible Research and Innovation (RRI), especially considering ethical issues related to personal data collection, analysis and storage. Open source and open access are important elements of RRI and the strategy of the consortium in dealing with these aspects is reflected in the open data management plan, which forms part of this document.

The main target group for this deliverable are the consortium partners themselves as this handbook defines the project internal processes for securing high quality research work to be performed across a set of complementary partner institutions. It serves as a reference document for all MAKE-IT team members including individuals joining in the project at a later stage.

Since the project is bringing together a set of diverse experts from different fields and backgrounds a core principle guiding internal processes is open participation and flexibility. Transparency about the project status as well as risk recognition is an additional principle that the project partners are committed to.

Still, in order to effectively operate in a distributed team we have defined some procedures of how to best communicate and structure our collaboration. Regular meetings are held via videoconference as well as face-to-face. Communication is also taking place via e-mail and the project mailing list. The main tool for sharing and collaborating on documents is SharePoint.

The consortium is committed to producing high quality research outcomes and deliverables and thus quality control is important. Quality guidelines describe the internal peer review process, which is applied to all project deliverables. In order to continuously improve our internal processes regular internal surveys are performed, normally before project meetings. These surveys are intended for the whole group to serve as a self-reflection and self-evaluation tool about the project structures.

In terms of ethics, the consortium is following the general rules defined by the EC (c.f. chapter 3) and commits strongly to respect the individual and their privacy at all times. Templates have been prepared for informed consent as well as the exchange of primary research data amongst partners that may contain personal data

from study participants. Raising awareness about related RRI issues is of concern for the management and is regularly stressed.

Finally, openness is a core value of the project and thus the consortium is looking into open strategies with regards to the research outcomes. This relates to software that is published under specific open licenses, following, and where possible contributing to, open standards as well as the research publications, which should be made openly accessible as far as possible.

This handbook is understood as a living document and is updated if need arises in order to improve the internal processes.

Table of Contents

1. Introduction

The MAKE-IT project is committed to high quality output and responsible research and innovation. Thus this document defines a set of procedures that the consortium is committed to adhere to and to improve in the course of the project.

Openness and transparency are two of the guiding principles reflected in the different processes and methods described. At the same time there is a strong awareness within the consortium related to privacy and data protection of individual citizens. These core principles underlying the research work in MAKE-IT correspond with the practices related to Responsible Research and Innovation (RRI).

Section 2 below describes the management structures, including the nominees for the various boards. Section 3 is dedicated to specific quality management procedures, including communication structures and tools, the peer reviewing process for high quality deliverables, as well as risk management, SWOT and other quality assurance means. In Section 4 the technical infrastructure for communication and collaboration is presented. Section 5 presents the RRI policies and identifies the most relevant aspects for MAKE-IT while Section 6 outlines the specific ethical guidelines that the project is following. In Section 7 the consortium's strategy towards openness is described and relates to open source in terms of software as well as open access in terms of publications and other project results. Finally, Section 8 discusses implication of gender aspects for the project.

The appendix includes examples of templates mentioned throughout the project.

2. Management structure

Both the Grant Agreement (GA) and the Consortium Agreement (CA) specify a number of bodies for the management of the project. Though the GA and CA, being legal documents that can be found on SharePoint in WP1 > Contracts, take precedence over this handbook, the following sections specify the operational view of these bodies.

2.1. Work Package (WP)

The work package (WP) is the building block of the project. The WP leader

1. organises the WP,
2. prepares and chairs WP meetings,
3. organizes the production of the results of the WP,
4. represents the WP in the WP Leaders Committee (WPLC).

Current WP leaders are shown in Table 1.

WP	WP name	WP leader
WP1	Project Management and Coordination	Paul Tilanus, TNO
WP2	Conceptual & Methodological framework	Jeremy Millard, DTI
WP3	Case Explorations	Christian Voigt, ZSI
WP4	Innovation Action research	Tijs van den Broek, TNO
WP5	Technology and Use Scenarios	Olivier Jay, DTI
WP6	Synthesis and Impact Analysis	Bastian Pelka, TUDO
WP7	Dissemination, Exploitation and Communication	Massimo Menichinelli, IAAC

Table 1: Current WP leaders

2.2. WP Leaders Committee (WPLC)

The WPLC consists of

- the WP leaders of all (active) WPs,
- the scientific lead of the project,
- consortium manager.

The additional[1] WPLC members are shown in Table 2.

The consortium manager organizes and chairs the WPLC meetings. The WPLC manages the coordination between the WPs. The WPLC has a mandate from the Project Management Board (PMB) for all day-to-day management.

The PMB members and task managers, even if not WPLC member, are welcome at the WPLC meetings.

Role	Person
Scientific lead	David Langley, TNO
Consortium manager	Paul Tilanus, TNO

Table 2: WPLC members in addition to the WP leaders

2.3. Project Management Board (PMB)

The PMB consists of one representative of each partner. The current PMB-members are listed in Table 3. The members of the PMB are referred to as 'partner manager'.

The PMB takes all decisions that affect the direction of the project. The PMB members are addressed for any issue, technical or administrative, concerning that partner.

---

1. Consortium manager and WP1 leader are, on purpose, the same person.

Partner	Partner manager
TNO	Iris Blankers
DTI	Jeremy Millard
ZSI	Christian Voigt
TUDO	Bastian Pelka
IAAC	Massimo Menichinelli
FLZ	Roberto Vdovic
HLW	Karim Jafarmadar
AHHAA	Helin Haga
CIR	Jeremie Gay

Table 3: Partner managers

2.4. MAKE-IT Advisory Board

The MAKE-IT Advisory Board (MAB) is a group of persons from outside the project. The MAB will be consulted for important decisions that affect the direction of research and/or are related to adoption of the results from the MAKE-IT project. The MAB members are listed in Table 4.

MAB member	Affiliation
Sherry Lassiter	MIT
Dale Dougherty	Maker Faire & Make Magazine
David Cuartielles	Arduino
Willem Vermeend	NL Smart Industry & IoT Academy
Katherine Stokes	NESTA
Tom Saunders	NESTA

Table 4: MAB members

3. Quality procedures and Code of Conduct

3.1. Internal communication structures & procedures

The Consortium Agreement (CA) specifies a number of rules for the governance of the project. Though the CA, being a legal document that can be found on SharePoint in WP1 > Contracts, takes precedence over this handbook, the following describes the operational view of project meetings.

3.1.1. PMB Meetings

Every 6 months a PMB meeting will be scheduled. In principle the PMB meetings will be collocated with the plenary workshops. If important decisions need to be taken at PMB level, then an ad-hoc meeting can be scheduled.

The agenda will be distributed at least two weeks before the meeting. All partner managers can enlist agenda items for the PMB meeting.

No minutes are taken at the PMB meetings, but decisions and actions of the PMB are listed. These decisions and actions are shared with the WP leaders via the consortium manager in the first WPLC meeting after the PMB meeting.

3.1.2. WPLC meetings

Every two weeks the WPLC has a conference call. The main purpose of these meetings is the alignment of work between the WPs.

The agenda will be distributed at approximately one week before the meeting.

The decisions and action points of the WPLC meetings are communicated to all PMB members by the consortium management via e-mail. For that purpose the agenda of the WPLC meeting is extended, within two working days after the WPLC meeting, with the actual participants list, the decisions and action points. The extended agenda is shared on SharePoint (WP1 > Meetings > WPLC). This allows PMB members to react, e.g. if decisions are taken in a WPLC meeting and a PMB member considers that decision to require PMB endorsement.

3.1.3. WP and task meetings

For meetings within the WP the WP leaders have full freedom to arrange them as they wish. The only constraint will be the travel budget of the partners.

If a partner is not participating fully in the WP or task, and there is a risk of that partner becoming a 'defaulting partner', as defined in the Consortium Agreement, then the following steps will be taken.

- The manager of the task/WP will have a private discussion with the partner. The result will be recorded in an e-mail, sent in Cc to the consortium manager. In the unlikely case the WP leading partner is not fully participating, any partner in the WP can signal this to the Consortium manager, initiating the next step immediately.
- If this fails to produce the desired behaviour or if a WPL is not participating fully in the WP, the Consortium manager will have a private discussion with the partner. The result will be recorded in an e-mail, sent in Cc to the PMB.
- If this fails to produce the desired behaviour, the PMB starts the 'defaulting partner procedure' as defined in the Consortium Agreement.

3.2. External communication structures & procedures

The following key groups are identified in the external communication. In all other cases the WPLC will propose how to proceed. Wherever there is a risk of confidential information of any partner being published, the 'PMB check', as described in section 3.3.1, has to be applied.

For all material used in the external communication, the quality assurance/review procedures, as described in 3.3, apply.

3.2.1. MAB

All communication with the MAB members is coordinated by the scientific lead.

Support will be provided by those project members who already have a personal relation with the MAB members and the consortium management.

3.2.2. EU

All communication with the European Commission (EC), and in particular with the project officer, will be coordinated by the consortium management as defined in Table 5 below:

Role	Person
Consortium manager	Paul Tilanus, TNO
Consortium management support	Catelijne Rauch, TNO

Table 5: Current consortium management

3.2.3. Related projects

Exchange of information with related projects will be coordinated by the consortium management team (Table 5). Support can be provided by partners already having personal relations with project members of the related project.

Project members should be aware that exchange of information with related projects might require an NDA prior to the information exchange.

3.3. Quality of (non-)deliverables and peer review

Reviews are the key elements in the quality assurance of a project like MAKE-IT. For the review process there is a distinction between review of deliverables and the review of other material.

3.3.1. Deliverables

For deliverables good planning is possible, since a global description of the content, the submission date and the partners working on it are set out in the DoA. The review will be done in three stages:

- Structure or scope review
- Content review
- PMB check

Two independent reviewers are appointed by the WPLC for each deliverable, and in principle both[2] perform the structure/scope and the content review. Reviewers are considered independent when they are not authors of the deliverable. Of course, others are free to review too, but the appointed reviewers take on the quality assurance responsibility for the deliverable.

3.3.1.1.   Structure or scope review

The input for the structure review is the structure description of the deliverable. The structure description consists of at least two levels in the table of contents, chapters and sections. At section level there is a 5-line description of the content, the responsible partner/person for generating the content, and the expected number of pages as indicator for the level of detail.

For some deliverables the definition of the structure is too detailed and the definition of the scope of the deliverable is more appropriate than the definition of the structure. In those cases a scope description with a division of work – which partner is taking on what parts of the scope – replaces the structure definition.

The **structure/scope review** starts as soon as the structure/scope description is available, but not later than **8 weeks before** the submission date of the deliverable. **Reviewer comments** are to be submitted to the deliverable editor **7 weeks before** the submission date.

---

2. In case of a reviewer from outside the consortium, e.g. a EAB member, then the external reviewer will in general be asked for just one of the reviews.

3.3.1.2.   Content review

The input to the content review is the full deliverable text; only supporting parts – references, list of abbreviations and annexes – might still need completion.

The **content review** starts at the latest **3 weeks before** the submission date. **Review comments** are submitted to the deliverable editor **2 weeks before** the submission date.

In general the content review contains four main attention areas.

- DoA coverage
  - o Is the scope and the content of the deliverable consistent with the intention of the deliverable as stated in the DoA?
  - o In case of deviations, are they fully and plausibly motivated?
  - o Are the relations to other MAKE-IT work/deliverables clear? Deliverables are rarely produced in splendid isolation, so ... a deliverable provides input to other work, or brings other work together, or ...
- Target audience
  - o Is the target audience clear?
  - o In case of multiple target groups, is it clear what parts of the deliverable are intended for each audience?
  - o Are the management summary, introduction and conclusions/recommendations at the level, and using the language, of the target audience?
    Note: The detailed content might be too detailed for all target groups, but not the sections mentioned above.
  - o Are the conclusions fully backed by the preceding material (no "jumping to conclusions") and are recommendations actionable?
- Language and structure
  - o Is the language used proper international English?
    Signal use of national variants – Dunglish, Gerlish, Itlish, ... – and sociolects – legalish, techlish, ...
     In case of doubt, consult a native English speaker.
  - o Is the text well-structured, e.g. using lists and tables where appropriate. Pages with a grey rectangle of text are suspicious J
  - o Do chapters have a local introduction/purpose and local conclusions/recommendations?
  - o Are illustrations and diagrams used to support the text where appropriate? If taken from external sources, is the attribution correct/complete?
  - o Are references to literature included – sufficient but not overdone?
  - o Is the terminology from the MAKE-IT glossary used as agreed (see also section 3.7)?
- Technical content
  - o < For the editor/WP leader to guide the review process>

3.3.1.3.   PMB check

The PMB members receive the deliverable one week before the submission date. They check that the deliverable does not disclose commercially sensitive information of their organisation. If the deliverable contains material from non-partners that is made available via their organisation, the PMB member checks the deliverable respects the confidentiality agreements made by their organisation with the non-partners.

Note: the PMB check is not a classical review. It is an 'emergency break' if confidential material is about to be disclosed and this was not noted by authors and reviewers.

Both submissions to reviewers are Cc-d by the deliverable editors to the consortium manager. The submission to the PMB for the PMB check is done by the consortium manager. Deliverables are uploaded and submitted by the consortium management.

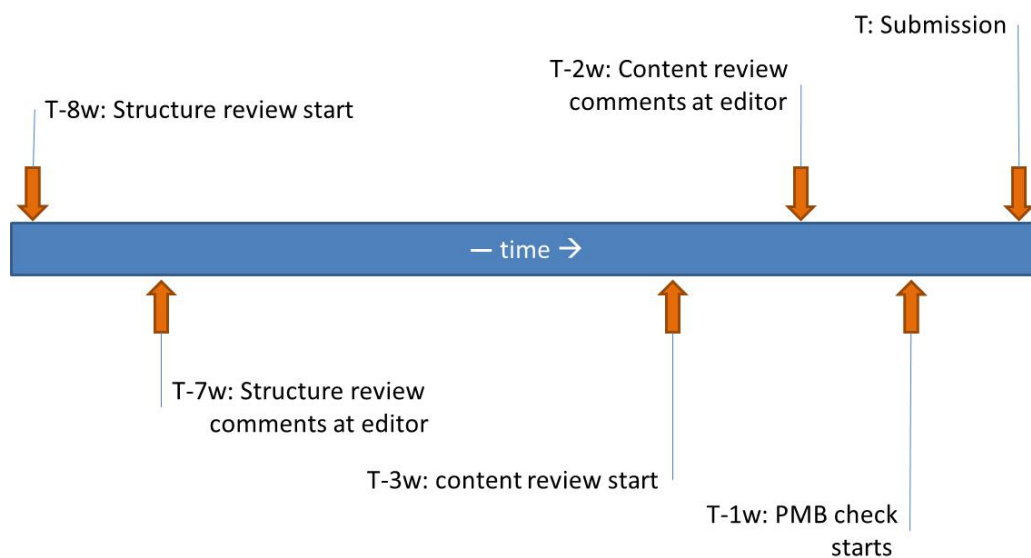The timeline for deliverables is depicted in Figure 1.

Figure 1: Timeline review of for deliverables

3.3.2. Non-deliverables

For non-deliverables, such as publications and dissemination material, the procedure for deliverables will be used where applicable and with a timeline that fits the material.

In all cases the WPLC is required to be informed via the WP leader about the intention to publish MAKE-IT material as early as possible, with a minimum of 4 weeks. The WPLC will decide on the review procedure for that case. This is enabled by WP leaders signalling planned academic publications or conference contributions to the Scientific lead and signalling non-academic work to the WP7 lead.

Since there are many types of material, this handbook cannot provide details for all cases. We distinguish the following broad categories of material.

- Dissemination material (flyer, website, leaflets, popular science publications, …)
  Default reviewer is the consortium manager, supported by one or more partner managers.
- Scientific publication or conference presentation
  Default reviewer is the scientific lead, supported by one or more partner managers.

3.4. Risk management

In the GA the results of an initial risk assessment are listed. This is considered the initial risk register.

When a partner or WP leader identifies

1. a new risk
2. a substantial rise of a risk, either because the chance of occurrence gets higher or the expected impact becomes bigger,

then this should be communicated with the consortium management as soon as possible. At the latest at the next WPLC this risk, and potential measures, will be discussed.

Periodically, approximately once every 3-4 months, the risk register will be reviewed in the WPLC. On this occasion, risks that cannot occur any longer, or became very small, will be removed. New risks can be added, with the associated mitigating actions.

3.5. SWOT

A mid-term analysis of strengths, weaknesses, opportunities and threats (SWOT) will be performed on the consortium team and the project. This will be done during the plenary workshop in December 2016 and is to be used to refocus, if needed, the project in the second project year.

The SWOT analysis is a structured planning method to evaluate the Strengths, Weaknesses Opportunities and Threats of a particular undertaking, be it for a policy or programme, a project or product or for an organization or individual. It is generally considered to be a simple and useful tool for analysing project objectives by identifying the internal and external factors that are favourable and unfavourable to achieving that objective. Strengths and weaknesses are regarded internal to the project while opportunities and threats generally relate to external factors.

Strengths can be seen as characteristics of the project that give it an advantage over others while weaknesses are regarded as characteristics that place the team at a disadvantage relative to others. Opportunities comprise elements that the project could exploit to its advantage whilst threats include elements in the environment that could cause trouble for the project.

The project manager will communicate the results of the SWOT to the whole consortium. The WPLC and the PMB will discuss and implement any measures that might be needed to steer the project, as a result of the SWOT.
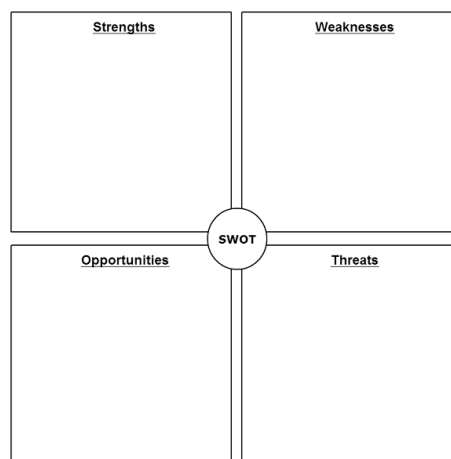
Figure 2: Template for the SWOT

analysis

3.6. Project survey (incl. Responsible Research & Innovation – RRI)

Prior to the plenary workshops a short project survey, including questions regarding Responsible Research and Innovation (RRI, see chapter 5), will be sent to all project members by ZSI. The questions will be discussed in the WPLC one month before the plenary workshop. The idea of this survey is to identify room for improving the cooperation within the project and awareness of the RRI principles.

3.7. Glossary/Definition of core concepts

During the kick-off meeting it was agreed that a glossary of relevant terms will be produced by WP2 (c.f. D2.1). The review of deliverables and other material will include a check on using the terminology included in the glossary in a way that matches the glossary definition.

Though WP2 ends after June 2016, the glossary will be maintained as a living document. When needed, the WPLC can be requested to provide additional definitions of terms for consistent use within MAKE-IT.

3.8. Project templates

The MAKE-IT project intends to use a consistent 'project style'. This is implemented by providing templates for the deliverables, the presentations and posters. More project style templates can be produced by WP7 when needed.

All available project style templates can be found on SharePoint in WP1 > Templates.

4. Tools and collaboration infrastructure

4.1. Document sharing

One key element in a research project like MAKE-IT is collecting/sharing/analysing information and the collaborative production of reports on the results of the analysis.

For both purposes a SharePoint environment has been created (see Figure 3) with URL: https://ecity.tno.nl/sites/MAKE-IT/SitePages/Home.aspx.
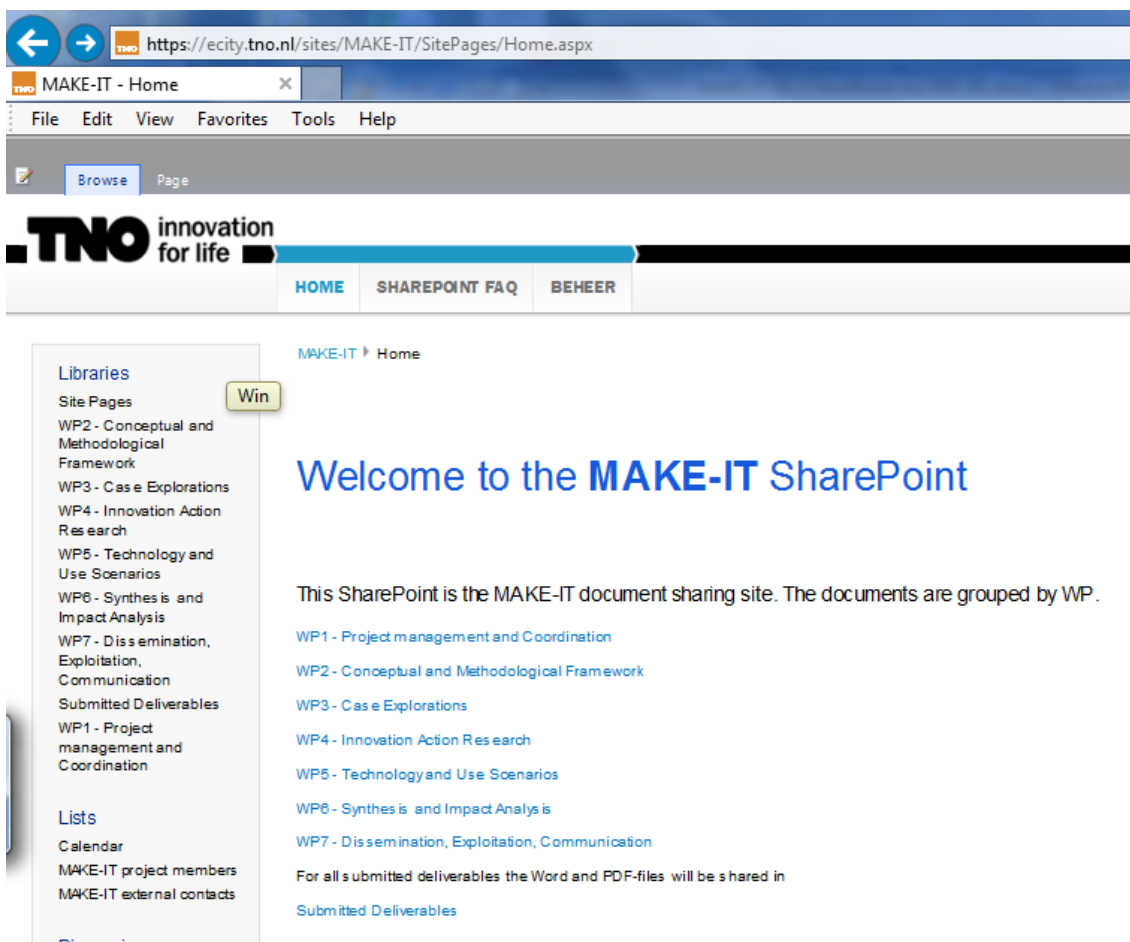
Figure 3: SharePoint Make-IT > Home

Within this SharePoint environment directories are available for each WP and all submitted deliverables. Furthermore, lists are maintained for project members and external contact persons.

Partner managers should announce a new project member to MAKE-IT SharePoint manager Catelijne Rauch. Name and e-mail address are sufficient for creation of the SharePoint access. All project members have to provide their contact details in the project member list.

If a project member leaves the project, this should also be reported to Catelijne Rauch.

4.2. E-mail and telephone

Day to day information exchange will be based on e-mail and telephone.

Basic rule for exchange of information via e-mail: *never* include a document larger than 50kB in an e-mail. Provide in the e-mail a link to the document, stored on SharePoint instead.

The available e-mail distribution lists are listed in Table 6.

E-mail	Contains
make-it_WPL@googlegroups.com	All WP leaders, scientific lead, consortium management
make-it_PPM@googlegroups.com	All partner managers
make-it_WP1@googlegroups.com	All project employees working in WP1
…	…
make-it_WP7@googlegroups.com	All project employees working in WP7
make-it_ALL@googlegroups.com	All project employees working in MAKE-IT

Table 6: Available e-mail distribution lists

Partner managers should announce a new project member to Catelijne Rauch and indicate the e-mail lists the new project member should be in. Project members leaving the project will be deleted from the e-mail lists.

4.3. Online meetings

Online meetings, such as the WPLC meetings, will use 'Skype for Business'. This tool supports screen sharing, making it possible to discuss lists of action points and decisions, presentations, etc.

Invitations for the meetings will include a link as shown in Figure 4.
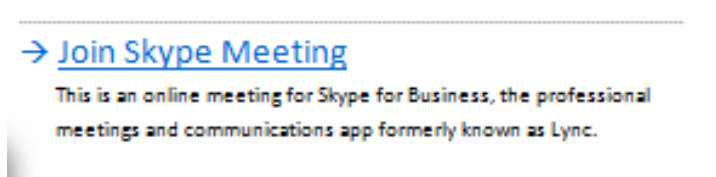
Figure 4: Link in a Skype for Business meeting request

Clicking this link one joins the meeting, and this requires only a suitable browser (on Windows, Mac, Linux or Android based operating system).

4.4. Quarterly progress reports

One of the risks of working in a consortium is that one of the partners spends a lot of effort without reaching a substantial result. To avoid this happening without the WP leader and the consortium manager being aware, the effort of each partner shall be reported every quarter.

The tool used for this monitoring is QPR, an Excel based tool where the partner reports the person months spent in the recently closed quarter for each Task. Figure 5 shows a part of the Excel sheet.

Quarterly Progress Report

Period				
Partner				

	PM	planned PM	Period	Name
WP1 - MGT				Project management & coordination
Task 1.1			M1-M24	Administrative and financial management
Task 1.2			M1-M24	Scientific and Knowledge Management
Task 1.3			M1-M24	Responsible Research and Innovation (RRI) management
Task 1.4			M1-M24	Project Quality Assurance and Risk Mitigation
Task 1.5			M1-M24	Risk mitigation
Task 1.6			M1-M24	Advisory Board
Task 1.7			M1-M24	Proactive cross-network communication with other projects and the EC
WP1 total				
WP2 - RTD				Conceptual & methodological Framework
Task 2.1			M1-M24	Screening and mapping CAPs and maker movement environments
Task 2.2			M1-M6	Desk-top research on the role of CAPs in the maker movement
Task 2.3			M1-M24	Developing a shared conceptual framework
Task 2.4			M1-M24	Building a CAPs and makers movement monitoring and assessment framework and tools
WP2 total				
WP3 - RTD				Case explorations
Task 3.1			M1-M4	Case validation, methodology and engagement strategy
Task 3.2			M4-M12	Data collection: external observations, self-reporting, exploratory workshops
Task 3.3			M7-M12	Data compilation and individual case analyses
Task 3.4			M12-M18	Cross-case analyses
WP3 total				
WP4 - RTD				Innovation Action Research
Task 4.1			M7-M12	Action research design
Task 4.2			M12-M24	CAPs improvements: knowledge transfer
Task 4.3			M13-M24	CAPs improvements: technology enhancements
Task 4.4			M19-M24	Assessing how CAPs improvements can strengthen societal impact
WP4 total				

Figure 5: QPR tool (partial)

The consortium management will consolidate all partner inputs. In the WPLC it is checked if the effort as reported is balanced with outputs of that partner.

QPR timeline:

- The partner managers receive a request for QPR reporting on the first working day of the month after closing a quarter.
- The partner manager reports the effort at the latest on the 15th of the month after closing a quarter.
- The consolidated QPR report is available at the latest on the 22nd of the month after closing a quarter and will be on the agenda of the first WPLC after the 22nd.

5.   Responsible research and innovation (RRI)

5.1. What is RRI?

Responsible Research and Innovation (RRI) has been formulated and widely promoted as guiding principle and policy concept by the European Commission to better align science with society and to meet the so called grand challenges[3].

The starting ground was laid in 2001 with the formulation of the "Science and Society Action Plan" to foster communication between science and society which later, in 2007, was further shaped into the "Science in Society" programme in FP7. RRI as concept was firstly mentioned in 2010 and became an overarching strategic guiding principle in Horizon 2020 and was then further confirmed in the recent Rome Declaration on Responsible Research and Innovation in Europe[4].

Although a rather young concept, RRI became an important umbrella term for principles that might not be actually new but which existed in isolation in parallel. The formulation of the concept of RRI represents the approach to generate a holistic paradigm with different so called key dimensions which will be described in detail in the following.

RRI is as a guiding principle "a transparent, interactive process by which societal actors and innovators   become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products" (Schomberg, 2013). Others' definitions of RRI (c.f. Jacob et al., 2013; Owen et al., 2013) might slightly differ from Von Schomberg's but as described by Wickson & Carey (2014) the overall common accordance is that responsible research and innovation should

1.   address significant socio-ecological needs and challenges,
2.   actively engage different stakeholders,
3.   anticipate potential problems and assess available alternatives and reflect on underlying values and beliefs and
4.   adapt according to these ideas. Generally speaking, RRI is doing science and innovation with and for society by re-imaging the science-society relationship.

---

3. Health, demographic change and wellbeing; Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy; Secure, clean and efficient energy; Smart, green and integrated transport; Climate action, environment, resource efficiency and raw materials; Europe in a changing world - inclusive, innovative and reflective societies; Secure societies - protecting freedom and security of Europe and its citizens

4. http://www.sis-rri-conference.eu/wp-content/uploads/2014/12/RomeDeclaration_Final.pdf

In other words, RRI is meant to provoke a paradigm shift among researchers and other stakeholders such as civil society organisations, educators, policy makers, and businesses, etc. who actively take part in science and innovation developments.

According to the European Commission (Jacob et al., 2013), RRI comprises the following key dimensions[5]:

1. **Governance:** Governance of policymakers to prevent harmful or unethical developments in research and innovation
2. **Open Access**: Open access to research results and publications to boost innovation and increase the use of scientific results
3. **Ethics**: Research must respect ethical standards and fundamental rights to respond to societal challenges
4. **Gender**: Gender equality and in a wider sense diversity
5. **Public Engagement**: Engagement of all societal actors (researchers, industry, policy makers, civil society) in a reflective research process
6. **Science education**: Enhancement of current education processes to better equip future researchers and society as a whole with the necessary competences to participate in research processes

As can be seen in Figure 6, there are overlaps between these key dimensions and overall, there are differences in the structure and layer of these dimensions. While some are rather narrow and concrete, others are broader and have rather an overarching function (European Commission, 2015) (such as the key dimension governance) and some remain on a rather abstract level. RRI and its key dimensions is an evolving concept, so the key dimensions are still subject to change. While some argue that the six key dimensions have to be complemented with further two (European Commission, 2015), others claim that RRI shall rather focus on process requirements (Kupper, Klaassen, Rijnen, Vermeulen, & Broerse, 2015).

In Figure 6, the two perspectives have been integrated for a better overview by the RRI Tools project[6]. While the inner circle shows the six key dimensions with its overlaps, the outer circle depicts the process requirements: **openness and transparency, anticipation and reflection, responsiveness and adaptive change and diversity and inclusion** . In fact, the two perspectives complement each other in a constructive way, while the one focuses on the process of RRI, the other puts forward policy agendas or visions. However, for a better understanding and easy comprehension, we will put on the glasses of the six key dimensions as they are more debated in scientific and public discourse.

---

5. A different operationalisation is described by Wickson and Carew (2014) who describe RRI from a process perspective with the following quality criteria: 1. Socially relevant and Solution oriented; 2. Sustainability centered and Future scanning; 3. Diverse and Deliberative; 4. Reflexive and Responsive; 5. Rigorous and Robust; 6. Creative and Elegant; and 7. Honest and Accountable

6. http://www.rri-tools.eu/

Figure 6: Overview of key dimensions and process requirements of RRI

according to RRI-Tools project

The key dimensions can be perceived as a set of moral values that shall be introduced in research and innovation. According to Kupper et al. (2015), for RRI to become a success story and to provoke shifts in mentality, however, it has to be based on further values such as democratic values regarding participation and power, social and moral values regarding care for the future and individual and institutional values of open-mindedness or receptiveness to change.

In the following the six key dimensions will be described in more detail.

5.1.1.1.   Governance

Among the six key dimensions of RRI, governance has a slightly different function compared to the others, as it is rather an organising and steering principle that determines the success of all other RRI dimensions. In other words, RRI relies on good governing structures for the promotion of RRI. "Governing is any form of coordination that a stakeholder sets to foster and mainstream (the process requirements and outcomes of) RRI within its own organisation or in the interaction with other stakeholders" according to the RRI Tools project[7].

7. http://www.rri-tools.eu

Governance methods range from foresight techniques (scenario studies, value sensitive design, etc.), assessment (ethical committees, needs assessment, technology assessment, etc.), agenda setting (consultation, co-creation, etc.) to regulation (code of conduct, policies, funding guidelines, etc.).

Governance as an organising principle is seen on different levels, at funding agencies level which need to support governance of RRI to institutional responsibilities level. Organisations are called to set up RRI guidelines and policies and also to install respective infrastructure and personnel support (e.g. RRI officers).

Currently, governance of RRI is rarely seen on a project level. The **MAKE-IT project** can be perceived as an attempt to tackle RRI on a project level. However, comprehensive RRI guidelines for projects are still missing and thus this handbook will aim at meeting this need. Also it has to be acknowledged that governance structures need to be at least on institutional level in order to be sustainable. On a project level however, it makes sense to break down what RRI in the context means specifically and how RRI "can be done" in the project since RRI is not a universal principle but a concept that needs adaptation.

5.1.1.2.　　Open Access

In the narrower sense, open access is about enabling or giving access to research results and publications to the public. It addresses only the final stage of research activity, the publication and dissemination phase. Open access, in this sense, is different from open science, open innovation and open data although there are obvious overlaps.

For instance, in contrast to open access, open science implies opening up the whole science process in real time to the public, from choosing areas to investigate in, formulating the research questions to choosing the methods, collecting data and finally discussing the results. Open science means democratising science and research through ICT.

To avoid confusion, in the following, we will refer to open access in the narrower sense.

The value underlying open access is about democratising knowledge and removing barriers for the interested public, thus also empowering society. It enhances openness and transparency of the research process. The proposition is that open access is for the benefit of society but also for the benefit of research and innovation as access to a more diverse range of stakeholders might contribute to the development of new knowledge and to boost innovation potential. Furthermore, an argument that is often used to convince researchers is the fact, that open access articles are cited more often than publications in traditional formats (Föger et al., 2016).

For some, open access means publishing in digital, online, and free of charge publication formats removing price barriers but not permission barriers (Gratis OA). For others open access means that additionally literature shall be free of unnecessary copyright and licensing restrictions (c.f. RRI-Tools project).

There is the call for publicly funded research and innovations developments being accessible free of charge for the public. In 2012, the European Commission proposed to all Member States, that 60% of all scientific publications shall

be open access until 2016, following the Green or Golden Road (c.f. chapter 7). With the launch of Horizon2020 it has become mandatory to follow open access publication strategies (European Commission, 2012) .

MAKE-IT will follow open access publication strategies and will also make data available to the public at an earlier stage where suitable (c.f. chapter 7).

5.1.1.3.   Ethics

Ethics as a principle under the umbrella term of RRI has moved beyond fulfilling legal requirements and protecting objects of research. Certainly, complying to national and international standards and submitting proposals to ethics committees is fundamental also under this notion but the principle of Ethics is understood as a process, similarly to all other key dimensions, that urges researchers and stakeholders to question themselves if they comply with high moral standards and if they ensure increased societal relevance and acceptability of research and innovation outcomes. Ethics thereby shall not be perceived as a constraint but rather as a guiding principle to help ensure high quality outcomes and to justify decisions.

The European Commission defines ethics as key dimension of RRI as follows:

"European society is based on shared values. In order to adequately respond to societal challenges, research and innovation must respect fundamental rights and the highest ethical standards. Beyond the mandatory legal aspects, this aims to ensure increased societal relevance and acceptability of research and innovation outcomes. Ethics should not be perceived as a constraint to research and innovation, but rather as a way of ensuring high quality results." (p.4) [8]

Ethics comprises three main aspects (European Commission, 2015):

1. Research integrity and good research practice: scientific misconduct and questionable research practices shall be avoided.
2. Research ethics for the protection of research objects (people, animals, and environment). This is the aspect that is best developed in institutional guidelines as well as national and international laws and policies. This aspect matches the traditional notion of ethics and is most referred to when speaking about ethics.
3. Societal relevance and ethical acceptability of research and innovation outcomes. This aspect is closest to the key dimension of ethics in the understanding of RRI as it is a cross-cutting principle. It relates to the grand challenges as formulated in the Lund Declaration in 2009 [9]. In this sense, it is ethical if science and innovations contribute in facing and solving them.

---

8. http://ec.europa.eu/research/science-society/document_library/pdf_06/responsible-research-and-innovation-leaflet_en.pdf

9. https://www.vr.se/download/18.249c421a1504ad6d28144942/1444391884365/Lund_Declaration_2009.pdf

Ethics further implies social justice and inclusion aspects: The widest range of societal actors and civil society shall benefit from research and innovation outcomes. In other words, products and services as a result of R&I activities shall be acceptable and affordable for different social groups. Researchers and innovators are asked to reflect upon the impact of their activities on "society" and to minimise potential negative outcomes.

Instruments that can be used to reflect upon potential negative and positive, intended and unintended outcomes comprise, for instance, ELSI/ELSA tools (Ethical, Legal and Social Implications/Aspects) and mechanisms for multi-stakeholder/transdisciplinary processes of appraisal of ethical acceptability. RRI is thus not "outsourced" to ethical committees but consists in continuous reflective questioning.

Chapter 6 is dedicated especially to dealing with ethics in **MAKE-IT**.

5.1.1.4.   Gender

Gender equality means equal rights, opportunities, and responsibilities for both genders so that individuals can exploit and realise their full potentials independently from their sex.

Gender equality as a key dimension of RRI comprises two main aspects (European Commission, 2015):

- The human capital dimension: Gender balanced teams in research and innovation and
- The science and innovation dimension: Inclusion and integration of gender perspectives in research and innovation content and process.

Firstly, to meet the human capital dimension of gender, emphasis shall be laid on balanced research teams and gender balanced leading positions. This is mainly a task for research and innovation institutions to set and follow gender equality plans but also international research projects with different institutions on board can emphasise gender balance for instance in the compositions of advisory boards or key note speakers at conferences or panel discussion boards. Promoting gender equality at all levels means contributing to achieving excellence: Female scientists and innovators are given an opportunity for promotion and making their voices heard. Furthermore, an attractive work place with flexible and family friendly working conditions might attract top-level female researchers (as long as household and family tasks are mostly carried out by women).

Secondly, to include gender in research and innovation activities as such, for instance, in the formulation of the research question, in the selection of the data (collection), etc. helps avoiding gender bias in results. Output that is mainly based on a male perspective is not universally valid, since it cannot simply be transferred to or adapted to the other half of the population. However, gender bias is often unintentional but to make these biased perception, assumptions and prepositions more explicit is one of the goals of gender as key dimension in RRI.

The European Commission[10] underlines three objectives in the Horizon 2020 in terms of gender balance in research and innovation activities:

---

10. https://ec.europa.eu/programmes/horizon2020/en/h2020-section/promoting-gender-equality-research-and-innovation

I. fostering gender balance in Horizon 2020 research teams,
II. fostering gender balance in decision-making bodies (40% female in panels and 50% female participation in advisory groups) and
III. integrating sex and gender analysis in research and innovation.

Apart from the institutional change that is necessary to come to equal participation in research and innovation activities, a research project can aim at addressing unconscious gender bias, e.g. perception of women's achievement in STEM (Science Technology Engineering Mathematics), in the formulation of the research questions, and in analysing the breath and width of penetration of gender perspectives in research content. Furthermore, project members shall make sure that tasks and responsibilities are equally distributed and that in advisory boards and other decision making or consulting bodies both sexes are represented. Similarly, it has to be made sure that among first authors on research papers there are also female authors. All written materials, dissemination instruments, conceptual notions, reports, etc. should be critically analysed with gender sensitive glasses on.

Gender analysis and gender monitoring throughout the project shall aim at looking at both aspects of gender equality, at the human capital dimension (where possible, apart from institutional conditions) and the research aspect of gender (Föger et al., 2016).

In **MAKE-IT** we pay special attention to gender in this project. On the one hand gender is an aspect to be considered in the definition of the specific research questions. E.g. is gender equally presented in the Maker communities or is there a dominant gender? Does gender influence governance structures in the different cases, etc.

On the other hand, gender is also relevant when it comes to internal processes, such as the composition of research teams, of work package leaders, of advisory groups, the use of gender sensitive language and the awareness of producing gender sensitive content. We are aware of the current imbalance in the WPL and less so in the advisory board and will consider gender specifically in any new allocations.

In line with the Toolkit on Gender in EU-funded research (European Commission, 2009) Make-IT will strive at doing gender-sensitive research. Particularly in the following project steps gender as a research factor has to be addressed and taken into account:

I. Research ideas and hypotheses: The main research questions have been formulated in the proposal. However, we will analyse and assess the relevance of gender in our research when specifying the research questions.
II. Project design and research methodology: As the toolkit suggests, in the very moment research concerns humans, research has to differentiate between the two genders and analyse the gender specific situation. In our research we will aim at representative data in the sense that both perspectives will be described.
III. Research implementation: Data-collection tools such as questionnaire, interview guidelines, etc. need to be gender sensitive and use gender-neutral language and have to allow for differentiation between gender perspectives. In the data analysis we will particularly pay attention whether there are differences between males and females, for instance, in the usage of FabLabs, in terms of artefacts that are produced, in terms of learning, etc.
IV. Dissemination phase – reporting of data: We will use gender-neutral language in our publications. Furthermore, we will sensitively decide which visual materials to use. Also we will aim at publishing gender specific results.

5.1.1.5.   Science Education

Science education under the RRI umbrella is meant to meet several objectives (European Commission, 2015; Föger et al., 2016):

    I.   To empower the society to critically reflect and to improve on their skills to be able to challenge research, thus to make them "science-literate" (in this sense, there is a great overlap with the key dimension of public engagement)

    II.   To enhance future researchers and other societal actors to become good RRI actors

    III.   To make science attractive to children and teenagers with the purpose to promote science careers, especially in STEM

    IV.   To close the gap between science and education. There is still a significant distance between the two areas.

Thereby, science education does not build on one-way communication channels but on channels that allow and enhance "the society" to talk back. According to the RRI-Tools project, RRI should be integrated in all levels of education, from primary to university level, and in different segments of education, i.e. formal, lifelong learning and informal learning activities. Inspirational activities that make pupils reflect upon "good" research, its negative and positive outcomes, about ethics and ethical dilemmas, gender inequalities, etc. can have an empowering function. Other tools comprise courses in open democracy, in co-design or co-research or "living labs" that enable participants to shape the development of certain technologies or services.

In **MAKE-IT** we will particularly pay attention to activities that address children and teenagers. Most FabLabs in our 10 case studies regularly offer educational activities to young people and schools and the Maker movement has started to get attention from schools and educational authorities.

5.1.1.6.   Public Engagement

From the so-called "deficit" model with the willingness to educate and to inform about science through one-way-communication channels in the past two decades, the emphasis now is laid on public engagement, which means more elaborate and active involvement of citizens.

According to the International Association for Public Participation (Pearce, 2010) participation ranges from informing to active co-decision:

    1)   informing „…we will keep you informed…")

    2)   consulting „… we will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision…"

    3)   involving „… we will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decisions…"

4) collaborating „...we will look to you for your advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible...“ and

5) empowering „...we will implement what you decide...“).

There is a vast range of tools and methods with different levels of participation available, e.g. public consultations, public deliberations for decision making, public participation in R&I processes.

The goal by opening up research and innovation processes to the public is to better meet the values, needs and expectations of society and thus to improve R&I and to find solutions to the so called grand challenges that society is facing (Cagnin, Amanatidou, & Keenan, 2012).

According to Föger et. al (2016), participation is not free of charge and cannot just simply be "ordered" and thus activities have to be calculated in the budget allocation.

Thus, this key dimension of RRI is difficult to realise in **MAKE-IT** but activities will be set to involve children and teenagers.

5.2. RRI in MAKE-IT

The notion of Responsible Research and Innovation does not offer a checklist or one universal guideline how to do RRI. It is also not in the spirit of RRI to have such set measures, as RRI is rather perceived as a process that requires continuous questioning and reflection. Thus, mechanisms have to be installed and embedded in the project to stimulate reflection of the consortium and to keep these alive throughout the lifetime of the project.

We would like to point out that not all key dimensions are equally relevant for MAKE-IT. Except some projects that deal specifically with RRI, there are no projects as of our knowledge that have installed RRI as a whole as a cross-cutting principle. Most projects address one or two key dimensions of RRI.

In MAKE-IT RRI principles will be implemented as far as possible and relevant, whereby the responsibility for implementation and the monitoring will be shared among all consortium members. WP leaders shall particularly pay attention that RRI principles are reflected in their work package where relevant.

To find out which key dimensions are particularly relevant for MAKE-IT we conducted a workshop with all consortium members at the Kick-Off Meeting.

5.2.1. Results of The Hague workshop

In the framework of the Kick-Off meeting in The Hague in January 2016, we carried out a small workshop with all the Consortium partners to get a few ideas on what RRI means in this project and which RRI key dimension might be of particular relevance in this project. The workshop was meant to make the project partners familiar with the concept of RRI and to stimulate reflection and discussion on RRI themes.

After a short introduction to the concept of RRI and its key dimensions, the partners were asked to note down on cards important aspects for MAKE-IT related to any of the RRI dimensions and to cluster them accordingly.
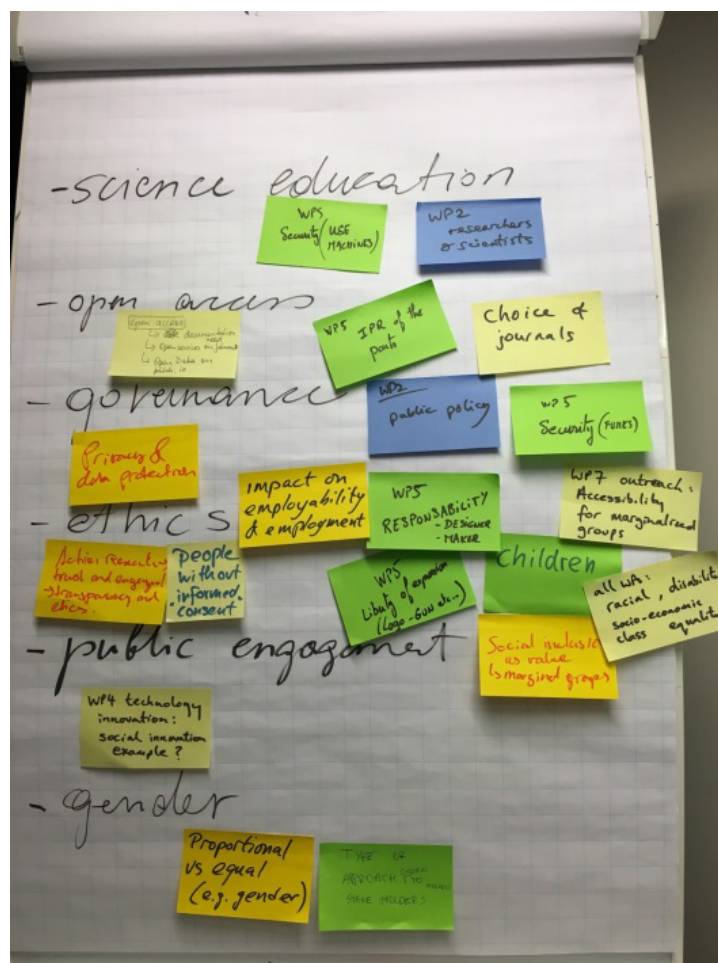
Figure 7: Exercise on RRI dimensions

Under **Science education**, the partners mentioned two aspects: work in WP 2 in the conceptualisation and development of the methodological framework as well as security issues in WP 5 relating to the use of machines.

When thinking about **Open Access**, the partners found the need for documentation, open services and open data on fablab.io. In WP 5, the IPR of fabricated parts could be an issue. Furthermore, the choice of journals where the consortium publishes is an important aspect of open access (open access versus closed access journals).

In respect to **Governance**, a public policy in WP 2 was found useful as well as privacy and data protection guidelines. Further, a potential impact on employability and employment was mentioned by the partners. In WP 5, the partners found that in the technology and use scenarios, designers and makers shared responsibility.

The **Ethics** key dimension of RRI seems to be the hottest topic in MAKE-IT as it received the largest number of comments: There are security issues in WP5 when people are exposed to fumes, for instance, when operating the

machines. Children as participants in Fablabs might be particularly affected by any of these potentially harmful practices. As consortium partners we will have to make sure to involve people in any of the research activities only after briefing them and after their given consent. Partners posed the question how to deal with liberty of expression when making use of digital fabrication: the technology can be used for the good and the bad. On the one side, it allows for convenient prosthetics, on the other hand, a gun can easily be built. This is particularly relevant in WP 5. In action research (WP 4), transparency and ethics are regarded as crucial to build on trust and engagement. Giving access to all people irrespective of socio-economic class, ethnic group or disability was another mentioned aspect (particularly relevant in WP7 outreach activities). Social inclusion as value to reach marginalised groups is found very important.

Regarding **Public Engagement** there was just one question noted down: Whether WP 4 technology innovation constitutes a social innovation example.

The key dimension **Gender** shall be taken into account when deciding upon how to approach and address stakeholders. In regard to gender the question is whether to aim for proportionality or equality or both.

The results of the workshop served as a good starting point in the RRI considerations in MAKE-IT. The exercise was particularly useful to sensitise the project partners. Furthermore, it became clear that some key dimensions are more important or relevant for MAKE-IT than others. The three core topics that evolved were: Gender, ethics and open access.

In the following we will therefore concentrate on these key dimensions which will be dealt with in more detail. However, also the remaining three shall remain in our mind-sets as we would like to continuously stimulate reflection and discussion on RRI.

5.3. RRI management plan

In order to stimulate reflection and deliberation on Responsible Research and Innovation and to keep these alive we have foreseen several instruments:

- Regular surveys: RRI specific questions will be added to the regular management survey that is distributed a few days before each partner meetings. Questions to be included will look at how different key dimensions have been addressed in the past 6 months and what could be done to better address the respective key dimensions of RRI or showcase lessons learned.
- RRI Self-Reflection-Tool: The RRI-Tools project has developed the so called "RRI Self-Reflection-Tool". It is an online tool for different stakeholder groups and for people with any level of knowledge on RRI. The tool is meant to comprise food for thought to stimulate reflection on RRI key dimensions and process requirements. Participants can choose which questions they would like to reflect upon (since not all of them will be relevant) and receive suggestions at the end how to further improve in terms of RRI. Further resources such as best practice examples, tools or literature will be recommended. In MAKE-IT we will invite the project partners to regularly make use of the Self-Reflection –Tool.

- RRI reflections at Consortium Meetings: At every consortium meeting we would like to propose a short reflection on RRI issues and to discuss RRI topics based on the results of the Self-reflection-Tool and the experiences made by the consortium.

5.4. RRI instruments and tools

Our main instruments for implementing RRI are described in detail in the following sessions. The main tools are the:

- ethical guidelines, including forms for informed consent and confidentiality agreement
- open data management plan
- RRI self-assessment tool and survey

6. Ethical guidelines

Ethics is an integral part of responsible research, from the conceptual phase to the publication of research results. The consortium of MAKE-IT is clearly committed to show appreciation of potential ethical issues that may arise during the course of the project and has as such defined a set of procedures on how to deal with ethics in a responsible way.

The main aspects the project is dealing with in regards to ethics are the protection of identity, privacy, obtaining informed consent and communicating benefits and risks to the involved target groups.

The studies performed in MAKE-IT may include data collection from individuals and organisations remotely as well as on site. In order to achieve the goals defined within the research tasks of the work programme the consortium may collect personal data from study participants. Such data may include basic demographic data, responses to questionnaires or interaction data with technologies.

6.1. Data protection and privacy

During any data collection process data protection issues involved with handling of personal data will be addressed by the following strategies:

Volunteers to be enrolled will be exhaustively informed, so that they are able to autonomously decide whether they give their consent to participate or not. The purposes of the research, the procedures as well as the handling of their data (protection, storage) will be explained. For online interviews these explanations will be part of the initial briefing of interviewees, for face-to-face interventions informed consent (see below) shall be agreed and signed by both, the study participants as well as the respective research partner.

The data exploitation will be in line with the respective national data protection acts. Since data privacy is under threat when data are traced back to individuals – they may become identifiable and the data may be abused – we will anonymise all data.

The data gathered through questionnaires, interviews, observational studies at the workplace, focus groups, workshops and other possible data gathering methods during this research will be anonymised and therefore the data cannot be traced back to the individual. Data will be stored only in anonymous forms so the identities of the participants will only be known by the research partners involved. Raw data like interview protocols and audio files will be shared within the consortium partners only after the confidentially agreement (See Annex II) has been signed. Reports based on interviews, focus group and other data gathering methods will be based on aggregated information and comprise anonymous quotations respectively.

The collected data will be stored on password-protected servers at the partner institution responsible for data collection and analysis. The data will be used only within the project and will not be made accessible for any third party. It will not be stored after the end of the project (incl. the time for final publications) unless required by specific national legislation.

The stored data do not contain the names or addresses of participants and will be edited for full anonymity before being processed (e.g. in project reports).

6.2. Communication strategy

Study participants will be made aware of the potential benefits and identified risks of participating in the project at all times.

The main means of communicating benefits and risks to the individual is the informed consent. Prior to consent, each individual participant in any of the studies in MAKE-IT will be clearly informed of its goals, its possible adverse events, and the possibility to refuse to enter or to retract at any time with no consequences. This will be done through a project information sheet or the informed consent form and it will be reinforced verbally.

In order to make sure that participants are able to recall what they agree upon when signing, the informed consent forms will be provided in the native language of the participants. In addition, the consortium partners will make sure that the informed consent forms are written in a language suitable for the target group(s).

6.3. Informed consent

As stated above informed consent will be collected from all participants involved in MAKE-IT studies. An English version of the declaration of consent form is provided in the Annex I of this document.

6.4.　　Relevant regulations and scientific standards

The consortium follows European regulations and scientific standards to perform ethical research. The following lists some of the basic regulations and guidelines.

The MAKE-IT project will fully respect the citizens' rights as reported by EGE and as proclaimed in the Charter of Fundamental Rights of the European Union (2000/C 364/01), having as its main goal to enhance and to foster the

participation of European citizens to education, regardless of cultural, linguistic or social backgrounds. Regarding the personal data collected during the research the project will make every effort to heed the rules for the protection of personal data as described in Directive 95/46/EC[11].

In addition, the consortium follows the following European Regulations and Guidelines:

1) The Charter of Fundamental Rights of the European Union: http://www.europarl.europa.eu/charter/default_en.htm
2) The European Convention on Human Rights http://www.echr.coe.int/Documents/Convention_ENG.pdf
3) Horizon 2020 ethics self-assessment http://ec.europa.eu/research/participants/portal/doc/call/h2020/h2020-msca-itn-2015/1620147-h2020_-_guidance_ethics_self_assess_en.pdf
4) The EU Code of Ethics: http://www.respectproject.org/ethics/412ethics.pdf
5) The European Textbook on Ethics in Research https://ec.europa.eu/research/science-society/document_library/pdf_06/textbook-on-ethics-report_en.pdf
6) European data protection legislation: http://ec.europa.eu/justice/data-protection/index_en.htm
7) The RESPECT Code of Practice for Socio-Economic Research: http://www.respectproject.org/code/index.php?id=de
8) The Code of Ethics of the International Sociological Association (ISA): http://www.isa-sociology.org/about/isa_code_of_ethics.htm

6.4.1. National and Local Regulations and Standards

In addition to the more general and EU-wide guidelines, project partners have to adhere to, and respect, national regulations and laws as well as to research-related organisational ethical approval as requested by the own institutions. All partners are aware of their responsibilities in that respect and will follow the respective guidelines.

---

11. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Al14012

7.   Open access and open research data

The project firmly believes in openness to be a major factor for innovation. There are many examples of how open innovation and open source are successful models, especially in domains where many different stakeholders are required to bring about effective change. Openness has many facets. The most important ones for the MAKE-IT consortium are, following Carlos Moedas's (European Commissioner for Research, Science and Innovation) strategy of the 3 Os, Open Science, Open Innovation and Open Data[12]:

1.   **Open project collaboration**. All partners are committed to developing (working for) relationships with external partners for mutual benefit. Making contacts with similar projects and establishing collaboration is considered beneficial for all. Open collaboration in MAKE-IT is understood in a trans-disciplinary way, opening research processes to the wider public and allowing new form of collaboration as intended in the action research stream of the project.

2.   **Open source technology**. From a technology perspective, the project builds upon open source technologies, such as the CAPs for Makers (especially fablabs.io) and wants to share its results with the community. Business models and exploitation strategies are not based on locking down access to project results, but on providing added value through services.

3.   **Open access to scientific results**. From a scientific perspective, the consortium clearly favours open access to its scientific output, which is supported by several project members' internal policies of supporting open access in general.

4.   **Open access to research data**. MAKE-IT is part of a pilot action on open access to research data and is thus committed to providing access not only to project results and processes, but also to data collected during that process. The general policy of the MAKE-IT project is to apply "open by default" to its research data, with exceptions being made based on privacy, competitiveness and the relationship between researchers and cases; ethical rules on anonymity as described above (chapter 6) are thus highly relevant and need to be agreed with each of the case participants.

MAKE-IT is part of the H2020 pilot action on open access to research data and has started to develop a first data management plan. The open access strategy will be detailed in the following sections.

https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf

---

12. http://europa.eu/rapid/press-release_SPEECH-15-4532_de.htm

7.1. Open access strategy for publications

In line with the EC policy initiative on open access[13], which refers to the practice of granting free online access to research articles, the project is committed to follow a publication strategy considering a mix of both 'Green open access' (immediate or delayed open access that is provided through self-archiving) and 'Gold open access' (immediate open access that is provided by a publisher) as far as possible.

All deliverables (reports, software, data, media, other) labelled as "public" will be made accessible via the MAKE-IT website (make-it.io). The publications stemming from the project work will also be made available on the website as far as it does not infringe the publishers rights as well as on the OpenAIRE platform https://www.openaire.eu/.

All outcomes of the project labelled as "public" will be distributed under specific free/open license, where the authors retain the authors' rights but the users can redistribute the content freely. The following are a few relevant sources for deciding on the specific license for each outcome:

- Data:
    - A definition of Open Data: http://opendefinition.org/
    - Licenses: http://opendefinition.org/licenses/
- Software:
    - Free Software
        - The definition: http://www.gnu.org/philosophy/free-sw.html
        - Licenses: http://www.gnu.org/licenses/licenses.html
    - Open Source Software:
        - The definition: https://opensource.org/osd-annotated
        - Licenses: https://opensource.org/licenses
- Reports, publications, media:
    - Creative Commons
        - Explanation: https://creativecommons.org/about/
        - Licenses: https://creativecommons.org/licenses/
        - Choose a license: https://creativecommons.org/choose/

7.2. Data management plan (DMP)

This is a first version of the DMP for MAKE-IT, which provides an analysis of the main aspects to be followed by the project's data management policy. The DMP evolves in the course of the project and will be updated accordingly as

---

13. http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1294&lang=1

research data is collected. The data management plan will be facilitated by the DMP online tool[14]. Consortium partner can either register and fill in the information requested directly in the tool in several iterations throughout the duration of the project or contribute to the template that will be developed based on the tool.

At the time of writing it is expected that the project will produce the following data:

1. WP2: aggregated datasets for trend analysis
2. WP3: case study data from interviews, workshops, questionnaires, etc.
3. WP4: case study data from surveys, platform data (e.g. from fablabs.io or happy lab platform), social media data and observational analysis.
4. WP5: platform usage data from Maker CAPs, such as fablabs.io
5. WP6: analysis of existing data, collected through the other research work packages
6. WP7: data from other CAPs regarding Dissemination, Exploitation, Communication of the MAKE-IT project

This initial list includes primary (empirical) and secondary (desk-top, aggregated) data. For the currently identifiable primary research data sets, that the project will produce, we follow the requested template description as defined by the European Commission[15] (Table 7):

Data set reference & name	Data set description	Standards & metadata	Data sharing	Archiving & preservation
DOI_1 MAKE-IT_TwitterAggregate_X	Aggregated Twitter feeds collected for the trends analysis of WP2; this will be included in the Deliverable D2.1 as well as in an academic publication; The data will only show links (Twitter IDs), which will allow authors to delete their tweets anytime	Twitter's Developer Agreement & Policy: https://dev.twitter.com/overview/terms/agreement-and-policy	Twitter's Developer Agreement & Policy: https://dev.twitter.com/overview/terms/agreement-and-policy Most Tweets are public, but researchers are not allowed to republish any information that links back to the user or his/her location. Thus following this policy and internal ethical guidelines only aggregated data will be made available; user and location will be omitted. Authors need to keep control of their tweets, e.g. if they delete a tweet or go private they express their wish not to be analysed – but if they are part of an archive,	The aggregated data (links to Twitter IDs) supporting the publication will be made available on the project website for the duration of at least 5 years after project end.

---

14. https://dmponline.dcc.ac.uk/

15. https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

			this wish isn't respected	
DOI_2 MAKE-IT_Survey_X	Survey data being collected at the different cases (possibly in WP3 and WP4); the data will be anonymised and will refer to aspects covered in the three core pillars of the project: collaboration, governance, value creation	As indexed on the sharing platform e.g. Zenodo, it will have publication data, DOI, keywords, collections, license, uploaded by the Consortium.	Shared on Zenodo, open digital repository; license will be most probably: Creative Commons Attribution Share-Alike	Zenodo is developed by CERN under the EU FP7 project OpenAIREplus (grant agreement no. 283595); the service is free for the moment; Zenodo is working on a sustainability plan to deliver an open service in the future; if this is not the case MAKE-IT will provide the data accessible via its website for the duration of at least 5 years after project end.
DOI_3 MAKE-IT_Interview_X	Interviews conducted with individuals being associated to any of the cases to be studied (WP3 and WP4) needs to be stored anonymously; The data may be in the following format (depending on the interviews and the specific cases): 1. audio files 2. transcripts 3. aggregated files 4. interview	As indexed on the sharing platform e.g. Zenodo, it will have publication data, DOI, keywords, collections, license, uploaded by the Consortium.	Shared on Zenodo, open digital repository; license will be most probably: Creative Commons Attribution Share-Alike	Is possible MAKE-IT will make use of Zenodo (see above).

	guidelines		
DOI_4 MAKE-IT_MachineUsage_X	Usage of machines in the labs/maker spaces (if available); this data can include information about check-in, check-out, usage time, material, gender; it will be part of the case studies (WP3 and WP4); depending on agreements from the lab (and possibly their users)	As indexed on the sharing platform e.g. Zenodo, it will have publication data, DOI, keywords, collections, license, uploaded by the Consortium.	Only in clear agreement with the organsations providing the data; Shared on Zenodo, open digital repository; license will be most probably: Creative Commons Attribution Share-Alike	Is possible MAKE-IT will make use of Zenodo (see above).
DOI_5 MAKE-IT_PlatformUsage_X	Platform usage data from fablab.io (anonymous data); the data includes: Communication pattern, usage patterns, uploads, downloads, etc.	As indexed on the sharing platform e.g. Zenodo, it will have publication data, DOI, keywords, collections, license, uploaded by the Consortium.	Shared on Zenodo, open digital repository; license will be most probably: Creative Commons Attribution Share-Alike	Is possible MAKE-IT will make use of Zenodo (see above).

Table 7: Currently identifiable primary research data sets

To summarise, the main open access points for MAKE-IT data, publications, and innovation are:

- The project website: www.make-it.io
- Zenodo: http://www.zenodo.org/
- OpenAIRE https://www.openaire.eu/ for depositing publications and research data

7.3. Open access and open data handling process

The internal procedures to grant open access to any publication, research data or other innovation stemming from the MAKE_IT project (e.g. technology) follow a lightweight structure, while respecting ethical issues at all time.

The main workflow starts at the WP level, where each team is responsible for respecting ethical procedures at all times during the data gathering and processing steps. The WP team members are also responsible for making any data anonymous, if applicable. For any publication the WPLB needs to be informed; agreement has to be reached within the WP for making any outcome openly available; the final approval is done by the PMB (see Figure 8):
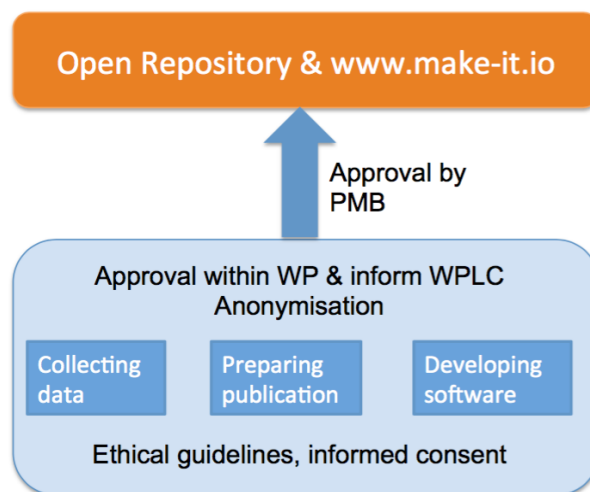

Figure 8: Open Access work flow

Finally, it should be stressed that due to the nature of the Project, the Data Management Plan has to be revised during the course of project activities, especially those related to action research. Due to the open nature of this type of research it is not possible to clearly specify all data sources and collected outcomes from the beginning.

8. Conclusions

This handbook describes the main procedures of the MAKE-IT project to operate successfully and effectively in order to achieve high quality project results following a responsible research and innovation (RRI) approach. Open access, ethics, and engagement of all societal actors are amongst the key elements of the European RRI framework (European Union, 2012). MAKE-IT is clearly committed to respond to societal challenges in a responsible way by the research topic itself as well as by the way the research is conducted.

While this handbook is provided in the form of a report and deliverable it is a living document in the sense of being updated and challenged by the consortium in the course of the project. The processes described in here are implemented in the daily work of the consortium and most of the elements (e.g. the forms for informed consent, data management plan, etc.) are separately available on the collaboration infrastructure such as Sharepoint.

The management reports will include updates on any crucial changes in the handbook as well as on the results of specific measures such as the SWOT analysis or any additional elements added to the project structure related to high quality responsible research.

9. References

Cagnin, C., Amanatidou, E., & Keenan, M. (2012). Orienting European innovation systems towards grand challenges and the roles that FTA can play. Science and Public Policy, 39(2), 140–152. http://doi.org/10.1093/scipol/scs014

European Commission. (2009). toolkit gender in eu funded research - Google-Suche. Retrieved 24 February 2016, from https://www.google.at/search?q=toolkit+gender+in+eu+funded+research&ie=utf-8&oe=utf-8&gws_rd=cr&ei=H2nNVpaSE8rP6AS_nI5A

European Commission. (2012). Cultural change in research institutions: Enhancing excellence, gender equality and efficiency in research and innovation. Report of the Expert Group on Structural Change. Retrieved from http://ec.europa.eu/research/science-society/document_library /pdf_06/structural-changes-final-report_en.pdf

European Commission. (2015). Indicators for promoting and monitoring Responsible Research and Innovation (Report from the Expert Group on Policy Indicators for Responsible Research and Innovation). Brussels.

Föger, N., Garber, K., Grießler, E., Gschmeidler, B., Hafellner, S., Polt, W., … Wroblenski, A. (2016). RRI in Österreich. Positionspapier 'Verantwortungsbewusste Forschung und Innovation'. Begriffsbestimmung, Herausforderungen, Handlungsempfehlungen. Wien/Graz: Plattform RRI Österreich.

Jacob, K., Van Den Hoven, J., Nielsen, L., Roure, F., Rudze, L., Stilgoe, J., Riera, C. M. (2013). Options for strengthening responsible research and innovation: Report of the expert group on the state of the art in Europe on responsible research and innovation. European Commission: Brussels.

Kupper, F., Klaassen, P., Rijnen, M., Vermeulen, S., & Broerse, J. (2015). D1.3 Report on the quality criteria of Good Practice Standards in RRI (RRI-Tools Project Report).

Owen, R., Stilgoe, J., Macnaghten, P., Gorman, M., Fisher, E., & Guston, D. (2013). A framework for responsible innovation. Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society, 27–50.

Pearce, K. (2010). Public Engagement and Civic Maturity: A Public Dialogue Consortium Perspective. Lulu.com.

Schomberg, R. Von. (2013). A vision of responsible research and innovation. Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society, 51–74.

Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. Research Policy, 42(9), 1568–1580. http://doi.org/10.1016/j.respol.2013.05.008

Wickson, F., & Carew, A. L. (2014). Quality criteria and indicators for responsible research and innovation: learning from transdisciplinarity. Journal of Responsible Innovation, 1(3), 254–273. http://doi.org/10.1080/23299460.2014.963004

10. List of Acronyms and Abbreviations

CA	Consortium Agreement
DoA	Description of Action
DMP	Data Management Plan
GA	Grant Agreement
MAB	MAKE-IT Advisory Board
NDA	Non-Disclosure Agreement
PMB	Project Management Board
RRI	Responsible Research and Innovation
SWOT	Strengths, Weaknesses, Opportunities, Threats
WP	Work Package
WPLC	WP Leaders Committee

11. Annex I: Informed Consent

Declaration of Consent

The data collection from participants is part of research activities within the larger context of an EU-funded project named MAKE-IT.

You have been invited to participate in the MAKE-IT project and will have received information about the project separately.

Your data will be held and used on an anonymity basis only for the purpose of the MAKE-IT project. It will be stored after the end of the project in an anonymous form for 5 years. Your raw data will be kept confident and will only be shared in an open data repository upon your agreement. Written reports referring to your data will not contain any data that could lead to the identification of a specific data subject.

Your participation is voluntary, consent can be refused, and withdrawal is an option at any time.

Declaration of consent: I hereby give consent for my data to be conveyed and documented for the purpose stated above. I confirm that I have been informed of the nature of MAKE-IT and that my participation is voluntary. I am aware that I may withdraw my consent at any time.

Date:...

Name:...

Signature: ....

Signature of MAKE-IT representative: ....

For further information about the research project MAKE-IT, please contact at any time:

_____

Please provide your contact information if we are allowed to contact you again with regard to your data (*This information will of course be stored separately from your data!*):

_____

12. Annex II Confidentiality Agreement

Confidentiality Agreement

Research data shared between the researchers in the MAKE-IT project may contain personal identifiable information (PII), the usage of which is protected by law. To comply with this law, usage and sharing of data is restricted and it is essential that you follow the rules and guidelines described in the ethical guidelines defined for MAKE-IT for collecting, processing, sharing and storage of data.

In addition to this you are obliged to comply with the following terms:

- I will not share the participant data collected by the project team with any third parties, including the case study organisations, employers of the participants, or other members of the consortium of the MAKE-IT project without explicit, written consent from the person(s) who provided the data.
- Where relevant, I will instruct the people for whom I have responsibility who have access to the data of the relevant ethical protocols and ensure that they follow the guidelines defined for the project, as listed below.
- I will delete the data at least _____ months after the project outcomes have been published (recommended time is 3 months).

Declaration: I hereby declare my consent with the rules outlined above:

Date:..

Name & Organisation: ....

Signature: ....

List of persons in my organisation who have access to the data: