Global Model and Observatory for International Responsible Research and Innovation Coordination

D4.6 Observatory Handbook

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D4.6 Observatory Handbook			
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Executive Summary

The Observatory of Responsible Research and Innovation (RRI) aims to be established as a permanent point of reference and actual fore-thinking regarding the current concept and developments in the field of RRI. This handbook helps a user to navigate through the Observatory and its rich content, create a user account, and insert new content. The handbook also presents various technical specifications of the Observatory and important information important for an administrator. The handbook also explains the data and user privacy aspects that have been ensured by this Observatory.

Finally, this deliverable contains the Common Glossary of RRI which is presented as an annex in this handbook and has been also inserted into the Observatory platform.

1 OBSERVATORY USER MANUAL

1.1 HOME SCREEN: Using Information on the Home Screen (no login or account necessary)

Home Screen: This screen provides initial descriptions of the Observatory, Forum, and access to either creating a new account or logging into your existing account. "**Create an Account**" is one of the images you will see on this screen; others are "RRI: Responsible Research Innovation" and "The Observatory: Global Model and Observatory for International RRI Coordination". You have access to RRI information without creating an account.

Home page information:

Scrolling down this home page you have access to general information about this project, the team that developed it and a brief FAQ about the purposes of this Observatory and Forum.

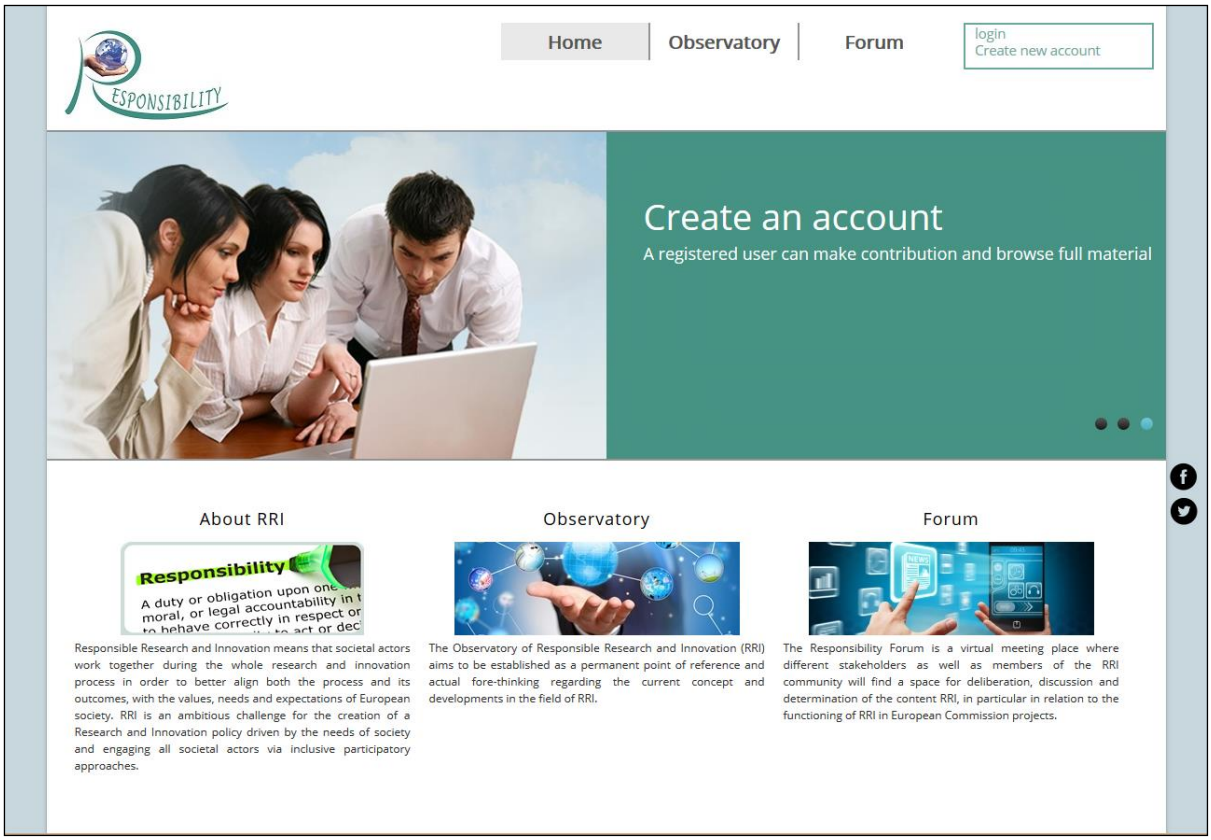

Figure 1.1: Start page for the platform

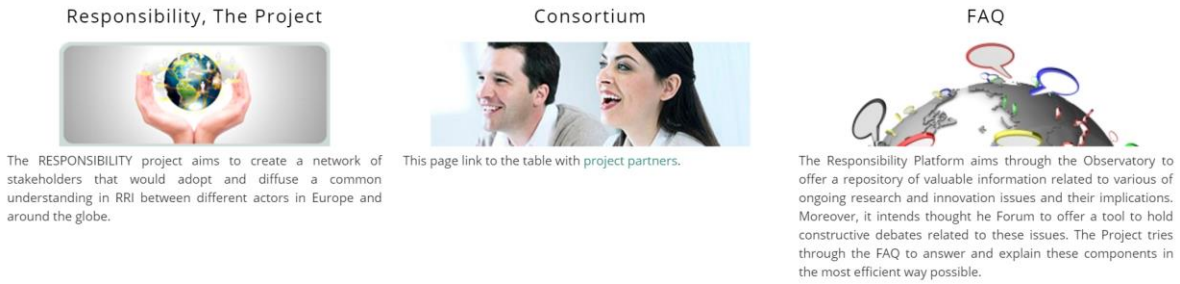

Figure 1.2: Fast access

Further down the page are links to other RRI related platforms in the UK and elsewhere. There are also links to other several other RRI Related Projects dating back to 2007

Link to Front Page	Country of the Source
Institute for Technology Assessment and Systems Analysis	Germany
Science and Innovation Programme of the Woodrow Wilson Center	United States
CSSC - Centre for Science, Society and Citizenship	Italy
Jerry Ravetz	United Kingdom
Woodrow Wilson International Center for Scholars	United States

« first ‹ previous 1 2 3 next › last »

RRI Related Projects

Projekt Website	Project Start	Body
ResAGorA Website	2013	The major goal of the Res-AGorA project (Responsible Research and Innovation in a Distributed Anticipatory Governance Frame. A Constructive Socio-normative Approach) is to develop a normative and comprehensive governance framework for Responsible Research and Innovation (RRI). This will be a contribution to the EU ambition of becoming a genuine Innovation Union by 2020 striving for excellent science, a competitive industry and a better society without compromising on sustainability goals as well as ethically acceptable and socially desirable conditions.
RESPONSIBILITY Project	2013	The goal of the RESPONSIBILITY project is to develop a virtual observatory for enhancing the interaction among research outcomes and policy making, making use of the full potential of scientific achievements to be incorporated in the policy development and implementation. Furthermore, it will articulate in plain language policy reports with specific outcomes and practical solutions.

Figure 1.3: Overview of RRI projects and platfroms

1.2 OBSERVATORY SCREEN: Using Information on the Observatory Page (not logged in)

While accessing the Observatory section of the platform, the Observatory item in the main menu will be highlighted to reflect this.

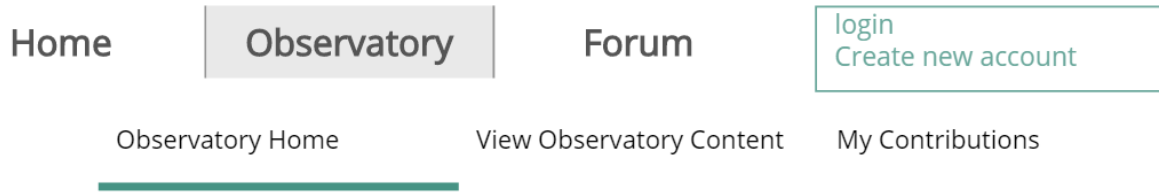

Figure 1.4: Main observatory menu

From this menu you can quickly access:

- Observatory Home Page
- Viewing Observatory Content
- Adding New Content to the Observatory
- Your own Contributions to the Conservatory

The Observatory page provides access to three distinct submenu options. The current option is indicated by a green underline. While in the Observatory section of the platform the Observatory sub-menu will be displayed beneath the main menu in the title area. This sub-menu can be used to navigate within the Observatory.

Observatory/ <u>Observatory Home</u> submenu contains:

Information items and links to other functions include:

Recent Observatory Content

This sidebar will show brief summaries of the most recent content added to the Observatory. Clicking on the title of an article will take you to the full page for the article

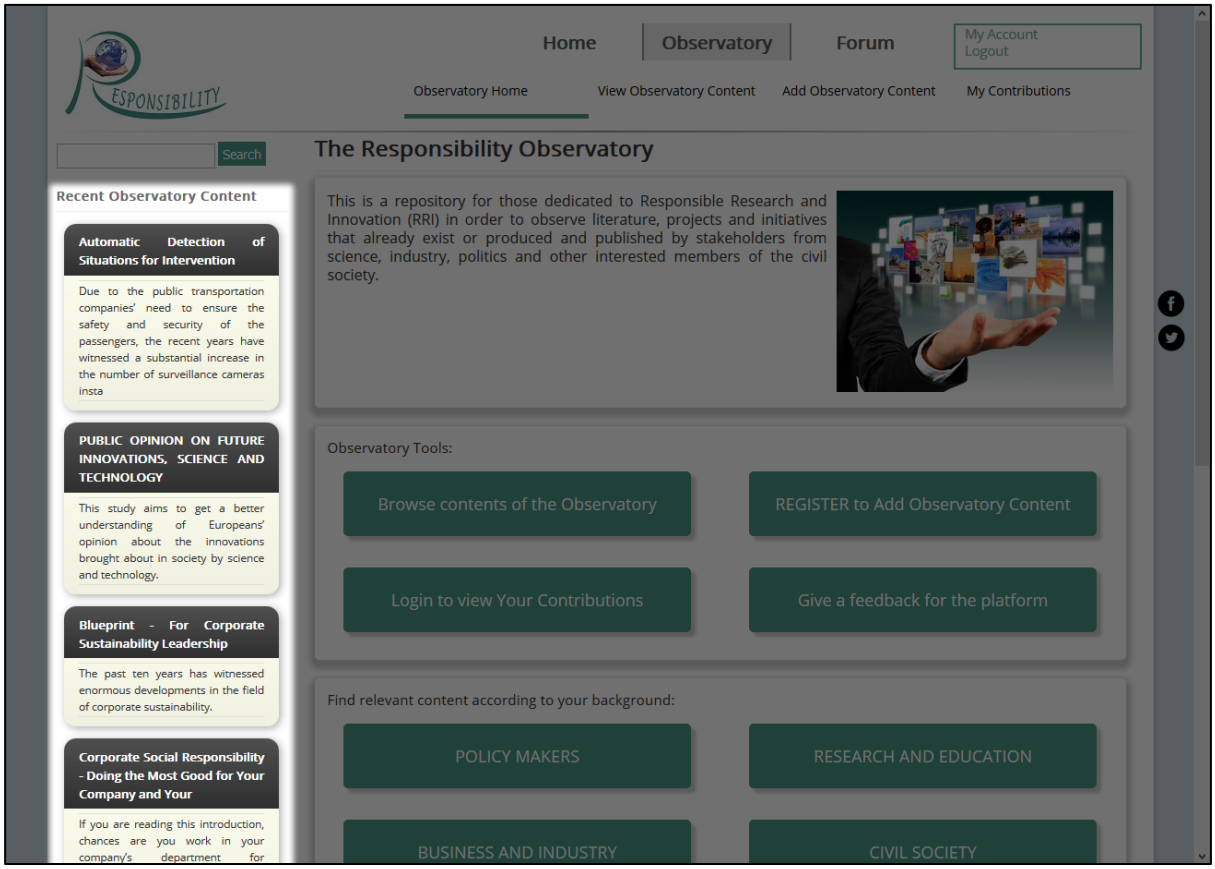

Figure 1.5: Recent Observatory content

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There is also brief information about the Observatory

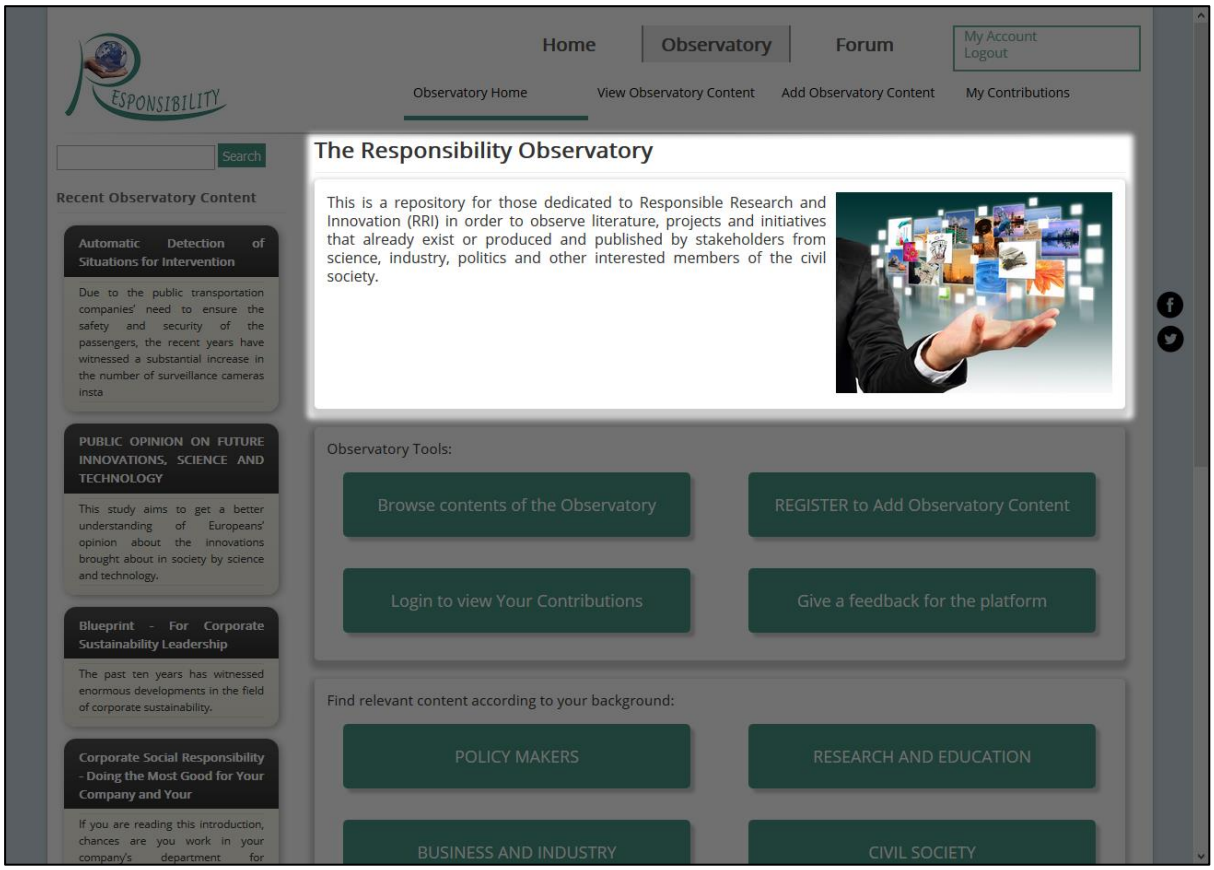

Figure 1.6: Brief information about the Observatory

And an Observatory User Guide; a detailed user guide is available by clicking

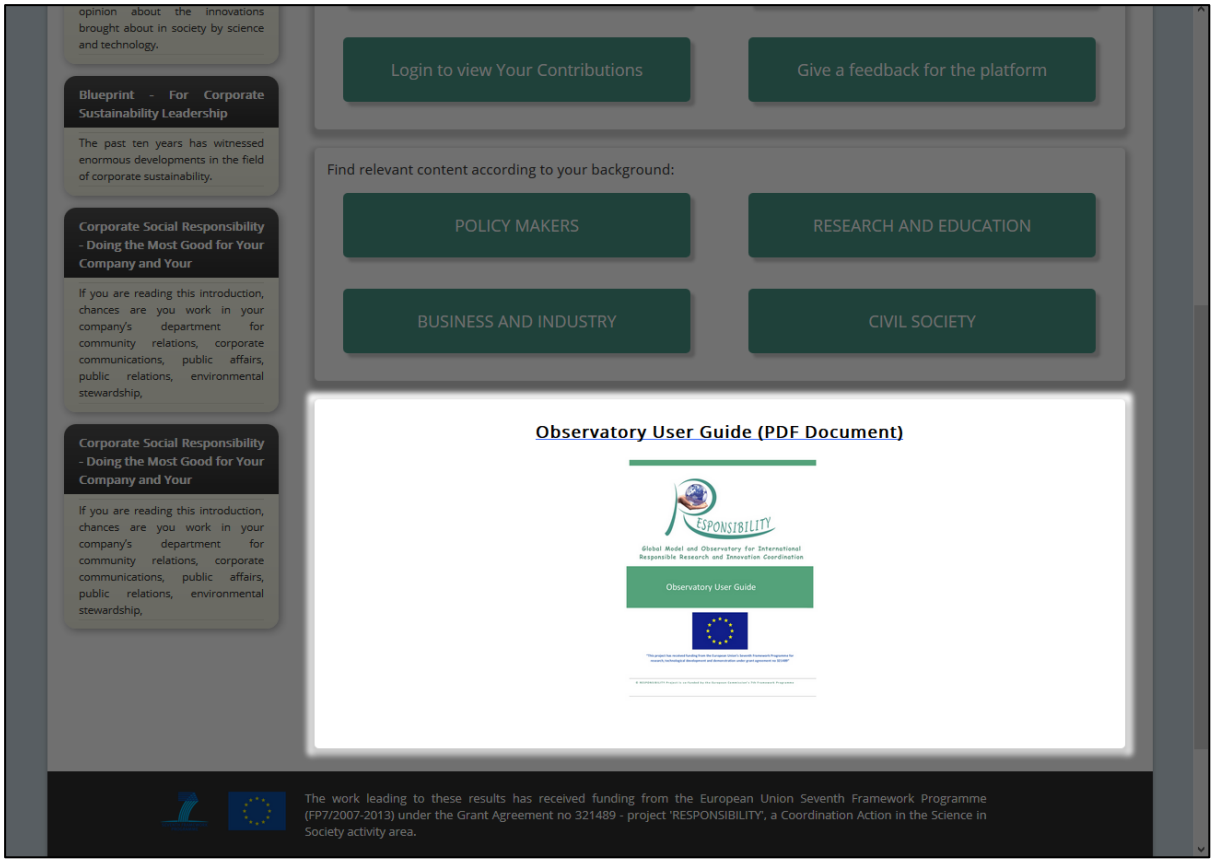

Figure 1.7: Observatory User Guide

This Observatory User Guide is a detailed description of how Observatory content is recorded and organised.

Observatory Home / Observatory tools

This section enables access to tools for browsing. Registration as a content provider, and platform feedback form (requires login)

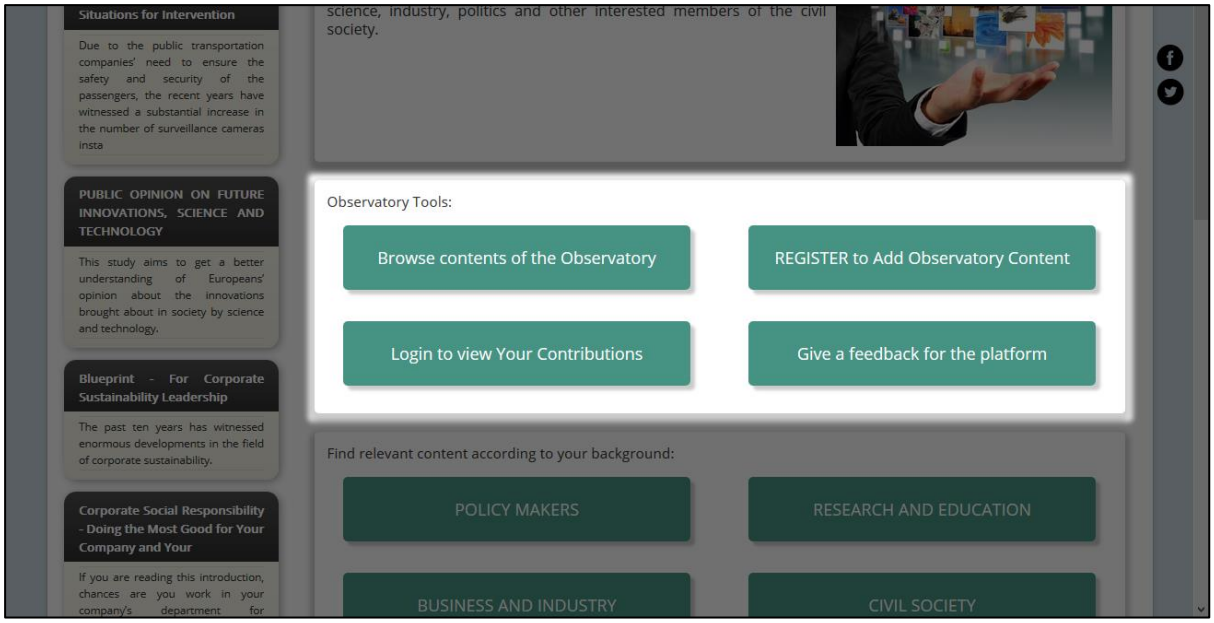

Figure 1.8: Observatory tools

Observatory Home / Search

The research can also search based on their background. The backgrounds include: maker, Business and Industry, Research and Education, Civil Society

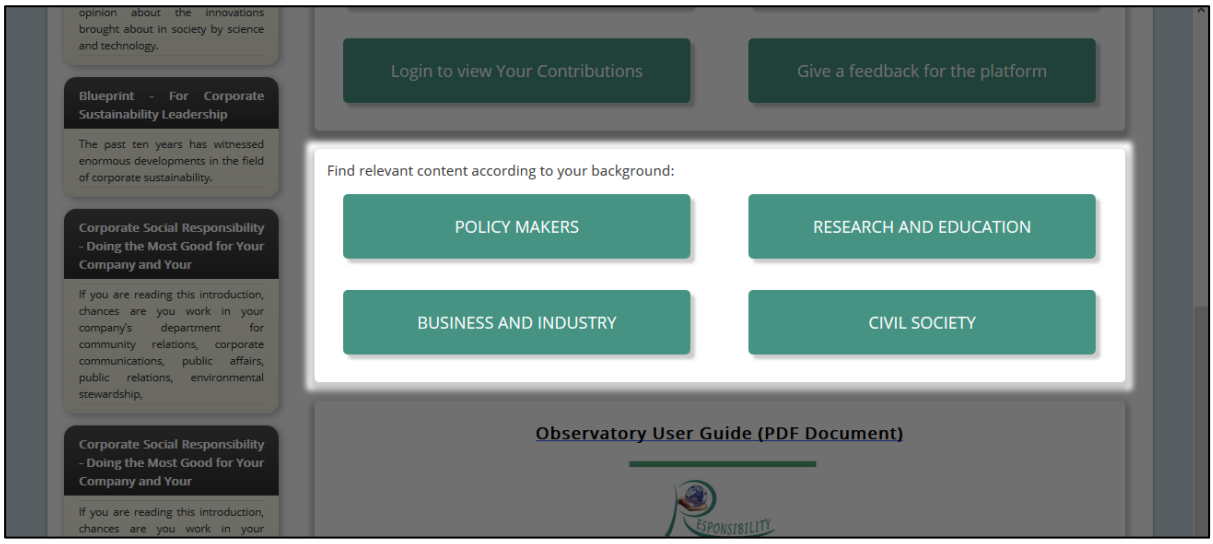

Figure 1.9: Observatory stakeholder categorized content

1.3 VIEW OBSERVATORY CONTENT

Select View Observatory Content to access

Figure 1.10: View Observatory content

Observatory > View observatory Content provides access via drop down menu to access a variety of RRI content.

Hovering cursor of View Observatory Content presents a drop down menu giving groups of categories.

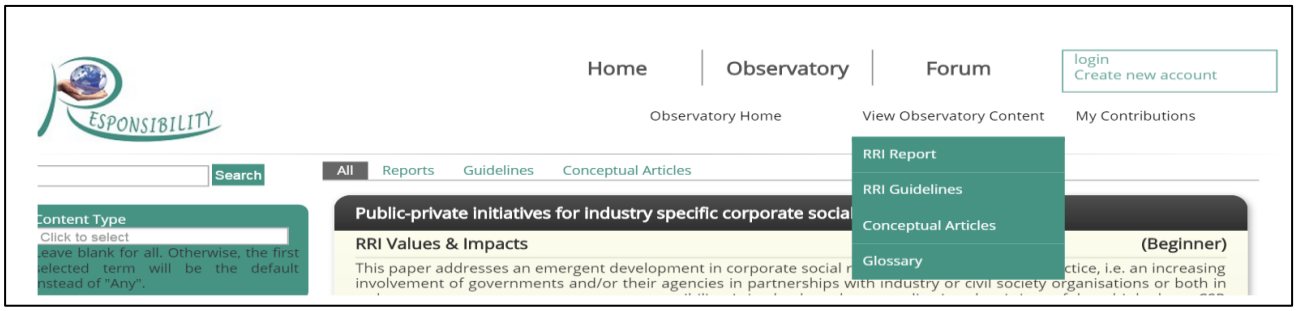

Figure 1.11: Observatory content first level categories.

Selecting **RRI REPORT** provides access to Case Studies and Technology Assessments

Figure 1.12: Observatory content second level categories

RRI REPORT: Case Studies

Cases studies are at different levels

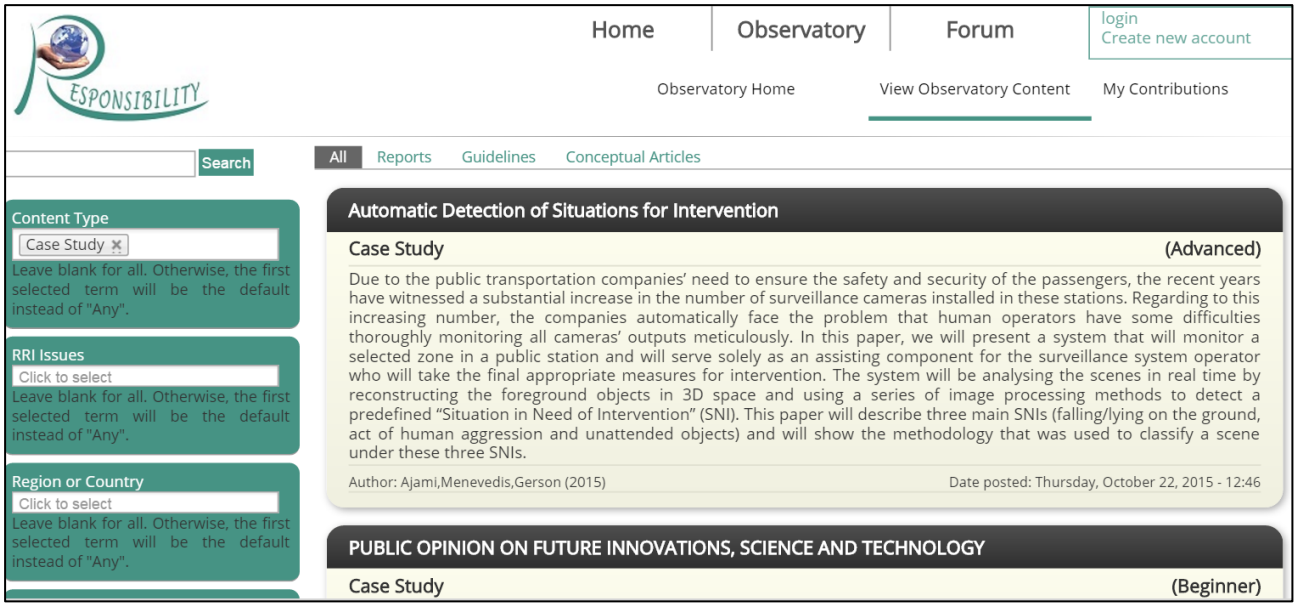

Figure 1.13: Cases studies overview

RRI REPORTS: Technology Assessment

The system also provides access to assessments of different technologies distinguished by type of technology and research level.

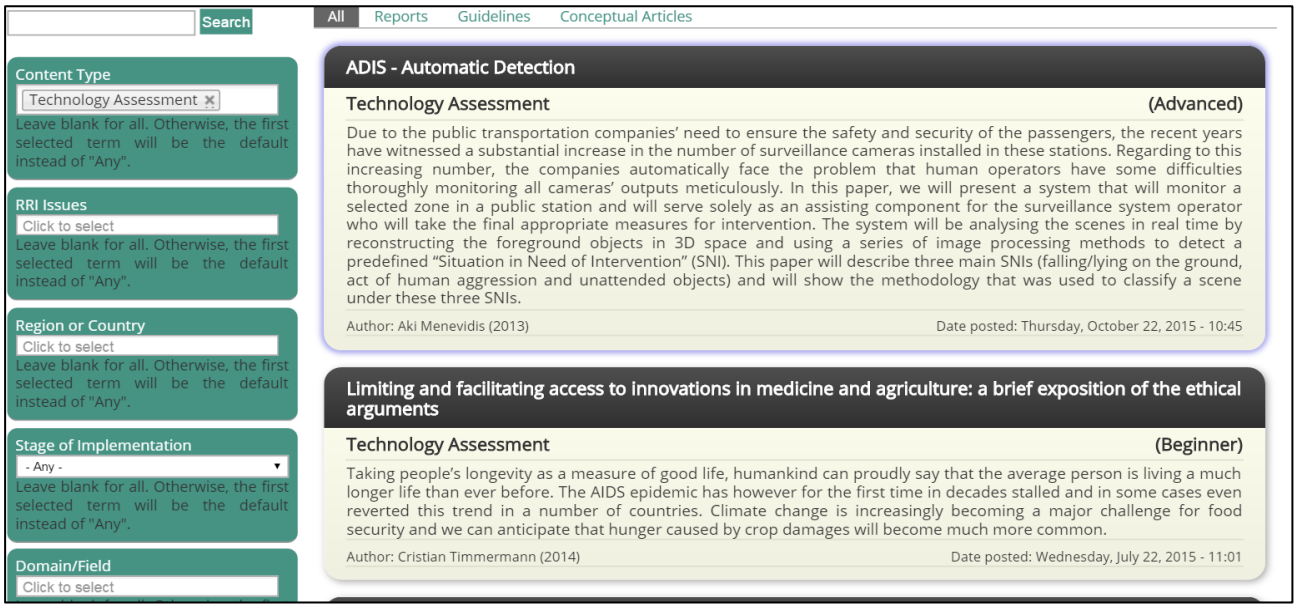

Figure 1.14: Technology Assessment overview

Selecting **RRI GUIDELINES** provides access to several RRI documents

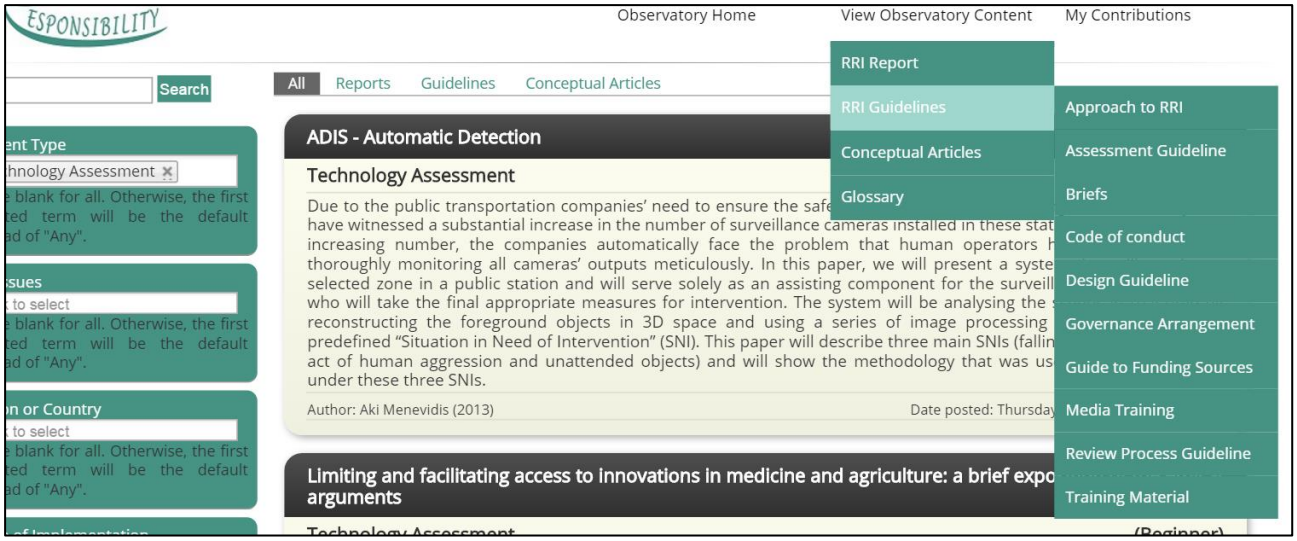

Figure 1.15: RRI Guidelines overview

RRI Guidelines provides access to several RRI Documents including:

- Approach to RRI containing examples of RRI practice in different domains.
- Assessment Guideline giving examples of how to do RRI assessment.
- Code of Conduct examples
- Design Guidelines for various Innovation research project
- Governance Arrangements
- Guide to Funding sources
- Media training
- Review process Guidelines
- Training Materials

Selecting **CONCEPTUAL ARTICLES** provides access to several documents about RRI and RRI Values

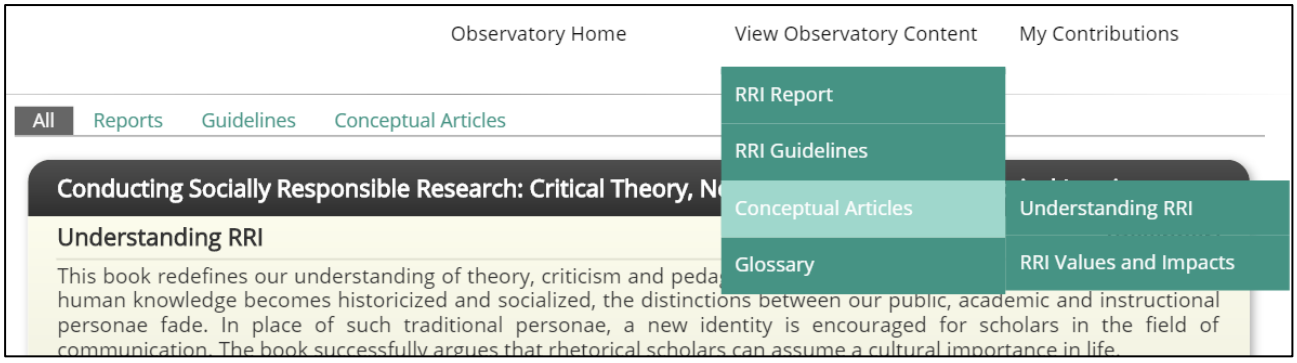

Figure 1.16: Conceptual Articles overview

Selecting **Glossary** provides access to the Common Glossary of RRI (see Annex)

Figure 1.17: Glossary

1.3.1 Observatory Functions Requiring Login

New Users Creating an Account

This can be done from the Login Box on the home screen or from the My Contributions sub-menu

Figure 1.18: Creating a new account

Creating an Account - New Users

The user must enter the following details to create an account.

- **Username** *
  Spaces are allowed; punctuation is not allowed except for periods, hyphens, apostrophes, and underscores. The user name must be unique on the system.
- **E-mail address** *
  A valid e-mail address. All e-mails from the system will be sent to this address. The e-mail address is not made public and will only be used if you wish to receive a new password or wish to receive certain news or notifications by e-mail.
  The email address must also be unique on the system and one email address cannot be associated with more than one account.
- **Surname** *
- **Name** *
- **Country** *
- **Contributor Status** *
- **Academic**
- **Health Care Organisation**
- **Industry Representative**
- **PhD Student**
- **Politician**

- **Representative of NGO/NPO**
- **Researcher**
- **Citizen**

Please select your current professional **Contributor Status** from the drop down list. This should be done in order for the other users to evaluate potential conflicts of interest.

- **Other Contributor Status**

Apart from that mandatory specifications for the Contributor Status above you are free to add a secondary description on your status.

- **Affiliation ***

Write down the name of the organization (choose the one suggested by the system or add a new one)

- **Domain/Field** has drop down list to select from
- **Ethical Responsible Issues** *

Please specify the domains you are interested in and flag those for which you consider yourself to be an expert and for which you are willing to get contacted by other users as an expert.

- **Agree to User Consent ***
  - Act as an expert
  - Act as a reviewer
  - Act as a moderator
  - Act as a governor
  - Receive the newsletter
  - Ask for a partnership via the partnership initiative page in the Forum
  - Sent a private message during a discussion in either an innovation café or a dynamic coalition.
- **CAPTCHA**

This question is for testing whether or not you are a human visitor and to prevent automated spam submissions.

If any required fields are not completed, then the page will be redisplayed with details of any errors or omissions listed clearly. In this event it is necessary to re-enter the password and confirmation.

AFTER filling the form press "Create a new account"

1.3.2 Logging in to the system

Login Box:

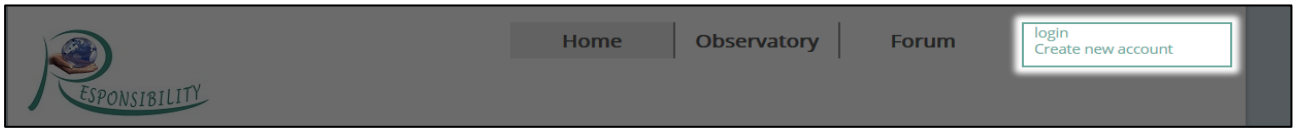

Figure 1.19: Login Box

When not logged in, this area will provide the following links for new users to create an account, or for existing users to log in. Once logged in this box will change to the following:

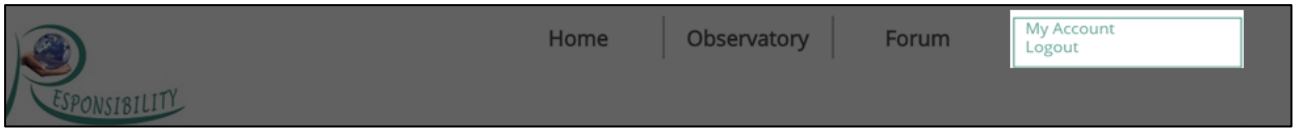

Figure 1.20: Once logged in shows a link to account and a Logout option

This allows the user to select a My Account to edit the details of their account on the platform, or log out of the platform.

Selecting Log In by presents the basic login screen

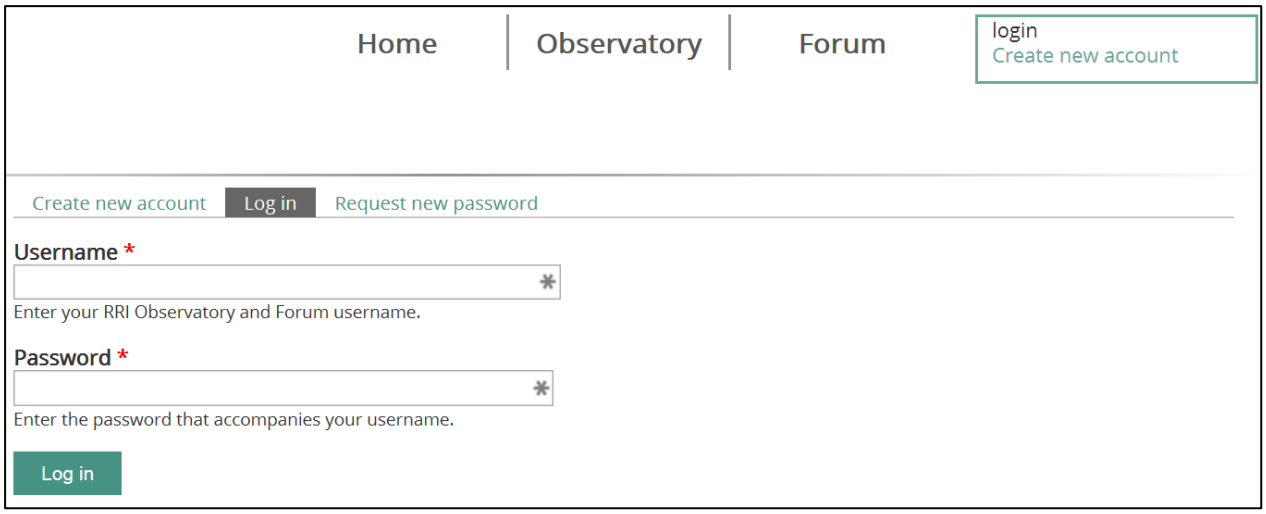

Figure 1.21: Logging in page

This page is used to enter your username and password. Simply enter the current details for the user and press enter or click the 'Log in' button.

If the username or password does not match the records, then the form will be redisplayed with a red border around the user name field. For security reasons the form will not specify if the user name is valid or not, merely that there was an error.

Requesting a New Password

If you do not recall your password, or the password is not accepted, then you can click on the 'Request new password' link at the top of the form. This will take you to the following form:

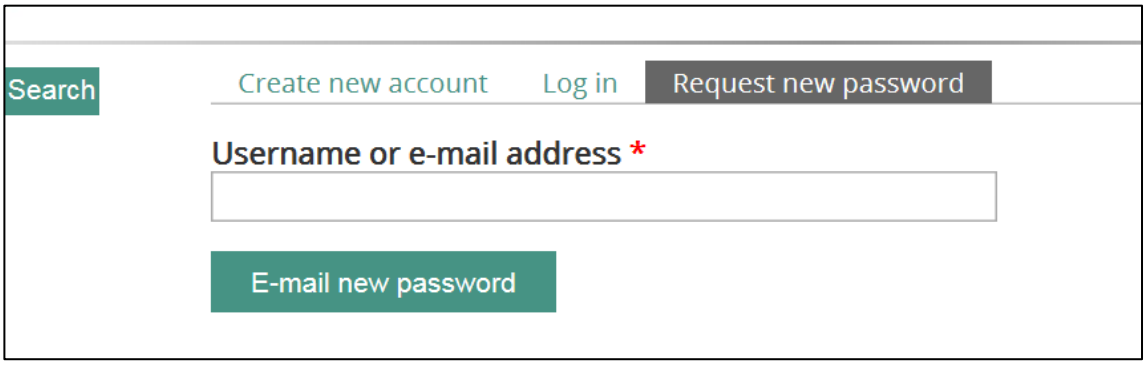

Figure 1.22: Requesting a new password

You can enter either your username or the email address associated with an account. This will cause a recovery message to be sent to the email address for that user. The message contains a link which will allow the user to log in without entering their username or password. This login will only work once, and is only valid for 24 hours after it has been requested.

After Logging In

When you have successfully entered correct user details you will be taken to the user summary page:

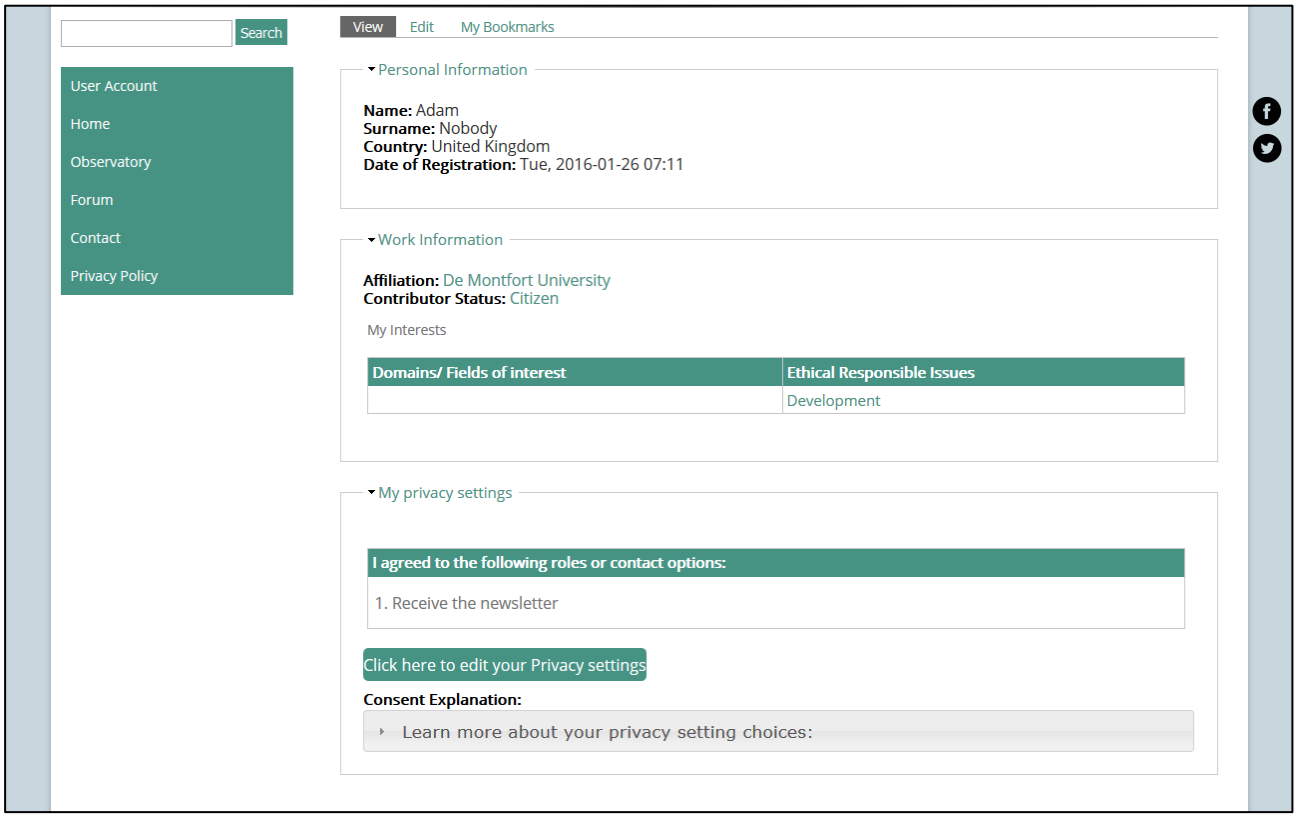

Figure 1.23: Profile page

This page displays a summary of the user's details.

Links at the top of the form can be used to edit the user details or view the user's bookmarks. The edit form is substantially the same as the form used when creating a new user.

The menu on the left can be used to quickly navigate to the following areas of the site:

- 'User Account' is the current page
- 'Home' is the home page of the platform
- 'Observatory' is the home page for the Observatory
- 'Forum' is the home page for the Forum.
- 'Contact' takes you to a form allowing you to send a message to the site administrators.
- 'Privacy Policy' is a page containing the complete privacy policy for the platform.

1.3.3 Adding Content to the Observatory

When you are logged into the system the Observatory screen displays an additional sub-menu option **Add Observatory Content**

Figure 1.24: Add Observatory content

You can access the forms for adding new content in a number of ways. From the Observatory home page you can click on the 'REGISTER to Add Observatory Content' in the Observatory Tools box. Alternatively from any page within the Observatory you can click on 'Add Observatory Content' in the Observatory Sub Menu in the title area of the screen. These will take you to the following screen for selecting content type to add.

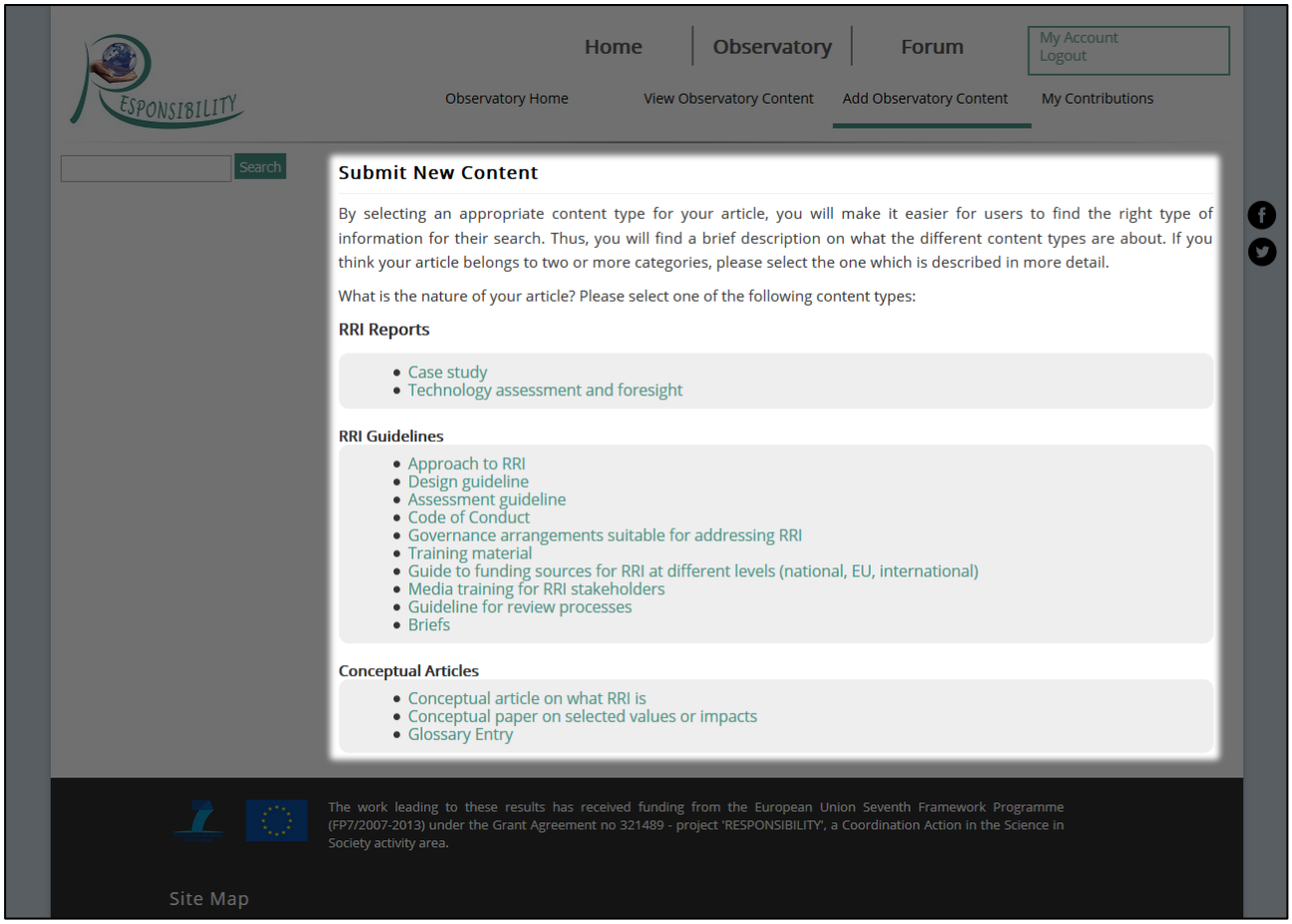

Figure 1.25: Submitting new content page

From here you can select the content type that you wish to add, taking you to the appropriate form. It is also possible to jump directly to the form for adding a specific content type using the popup submenus from the Observatory sub menu as shown below.

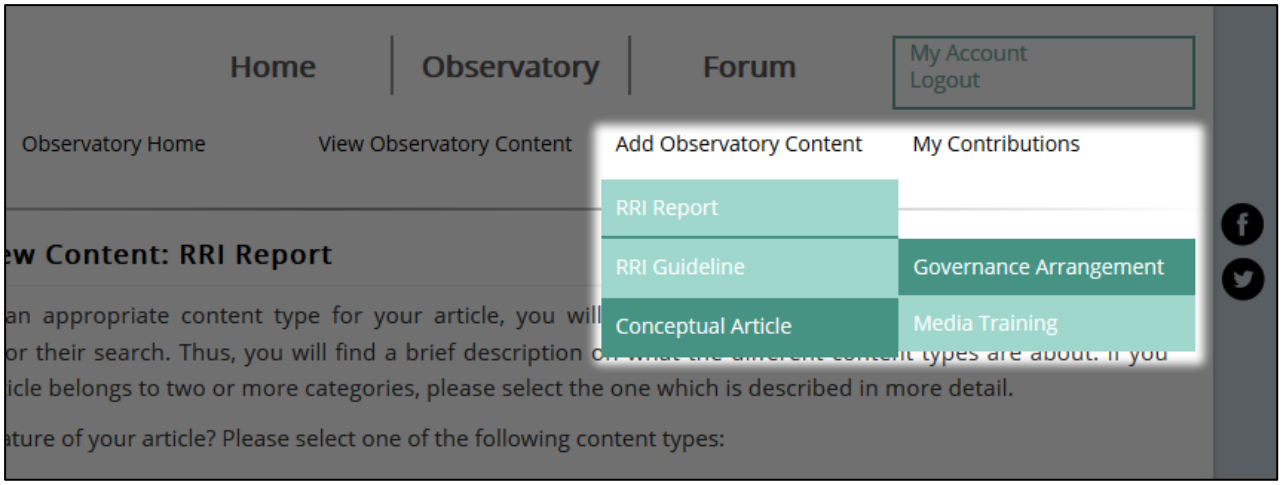

Figure 1.26: Adding new content in the menu

The forms for submitting new content to the Observatory are split into three primary areas.

The first section, titled 'About' is used to enter the initial data outlining the content to be added.

The 'Primary Document' section provides means to incorporate the actual document itself.

The 'Meta Data' section allows the contributor to specify in detail what subjects the document relates to. This data is vital for organising and searching the Observatory.

1. 'About' Section

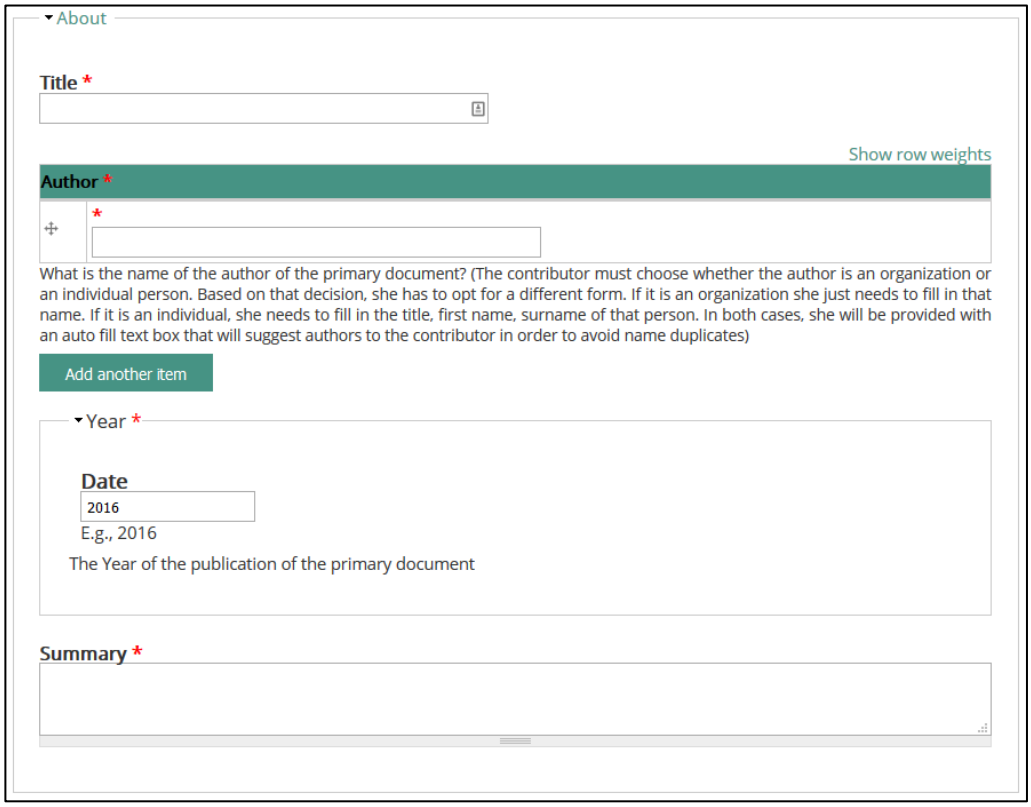

Figure 1.27: 'About' section

Title is the name by which the Observatory will refer to this piece of content.

Author is a field to enter the name of the author of the primary document. If there is more than one author then additional items can be added here.

Year is simply the year in which the primary document was published.

Summary allows the contributor to submit a brief synopsis of the primary document. This should be short and simple, consisting of one or two sentences.

2. 'Primary Document' Section

This section is used to provide access to the primary document. There are three methods of incorporating into the Observatory. Uploading, typing, and linking. It is vital to note that primary documents should only be shared in a manner that is authorised and acceptable to the author(s) and/or copyright holders.

- **Upload**

If the contributor has access to the primary document as a computer file, then the file can be uploaded to the platform. When 'Upload File(s)' is selected as Primary Document Type then the form will display controls for selecting and uploading files. Click on the 'Browse' button to select a file from the local file system, then click upload to submit this to the platform. Uploaded files can be downloaded by users of the platform to study the material.

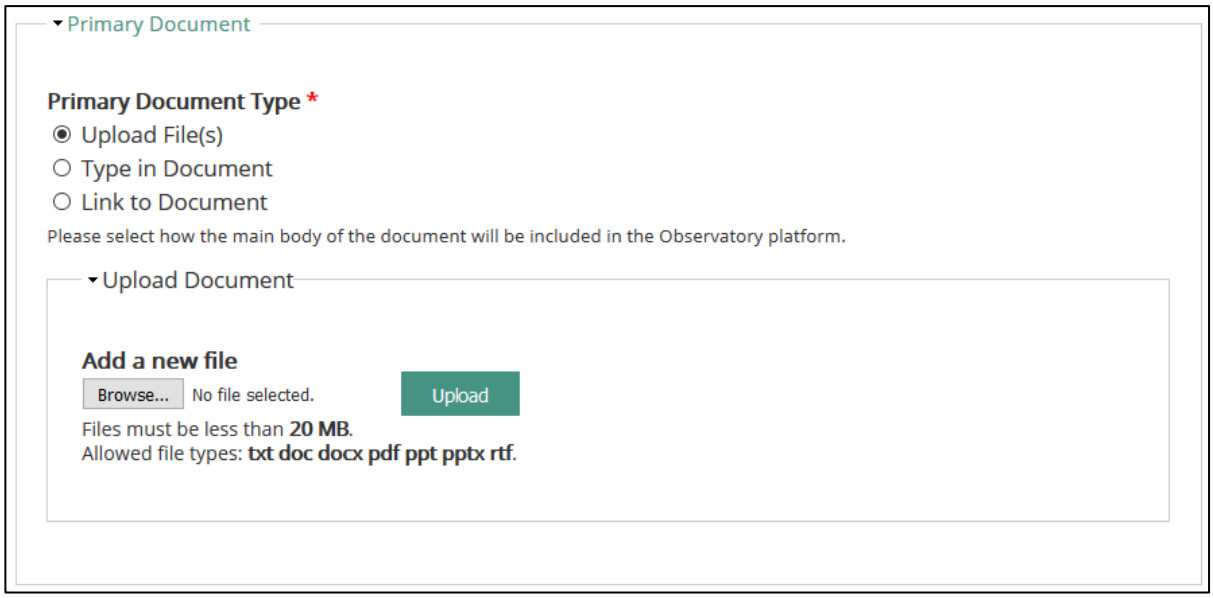

Figure 1.28: Choosing "Upload Files"

- **Type in Document**

If there is no alternative, then it is possible to either type in or cut and paste the content of the primary document for storage on the platform. This is done by means of a simple Rich Text Editor which is displayed when this option is selected for Primary Document Type.

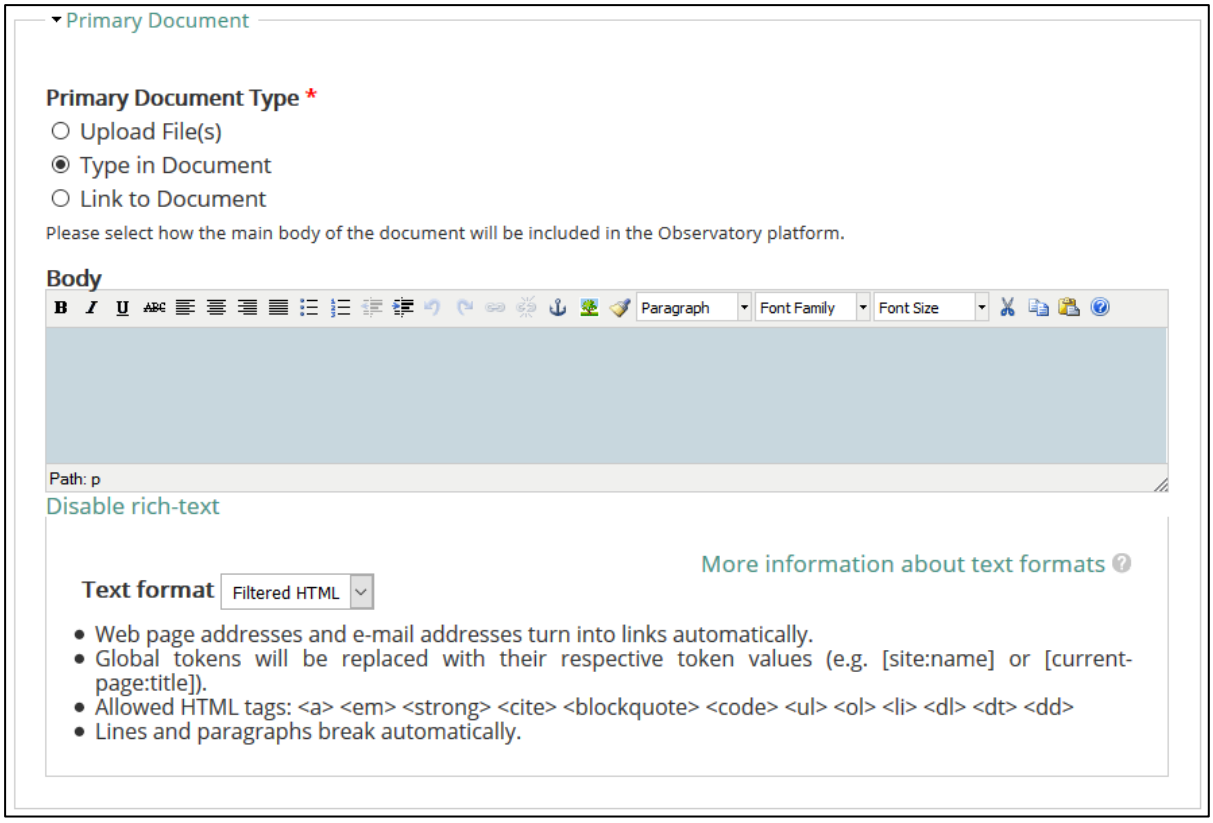

Figure 1.29: Choosing "Type in document"

- **Link to Document**

If the primary document exists as a web page at a fixed address, then the contributor can select to include a link to this address. When 'Link to Document' is selected for Primary Document Type then the contributor can enter the Title, which is the text displayed for the link, and the link (or URL) itself.

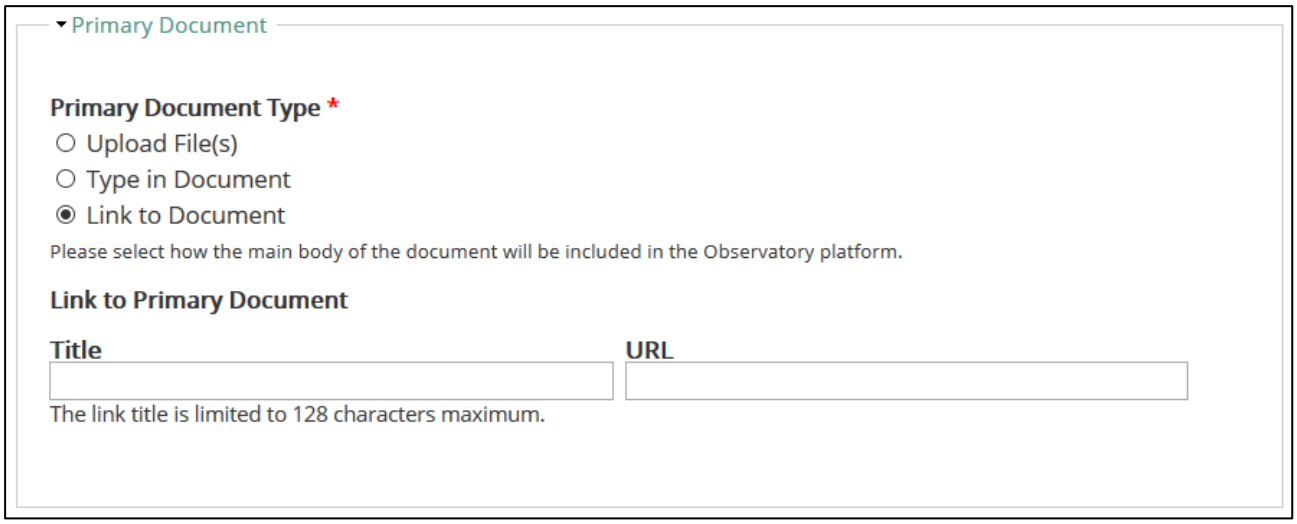

Figure 1.30: Choosing "Link to Document"

3. 'Meta Data' Section

This area allows the contributor to enter the details which define how the primary document relates to specific topics. These Meta Tags will vary somewhat between different content types. Details of these Meta Tags and their meanings are currently described in the Observatory User's Guide PDF, accessible from the Observatory home page.

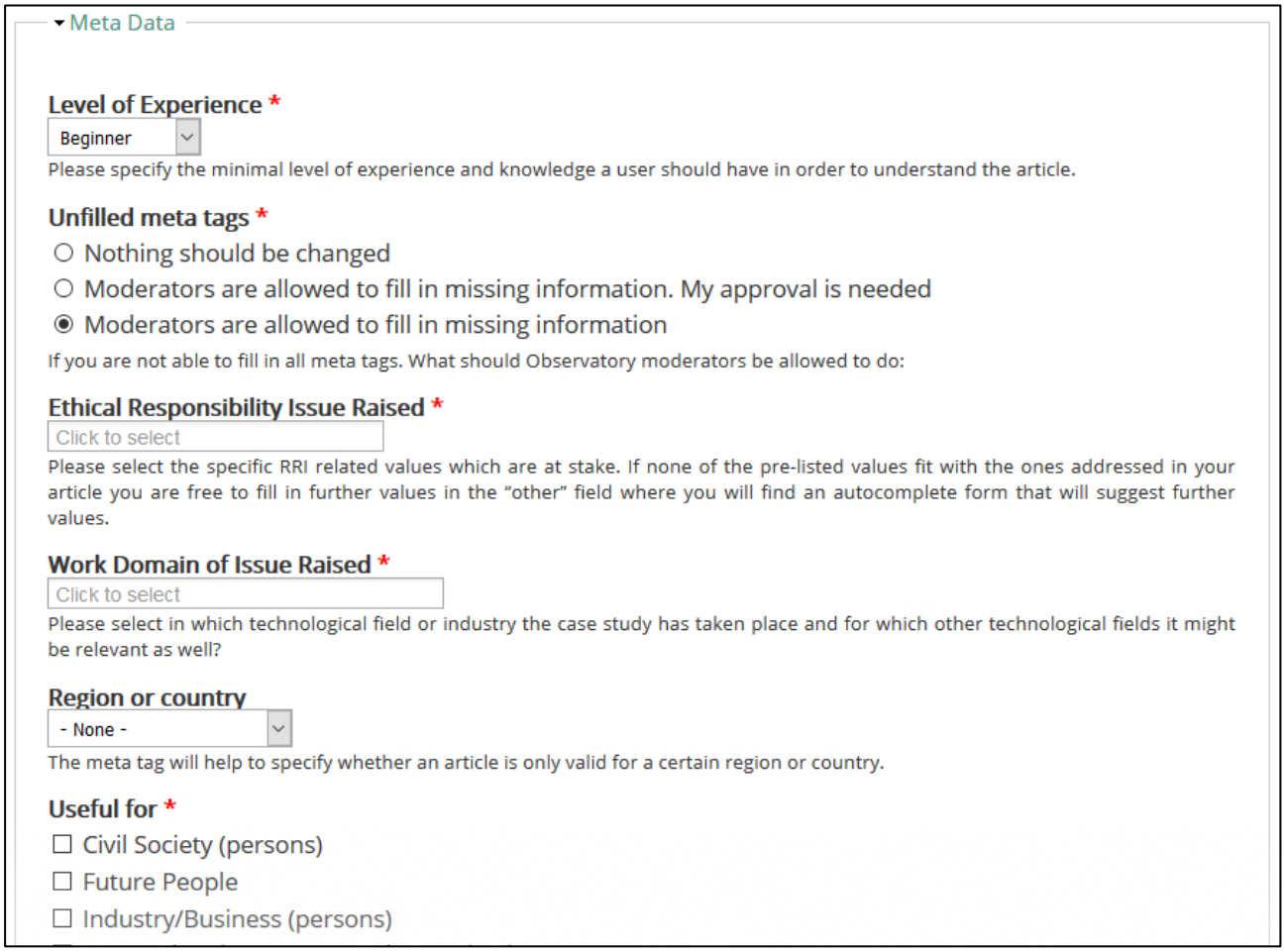

Figure 1.31: 'Meta Data' Section

1.3.4 Creating RRI Packages

The search and browse facility (http://observatory-rri.info/?q=obs/content) enables further fine-grained selection of relevant material from the database, including material that is not within the four pre-compiled packages.

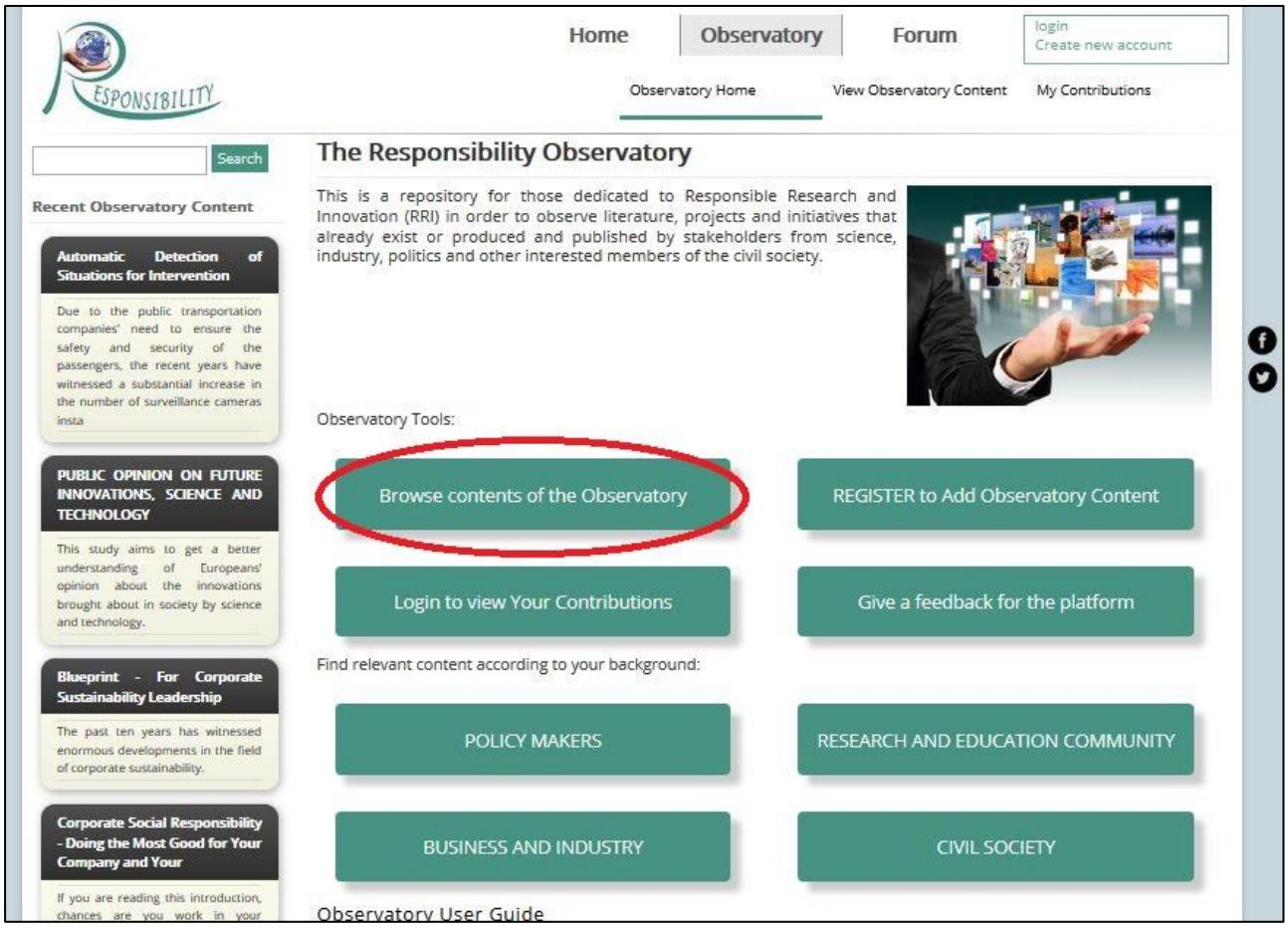

Figure 1.32: Browsing full content

In addition to the options of pre-compiled packages suitable for “Policy Makers”, “Research and Education Community”, “Business and Industry” and “Civil Society”, there are options accessible within the search facility to select suitability for “National Governments” “International Governmental Organizations” “Local Population” “Media” and “Future Persons”.

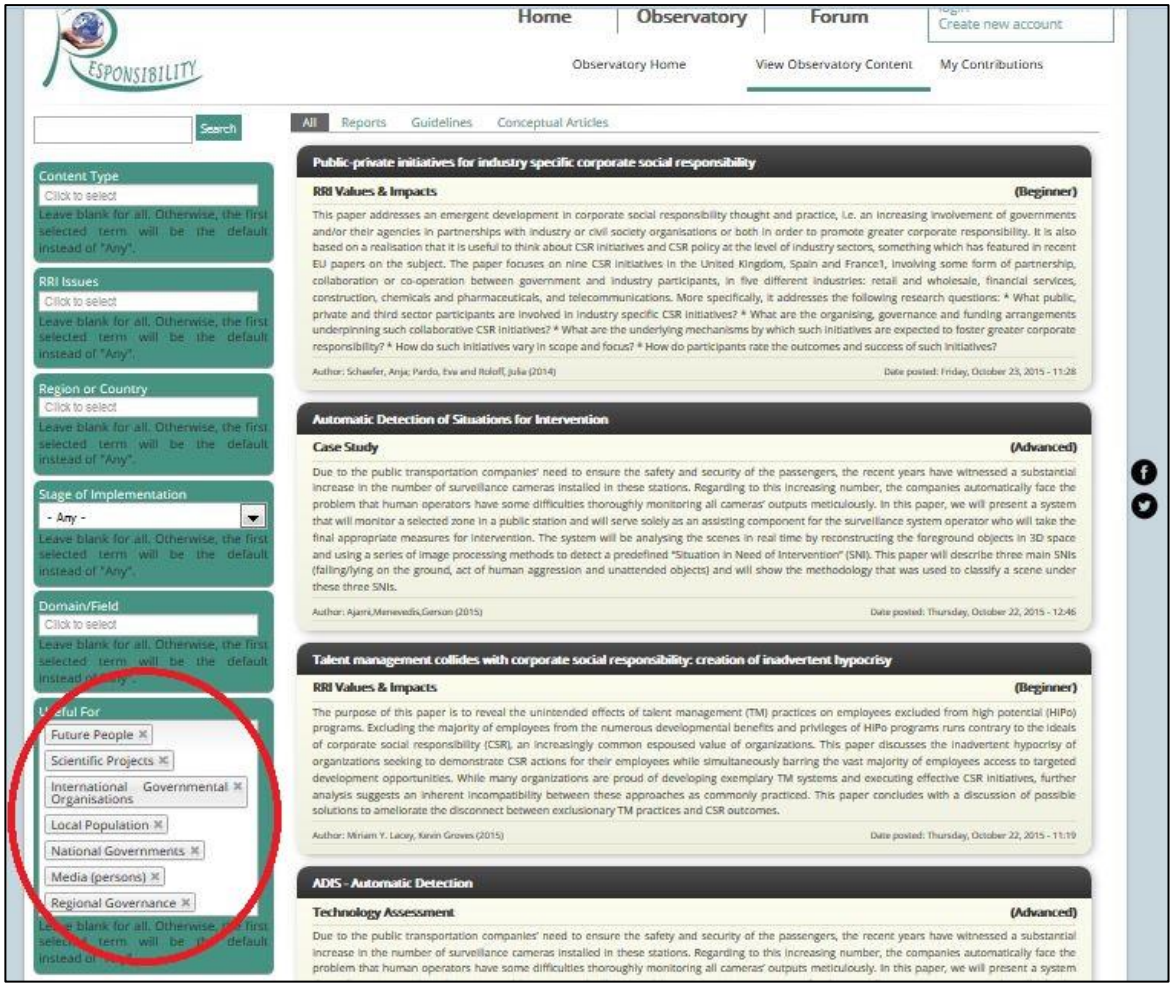

Figure 1.33: Refining full content

The same ranges of categories are available within these options as within the four pre-compiled packages. These fine-grained searches can be conducted by users without registering or logging in: however, there are advantages that accrue from logging in when it comes to self-complied packages.

The second element towards self-compiled packages is only available to logged-in users. Logged-in users are routinely presented with the option to 'bookmark' content, enabling users to collect a package for themselves that is more finely tuned to their needs and interests than any pre-compiled package or single set of search results could ever be. Removing 'bookmarking' is also an option available to users, so they can remove an item from their individual package (see Figure 1.34).

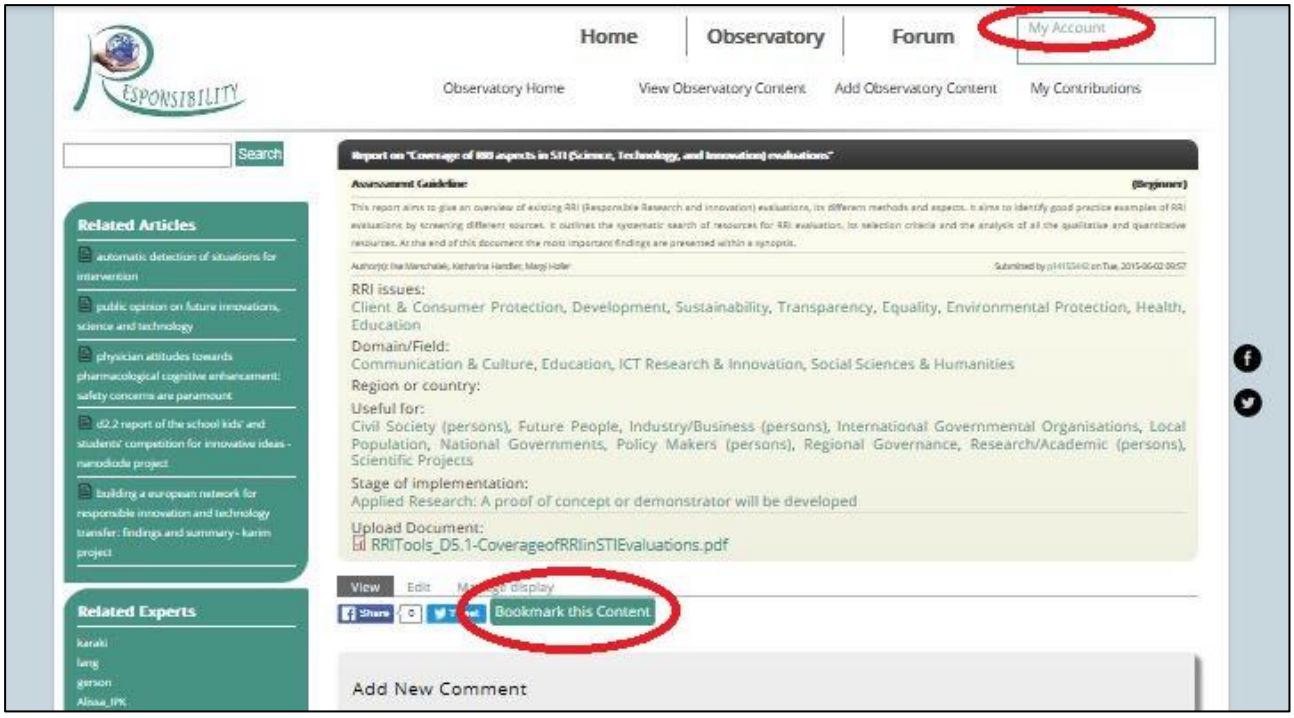

Figure 1.34: Bookmaking relevant content towards generating own packages

Bookmarked content can then be accessed by users by viewing their 'My Account' page, enabling users who have made use of the bookmarking facility to compile their own package to retrieve it (see Figure 1.35).

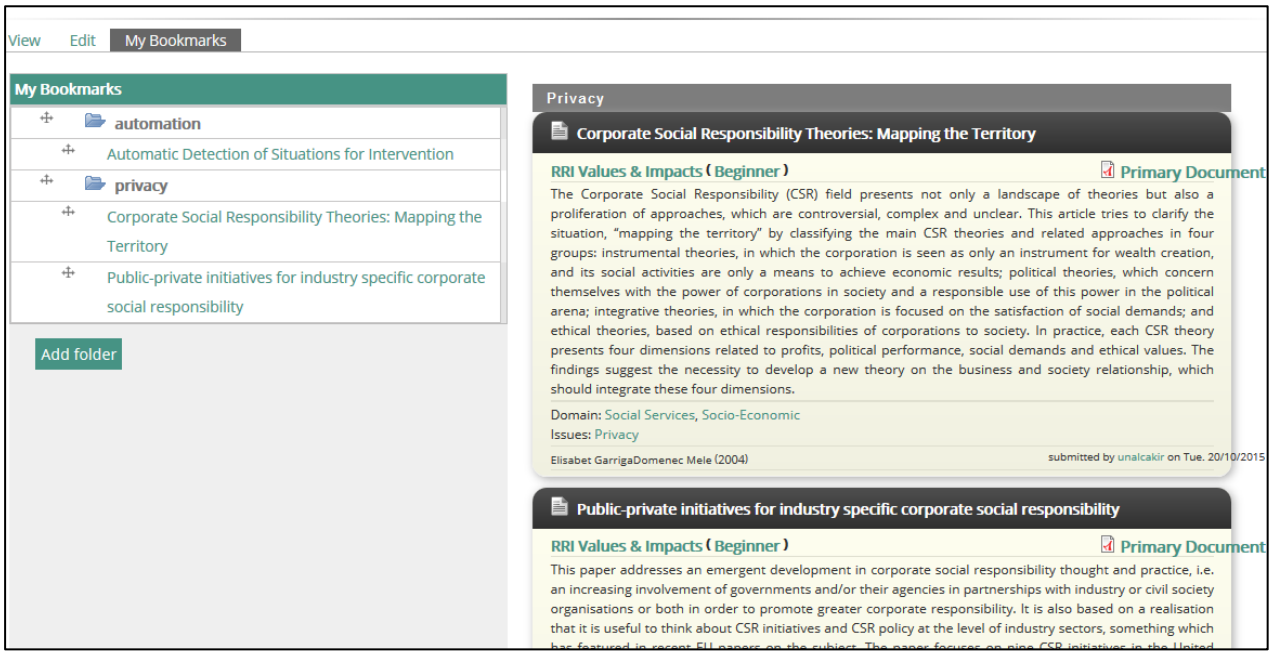

Figure 1.35: Setup and control your bookmarks in your account page

1.4 Appendix to the User Guide: Privacy Policy

1.4.1 Relevance of a Privacy Policy

This privacy policy is for this website http://observatory-rri.info and served by the RESPONSIBILITY project and governs the privacy of its users who choose to use it.

The policy sets out the different areas where user privacy is concerned and outlines the obligations & requirements of the users, the website and website owners. Furthermore the way this website processes, stores and protects user data and information will also be detailed within this policy.

This website and its owners take a proactive approach to user privacy and ensure the necessary steps are taken to protect the privacy of its users throughout their visiting experience. This website complies with all EU and national laws and requirements for user privacy.

You will always be informed on changes to this privacy policy by mail and as a registered user by an internal message that will appear in the information stream of your custom homepage. All changes will be highlighted.

1.4.2 Use of Cookies

Cookies are small files saved to the hard drive of the user's computer that track, save and store information about the users' interactions and usage of the website. This allows the website, through its server to provide the users with a tailored experience within this website.

This website will not set any cookies without your explicit consent.

This complies with recent legislation requirements for website's to obtain explicit consent from users before leaving behind or reading files such as cookies on a users' computer / device.

Customization Cookie:

This website will offer a customization cookie during registration. If the user decides to use it, the website will provide them with several customization features, including a custom homepage.

The following data will be stored in an encrypted way in the cookie:

- The name of the website the cookie was sent from which is http://tethys.eaprs.cse.dmu.ac.uk/rri
- The lifetime of the cookie which is 30 days and will be renewed whenever the user returns to the website
- A randomly generated unique number to identify the user and to provide the customization features

1.4.3 Google Analytics Cookie

This website uses Google Analytics to monitor its visitors to better understand how they use it. This software uses cookies to track visitor usage. The software will save a cookie to your computer's hard drive in order to track and monitor your engagement and usage of the

website but will not store, save or collect personal information. You can read Google's privacy policy here for further information [http://www.google.com/privacy.html]. The following data will be used for analytics by the operators of this website:

1- Visits / Session: This count represents the times our website was visited by an individual.
2- Unique Visitors: This count represents how many individuals actually visited our website.
3- Page views: Page views as the name itself suggests is the number of pages people have viewed during their visit to our website.
4- Pages/Visit: Pages/visit is actually the average number of pages viewed by people during their visit to our website.
5- Bounce Rate: This is one of the most important parameters to be considered in order to improve a website.
6- New Visits: This parameter is also an important parameter to be considered.
7- Other features: Apart from Visits, Page views and bounce rate, there are more reports/visualizations which can help us to determine if our website is being visited often and from where are the audiences.

Based on these data the following statistics will be calculated:

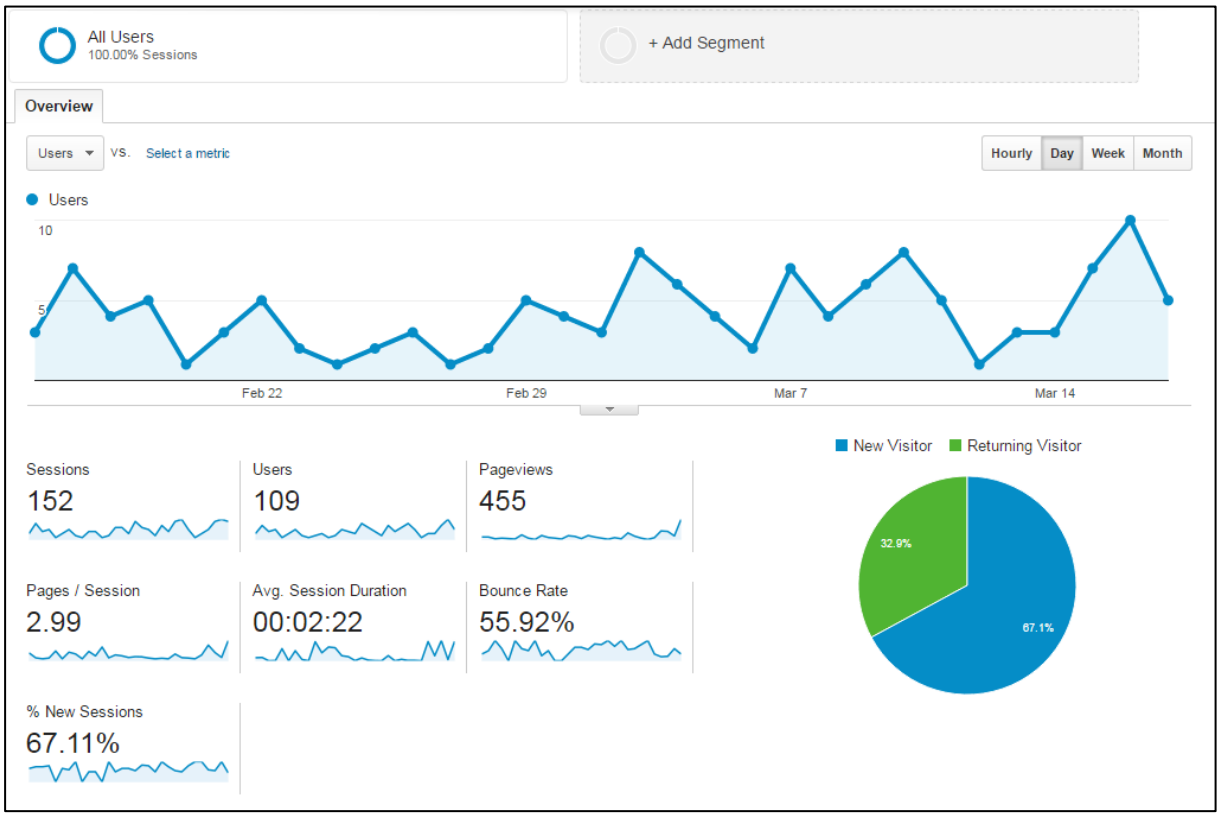

Figure 1.36: A recent Google Analytics statistic for a period between February-March

1.4.4 Data Storage

Your personal information is kept private, stored securely all the time and no data will ever be passed on or sold to any third party. The data will be stored only until either the user decides to delete the respective data or its entire account or if the user has not returned to the website for more than 1 year. After 1 year a reminder will be send to the user that its account and all data will be deleted in three months' time if she will not log in until then. There will be a final reminder one week before the end of this three month period. Thereafter all data and the account and all its data will be deleted.

Although we take all necessary actions to protect your privacy users contacting this website and/or its owners do so at their own discretion and provide any such personal details requested at their own risk.

1.4.5 Contact & Communication

The website will keep the email address of its users confidential all the time and it will not sell or relay it to any third party.

Your email address will only be used to:

- Send you administrative messages like login in confirmation mails and changes to the terms of use or the privacy policy
- Send you content notifications that you have explicitly specified and requested in advance
- Send you Forum notifications that you have explicitly specified and requested in advance
- Send you notifications of messages other user have send to you via the internal website communication system that is not using your email address. With these notification messages the content of the respective message will be forwarded to the user. The user will receive these messages only if she has explicitly given her consent in advance.
- Send you the websites newsletter, if you have explicitly given your consent
- Every effort has been made to ensure a safe and secure form to email submission process but we advise users using such a form to email processes that they do so at their own risk.

1.4.6 Email Newsletter

This website operates an email newsletter program, used to inform subscribers about products and services supplied by this website. Users can subscribe through an online automated process should they wish to do so but do so at their own discretion. Subscriptions are taken in compliance with UK Spam Laws detailed in the Privacy and Electronic Communications Regulations 2003. All personal details relating to subscriptions are held securely and in accordance with the Data Protection Act 1998. No personal details are passed on to third parties nor shared with companies / people outside of the company that operates this website. Under the Data Protection Act 1998 you may request a copy of personal information held about you by this website's email newsletter program. A small fee will be payable if you want this data in a written form. If you would like a copy of the information held on you please write to the business address at the bottom of this policy. If you do not need a printed copy you can always see all data that is stored about you in your personal profile page.

The email newsletter will not contain any tracking facilities.

In compliance with UK Spam Laws and the Privacy and Electronic Communications Regulations 2003 subscribers are given the opportunity to unsubscribe at any time through an automated system. This process is detailed at the footer of the newsletter.

1.4.7 External Links

Although this website only looks to include quality, safe and relevant external links users should always adopt a policy of caution before clicking any external web links mentioned throughout this website.

The owners of this website cannot guarantee or verify the contents of any externally linked website despite their best efforts. Users should therefore note they click on external links at their own risk and this website and its owners cannot be held liable for any damages or implications caused by visiting any external links mentioned.

1.4.8 Adverts and Sponsored Links

This website will not contain adverts, but it will contain links to the sponsors of the website. However no personal data will be passed over to our sponsors.

Clicking on any such a sponsor link will send you to the sponsor's website through a referral program which may use cookies and will track the number of referrals sent from this website. This may include the use of cookies which may in turn be saved on your computer's hard drive. Users should therefore note they click on sponsored external links at their own risk and this website and its owners cannot be held liable for any damages or implications caused by visiting any external links mentioned.

1.4.9 Social Media Platforms

Communication, engagement and actions taken through external social media platforms that this website and its owners participate on are custom to the terms and conditions as well as the privacy policies held with each social media platform respectively.

Users are advised to use social media platforms wisely and communicate / engage upon them with due care and caution in regard to their own privacy and personal details. This website nor its owners will never ask for personal or sensitive information through social media platforms and encourages users wishing to discuss sensitive details to contact them through primary communication channels such as by telephone or email.

This website may use social sharing buttons which help share web content directly from web pages to the social media platform in question. Users are advised before using such social sharing buttons that they do so at their own discretion and note that the social media platform may track and save your request to share a web page respectively through your social media platform account. In order to use a social share button you need to activate it first. That way automatic data retrieval via the respective social media widget will be avoided.

This website and its owners through their social media platform accounts may share web links to relevant web pages. By default some social media platforms shorten lengthy URL's [web addresses].

Users are advised to take caution and good judgement before clicking any shortened URL's published on social media platforms by this website and its owners. Despite the best efforts to ensure only genuine URL's are published, many social media platforms are prone to spam and hacking and therefore this website and its owners cannot be held liable for any damages or implications caused by visiting any shortened links.

2 Technical Manual: Updating Drupal Core and Modules.

The process of updating the Drupal core or individual modules is fundamentally a 4 stage process:

1. Firstly checking to see if any updates are available.
2. Secondly backing up existing files.
3. Thirdly replacing the old files with the new files.
4. Finally telling Drupal to update itself.

The above four stages form the basic outline although additional steps exist as outlined below. When you have updates available and are preparing to go through with the update it is advisable to create a working folder for performing the update. For example 'Drupal Updates\2015-09-03'. Within this folder create two new folders, 'new' and old'. The 'old' folder will be used to download a backup of the existing files and the new folder will contain files for any updates. It is best to carry out this task when the site is least busy to avoid affecting users.

2.1 Check for Updates

Check for Updates is done as following:

1. Log into the web site using an administrator account.
2. Go to 'Reports' in the admin menu at the top of the page and click on 'Available Updates'.
3. Click on 'Check Manually' which is located at the end of the 'Last Updated' line near the top of the page. This process usually takes a few minutes so can be left to run while doing other tasks.
4. Once this has completed you can scroll down the page to see the status of the Drupal core and all of the modules. Up to date files are shown in green. Anything with an available update will be clearly marked with a different colour and a warning icon.

Normal updates are not urgent and can be left to be done in a batch when convenient. Security updates should always be done as soon as possible to reduce the window of opportunity for exploitation.

To download the files for an update you should go to the Release Notes page for the update. Do not use the 'Download' links provided as the file downloaded is in a format not easily recognised by Windows. On the release note pages scroll down to where the recommended releases are displayed in green. Select the 'zip' link next to the latest 7.xx version of the update (as we are using Drupal version 7). This will download a zip file containing the update files which can be unpacked into the 'new' folder that you are using. You should download the files for all available updates on the report page.

2.2 Backup Old Files

To backup old files you have to:

1. Connect to the web site using FTP (Appendix 1).
2. Download the latest database backup (A2.1) into the 'old' folder.
3. If you are updating the Drupal Core then back this up as described in A2.2. Alternatively you could backup the entire site (A2.8).

For each module being updated (if any) back these up as described in A2.5.

2.3 Upload New Files

IMPORTANT Before continuing you should put the site into maintenance mode (A3.1).

When updating the Drupal Core you should first delete the existing Drupal Core files (A2.3).

You can then upload the new files for Drupal Core which you downloaded earlier (A2.4).

For each module being updated you should delete the existing copy of that module on the server (A2.6).

You can then upload the new files for each module (A2.7).

2.4 Force Drupal to Update

Open your browser and go to 'http://observatory-rri.info/update.php'.

Select the 'Continue' button.

The server will then scan through all of the updated files and ensure that they are properly integrated. Once this has completed successfully you can take the site out of maintenance mode (A3.1).

2.5 Appendices to the Technical Manual

2.5.1 Appendix 1: Connecting to the server using FTP software

2.5.1.1 Setting up the FTP Client

FTP stands for File Transfer Protocol. This is a method of communicating between 2 computers to allow the transfer of files. The machine which runs the web site server (an HTTP server) also runs an FTP server. Administrators can use an FTP client to connect to this server, allowing them to upload, download, move and delete files on the server machine. I have used the FileZilla FTP software, but any FTP client will do the same job.

When first running the FTP client you will need to set up the details of the server to which we need to connect. For FileZilla select 'File' from the menu, then select 'Site Manager'. This brings up a dialog box where the user can manage a list of servers to which they wish to connect.

Press the 'New Site' button and a new item will appear in the tree view on the left. The name will initially be 'New Site' but you can type your own name at this point (this name can be anything the user desires). You must now enter the following details on the right hand side:

Host:	'tethys.eaprs.cse.dmu.ac.uk'
Protocol:	'SFTP'
Logon Type:	'Ask for password'
User:	'ccsr'

Now select the 'Connect' button and the software will attempt to connect to the server. Enter the password when asked. On your first connection there will be an advisory warning regarding the identity of the server. For the purposes of this document it is safe to assume that we can accept that we trust the server.

2.5.1.2 Reconnecting to the server

After this initial set up you can reconnect to the server by running FileZilla, selecting the Site Manager, and then selecting the site by name in the tree view then clicking connect again. Alternatively there is a shortcut button for the Site Manager in the toolbar. This icon has a downwards arrow next to it which will display a list of sites. Selecting a site from this list will begin a connection.

2.5.1.3 Navigating the files on the server

When connected FileZilla shows two tree & file views. The left hand side displays a view of files on the local machine, while the right hand side shows files on the server. You can navigate these files in very much the same manner as you do with Windows File Explorer.

2.5.1.4 Location of files on the server

Each time you connect to the server your right hand panel will show the contents of the home directory for the ccsr user ('/home/ccsr').

The database backup files are stored in a sub folder of this directory 'script/backup_drupal'.

The files for the web site (drupal core and modules) are stored /var/www/rri. Inside this directory everything except the 'sites' folder is considered the drupal core. The files for individual modules are under 'sites/all/modules'.

2.5.2 Appendix 2: FTP Tasks

A2.1: Download Database Backup

- On the left panel (local files) navigate to the folder where you wish to download the files.
- On the right panel (server files) navigate to 'scripts/backup_drupal'.
- Select the latest file (the date is included in the file names).
- Right click on the file and select ‘Download’.

A2.2: Download Drupal Core

- On the left panel (local files) navigate to the folder where you wish to download the files.
- In FileZilla, on the right panel (server files) navigate to '/var/www/rri'.
- Select the all folders *except* the 'sites' folder.
- Right click on any of the selected files and select ‘Download’.

A2.3: Delete Drupal Core

- In FileZilla, on the right panel (server files) navigate to '/var/www/rri'.
- Select the all folders *except* the 'sites' folder then press the ‘delete’ key.

A2.4: Upload new Drupal Core

- In FileZilla, on the right panel (server files) navigate to '/var/www/rri'.
- On the left panel (local files) navigate to the 'new\drupal-7.xx' folder.
- Select the all folders *except* the 'sites' folder.
- Right click on the file and select ‘Upload’.

A2.5: Download Module Files

- On the left panel (local files) navigate to the folder where you wish to download the files.
- On the right panel (server files) navigate to '/var/www/rri/sites/all/modules'.
- Select the folder for the relevant module.
- Right click on the folder and select 'Download'.

A2.6: Delete Module Files

- On the right panel (server files) navigate to '/var/www/rri/sites/all/modules'.
- Select the folder for the relevant module.
- Right click on the folder and press the 'delete' key.

A2.7 Upload Module Files

- In FileZilla, on the right panel (server files) navigate to '/var/www/rri/sites/all/modules '.
- On the left panel (local files) navigate to the location of the new (unzipped) module folder.
- Right click on the folder and select 'Upload'.

A2.8: Download Complete Site

- On the left panel (local files) navigate to the folder where you wish to download the files.
- On the right panel (server files) navigate to '/var/www'.
- Select the folder 'rri' and double click (or drag it onto the left hand side) to download.

2.5.3 Appendix 3. Other Tasks

A3.1 Set Maintenance Mode on/off

- Log into the site as an administrator.
- In the admin menu go to 'Configuration', 'Development', 'Maintenance Mode'
- Select or deselect the check box for 'put the site into maintenance mode'.
- Select the 'Save configuration' button.

3 Annex to the Observatory Handbook: Common Glossary

The aim of the Common Glossary RESPONSIBILITY is to merge other glossaries or terms that have been explained in footnotes in deliverables from the other projects to a joint document "Common Glossary of RRI". This Common Glossary has been inserted in the Observatory in a structured alphabetically categorized manner[1].

3.1 Accountability

Accountability" stems from late Latin accomptare (to account), a prefixed form of computare (to calculate), which in turn derived from putare (to reckon). Refers to a principal-agent relationship in which an individual, group or other entity makes demands on an agent to report on his or her activities, and has the ability to impose costs on the agent (M. Weber. Politics as a Vocation. Philadelphia: Fortress Press 1921/1980) "Acknowledging responsibility for actions and outcomes."

References

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2. A.M.Goetz, R. Jenkins, 'Voice, Accountability and Human Development: The Emergence of a New Agenda' Human Development Report Office, Occasional Paper, United Nations Development Programme, 2002, bdr.undp.org/docs/publications/background_papers/2002/Goetz-Jenkins_2002.pdf
3. http://www.businessdictionary.com/definition/accountability.html#ixzz2RAPcuY00
4. The Self Restraining State: Power and Accountability in New Democracies, Andreas Schedler,Larry Jay Diamond,Marc F. Plattner
5. http://en.wikipedia.org/wiki/Accountability
6. Oxford English Dictionary 2nd Ed
7. Y. Wadsworth, 'The Mirror, the Magnifying Glass, the Compass and the Map: Facilitating Participatory Action Research' in P. Reason and H. Bradbury (eds.), Handbook of Action Research: Participative Inquiry and Practice, London, Sage 2001.
8. Pp. 35-50 in Sverker Gustavsson, Christer Karlsson, and Thomas Persson (eds) The Illusion of Accountability in the European Union. London: Routledge, 20099. REINVENTING ACCOUNTABILITY FOR THE 21ST CENTURY, Tom Burgis, Simon Zadek, www.accountability .org.uk

Author of Glossary Entry SIGNOSIS/Glossary CONSIDER project

3.2 Active citizenship

"Active citizenship is about being engaged in political discussion, community development, research."

Author of Glossary Entry Glossary CONSIDER project

[1] http://observatory-rri.info/?q=obs/content/glossary

3.3 Activity recognition

One goal of activity recognition is to provide information on a user's behaviour that allows computing systems to proactively assist users with their tasks.

Reference

Gregory D. Abowd, Anind K. Dey, R. Orr, and J. Brotherton. 1998. Context-awareness in wearable and ubiquitous computing. Virtual Reality 3, 3 (1998), 200–211.

Author of Glossary Entry FRAUNHOFER

3.4 Activity Sector

The sector of activity is tied to the specific economic activity in which a company mainly engages, e.g. automotive industrial machinery, personal goods, pharmaceutical products and medical equipment.

Author of Glossary Entry FRAUNHOFER

3.5 Actor

An action is 'the fact or process of doing something, typically to achieve an aim' (Oxford online dictionary). In order to complete an action it is necessary to have the means to achieve it. A means therefore, facilitates a change in state, and requires an actor or agent to act as that facilitator or means to elicit change. The term 'actor' stems from Late Middle English and is 'an agent or administrator' (Oxford online dictionary). However, in keeping with its more common use, an actor may be defined as 'a participant in an action or process' (Oxford online dictionary). Latour (2005, 1996) considers that an 'actor is 'a semiotic definition, an actant' (Latour 1996 p.7), and that whilst an actor may have an effect on a situation it is not always directly involved in its inception or development. In addition, actors are not always necessarily human or quasi-human. In fact, the danger of taking too much of a human-centric approach to identifying actors can result in missing important non-human actors such as other systems, official bodies, abstract concepts, physical and sociological artefacts and so on.Aristotle (Nic. Eth 3.1) reminds us that actors and actions have behaviours and impacts that can be considered from two perspectives; those that are voluntary and those that are involuntary. The voluntary is predictable but involuntary actions and actors are not and that an action should be judged on its intention rather than its outcome. Actors are considered in many fields of enquiry. For example, in computing, actor oriented designs 'acknowledge the variety of interaction models among components, and express these interaction styles independently from the functionality of components' (Liu et al 2004 p. 251). Further, Pask (1992) in his 'Interactions of actors theory' considered that actors facilitate a continuous and on-going 'process' that results in a contextual 'product' and he therefore considers an actor

to be a force or concept rather than being limited to an identifiable being. If a key actor group is not identified, it could result invalid or inaccurate outcomes of the research. Therefore, an understanding of the concepts of action and actor from a range of different views will reduce the likelihood of omission.

References

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Liu et al (2004) 'Actor-Oriented Control System Design: A Responsible Framework Perspective' IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY, VOL. 12, NO. 2, MARCH 2004

Pask, Gordon, et al. "Interactions of actors, theory and some applications." Monograph. Amsterdam University (1992).

Oxford online dictionary (2013) http://oxforddictionaries.com/definition/english/actor?q=Actor Accessed: 15/04/13

Von Schomberg, Rene (2013). 'A vision of responsible innovation'. In: R. Owen, M. Heintz and J Bessant (eds.) Responsible Innovation. London: John Wiley, forthcoming

Author of Glossary Entry DMU

3.6 Actor Network

By actor network is usually referred to so called Actor-network theory (ANT). The theory is related to the work of such scholars as Michel Callon, John Law and especially Bruno Latour. In short ANT puts forward that both human and non-human actors form constantly evolving and developing networks. Theory's background is in semiotics from which is borrows its vocabulary to describe the development of these networks – in a traditional sense ANT is not a theory but rather a vocabulary for this purpose (E.g. Latour utilizes the work of A.J.Greimas and other semioticians in his own work. The terms "actant" and "translation" come from this background. The influence can be seen also in the basic idea of the ANT, which can be seen as a network whose elements define and shape one another discursively).

The theory's central concept is actant which has an ability to act. Anything can be an actant and these actants form networks which are able to transform world. Actants construct themselves and transform other actants by a process which is called "translation". By translation actants construct definitions and meanings, which are used to achieve power positions in the network. The more central position the actant has in the network, the more

power it has to make other actants dependent on it as they are striving for their own goals. (Latour 1988)

Perhaps one of the most important and debated methodological principles of ANT is the principle of generalized symmetry. By this it is meant that human and non-human actors should be equally treated. They are as important actors in the networks and difference between them is socially constructed. This principle has been criticized from the perspective that non-human actors and especially material objects do not have consciousness and they are not intentional actors. Especially intentionality is seen uniquely as a human character, which differentiates humans as actors from other possible actors.

In principle, analysis of the network is power analysis, how it is achieved and used in the network. Especially for Latour (1983) science and technology are ways to change society and its power constellations or, in other words, to do politics. As scientists and engineers are central constructors of society, one should follow these actors in the social analysis in order to understand how social order is produced. In this view scientists and engineers are actually politicians, which use science as a vehicle of change and as a power instrument for societal position.

Perhaps one of the best known works by Latour (1988) concerns the work of Pasteur. In the very essence Latour is able to demonstrate in this work, how Pasteur was able to mobilize or orchestrate a network of actors to support his own goals and finally change also fundamentally the way the society functions. Pasteur indicated how microbs are behind diseases and in this case especially anthrax. By networking with other actors (like hygiene movement) and being successful in his development of vaccine, Pasteur was in the end able to change the whole society towards more hygienic direction.

References

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Author of Glossary Entry VTT

3.7 Actuarial society

An instrumentalist social theory, which instead of identifying and controlling normality and deviance in society, tries to solve social problems, especially deviant and criminal behavior, by preventative measures based on predicting people's future activities with the help of

profiling and mass surveillance

Author of Glossary Entry EKINT Project/ LISS

3.8 Adaptive Manufacturing

Ability to react to changing demands and adapt the manufacturing processes to the evolving environment, it recombines innovative processes to overcome existing limitations and transfers manufacturing know-how into totally new manufacturing-related methods

Reference

T. L. R. L. S. H. G. Creutznacher, "Performance Adaptive Manufacturing Processes in an Energy Efficient Car Production," in 11th Global Conference on Sustainable Manufacturing, Innovative Solutions, Berlin, 2013.

Author of Glossary Entry FRAUNHOFER

3.9 Agent(s)/ Agent based modeling

"Agent-based modelling is a computational method that enables a researcher to create, analyse, and experiment with models composed of agents that interact within an environment" (Gilbert 2007). Agents (computational programs) in this setting are units that have behaviour. They act within an (simulated) environment. Agents can react to other agents, pursue goals, communicate with other agents, and move around within the environment. Macro-level features can emerge from the interaction of agents. Agent-based models can provide a simulation environment of the laboratory in silico. Agent-based simulations (Gilbert and Troitzsch 2005, Gilbert 2007) provide computational demonstrations of production algorithms: they show whether a specific communication/action pattern on the micro level is sufficient to produce a macro-level phenomenon such as innovation. Where the aim is to understand the processes and mechanisms in innovation networks (Tesfatsion and Judd 2006) and to identify access points for policy intervention - even suggest designs and scenarios - this is the approach of choice (Ahrweiler, Pyka and Gilbert 2004, Gilbert, Ahrweiler and Pyka 2007). The aim of simulation modelling is not primarily to predict specific system behaviour or to reproduce statistical observations, but rather to gain a dynamic and detailed description of a complex system where we can observe the consequences of changing features and parameters. Innovation is an emergent property of a complex social system involving heterogeneous agents and evolving rule sets. Our simulations will serve as a laboratory to experiment with social life in a way that we cannot do empirically due to methodological reasons (cf. Ahrweiler and Gilbert 2005). Using this tool, we can understand innovation dynamics in complex social systems and find their potential for design, intervention and control.

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Tesfatsion, L. and Judd, K. (2006) Handbook of Computational Economics: Agent-Based Computational Economics, Elsevier.

Author of Glossary Entry EA

3.10 Ambient Intelligence

Ambient Intelligence has been defined as the field to study and create embodiments for smart environments that not only react to human events through sensing, interpretation and service provision, but also learn and adapt their operation and services to the users over time.

Reference

Ambient Intelligence Research Lab, http://airlab.stanford.edu/

Author of Glossary Entry FRAUNHOFER

3.11 Anticipatory Governance

Anticipatory Governance can be defined as ‘a broad-based capacity extended through society that can act on a variety of inputs to manage emerging knowledge-based technologies while such management is still possible’ (Guston 2008: vi). It motivates activities designed to build capacities in foresight, engagement, and integration – as well as through their production ensemble

Anticipatory Governance focuses on anticipating, examining in advance and to report on social, legal and ethical implications in order to reduce or eliminate bad outcomes ex ante, rather than maintaining a large bureaucracy to react to situations that have already turned bad.

Anticipatory Governance, among other related concepts, is discussed in literature as one of the constitutive conceptual pillars to RRI (Grunwald 2011; Owen, Macnaghten, and Stilgoe 2012). While a diversity of anticipatory practices with the aim to foresee and prevent negative consequences of scientific endeavors exist, the distinct concept of Anticipatory

Governance has gained momentum only in the last decade. It has particularly been discussed with regard to its governance capacity by political science for the realm of nanotechnology (Barben et al. 2008; Guston 2014) and biomedicine/bioethics (Gorman 2012; Ozdemir 2009). Similarly, it has been adopted within programmes and evaluations of scientific centers and counsels, foremost in the US.

References

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Author of Glossary Entry FRAUNHOFER

3.12 Appropriate technology

Appropriate technology is technology suited to the environment in which it is used. In this approach, technology should be designed with users foremost in mind, and suited to the long-term needs of the community in which it is utilized. Appropriate technology is typically small-scale, decentralized, labor-intensive, energy-efficient, environmentally sound, and locally controlled. This approach also seeks to make use of local knowledge and abilities, and tends to seek to spread productive employment widely and produce products that meet basic needs. Appropriate technology takes a long-term approach, assuring that the individuals using it can maintain it, and not require expensive or hard-to-acquire replacement parts or specialized knowledge not held by members of the community. Creating appropriate technology can be a challenge, as one author states. "Defining the 'appropriateness' of a technology in a general manner is difficult, as it is hard to specify the context in advance. An appropriate technology has to be feasible and implementable. But, more than that, it has to achieve the goals that have been set." (Baker, 52)

The appropriate technology approach is related to RRI insofar as it provides an analysis of

"responsible innovation": This approach stresses equity and an ethic of justice for all and seeks to increase the well-being of every member of the community and tries to give the community more control over the newly implemented technology.

For some, the term "appropriate technology" simply means "primitive technology" or "outdated technology, but this is a basic misconception. The appropriate technology approach does not seek to withhold technological advancements from developing nations. When advanced or new technologies can be incorporated into the local agricultural or manufacturing system without significant negative effects (as, for example, cell phones seem to have), they should be used. However, advanced or new technologies should not be adopted when they benefit some to the detriment of others (Bakker 60) or simply because they are "cutting edge".

Appropriate technology is a viable option for preparing communities for high technology. When appropriate technology projects are well-planned, the people involved learn enough both to keep it running and to improve it. When people operating the technology are in control, their expertise and mastery should increase, leading to further improvements. (Hazeltine, 278).

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Author of Glossary Entry Kelly Laas

3.13 Artificial intelligence

Artificial Intelligence, or AI, is the ability of a computer to act like a human being. It has several applications, including software simulations and robotics. However, artificial intelligence is most commonly used in video games, where the computer is made to act as

another player.

Reference

Tech Terms, “techterms.com,” 2010. [Online]. Available: http://www.techterms.com/definition/artificial_intelligence.

Author of Glossary Entry FRAUNHOFER

3.14 Behavioural Analysis

Pattern recognition techniques are able to automatically interpret complex behavioural patterns generated when humans interact with machines or with others. Visual human action recognition concerns the detection and tracking of people, and more generally, the understanding of human behaviours from image sequences involving humans. Automated vision-based analysis of human actions may assist security personnel in threat detection as well as it finds many other applications in surveillance technology by applying detection, classification and tracking algorithms.

Reference

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Author of Glossary Entry FRAUNHOFER

3.15 Benchmark

A benchmark serves as a standard or a point of reference against which things may be compared, assessed, measured or judged. Benchmarking aims at identifying and implementing best practice. It is a tool for evaluation and for improvement.

Author of Glossary Entry FRAUNHOFER

3.16 Bioethics

the study of ethical problems arising from biological research and its applications in such fields as organ transplantation, genetic engineering, or artificial insemination

Reference

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Author of Glossary Entry Res-AgorA Project

Biomedicine
The medical study of the effects of unusual environmental stress on human beings, especially in connection with space travel. **Reference** biomedicine. (n.d.). Collins English Dictionary - Complete & Unabridged 10th Edition. Retrieved May 29, 2015, from Dictionary.com website: http://dictionary.reference.com/browse/biomedicine **Author of Glossary Entry** FRAUNHOFER

3.17 Biotechnology

Biotechnology means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use

Reference

United Nations, "The Convention on Biological Diversity," in 1760 UNTS 79; 31 ILM 818 (1992), 1992.

Author of Glossary Entry FRAUNHOFER

3.18 Boundary Object

Boundary Object is an analytic concept referring to those objects "which both inhabit several intersecting social worlds […] and satisfy the informational requirements of each of them" (Star and Griesemer 1989, 393). Boundary Objects (BO) have had a fortunate theoretical reception in social sciences and in STS as conceptual devices to examine collaborations in heterogeneous scientific work and in the relationships between science, technology and other societal domains. Maps, inventories, collection guidelines, repositories, etc. have been mentioned as examples of BO, which can shape and enhance cooperation and coordination between different communities of practices.

BO make collaboration possible because "[t]hey have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable" (Star and Griesemer 1989, 393). This generally flexible meaning, but locally specific interpretations allow different groups to work together without consensus about the meaning of the objects themselves (Star 2010). The groups involved in its use "tack back and forth between both forms of the object" (Idem, 605).

It is important to notice that the concept of BO do not refer exclusively to their material representation/visualization, but extents to the processual patterns (behaviours, procedures, institutional arrangements) which are closely associated to them and which they organize (Star 2010). They can be scaled up as "boundary infrastructures", which are complex

assemblages and networks of BO create (Bowker and Star 2000), and in the context of "boundary organizations" (Guston 1999), which provide a space legitimising their development and use. They can be included in "standardized packages", which combine "several boundary objects […] with standardized methods […] in ways which further restrict and define each" (Fujimura 1992, 169). Standardized packages "define a conceptual and technical work space which is less abstract, less ill-structure, less ambiguous, and less amorphous" (Ibidem), thus differing from BO insofar they change practices on the various sides of the boundary (Guston 2001, 400).

The governance of responsible research and innovation is necessarily based on a distributed architecture, which rely on the gathering and mobilization of different (and somewhat disparate) knowledge, actors, capacities, and resources. Moreover, the notion of responsibility and its practical translations are subject to considerable variability, which corresponds to different framings, perceptions, capabilities, and interests:

These elements are linked mostly in a "non-hierarchical manner", a feature that makes intermediation a crucial component of responsible governance arrangements (see Kuhlmann, "Strategic Intelligence", This glossary). Bridging disciplinary and social boundaries, BO can play a twofold role in intermediations for responsible research and innovation. Firstly, using BO as analytical concepts can help examine collaborative interactions in the distributed landscape of (responsible) governance. Secondly, designing BO as operational tools can support intermediations in cooperative contexts in which consensus is nonetheless limited or absent.

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Author of Glossary Entry Res-AgorA Project

3.19 Capacity building

”Increasing capacity in terms of social capital and organizational capital in order to be more efficient and effective.” (Glossary CONSIDER project)

Author of Glossary Entry Glossary CONSIDER project

3.20 Case Study

“A case study (also known as a case report) is an intensive analysis of an individual unit (e.g., a person, group, or event) stressing developmental factors in relation to context. The case study is common in social sciences and life sciences. Case studies may be descriptive or explanatory. The latter type is used to explore causation in order to find underlying principles.[1][2] They may be prospective (in which criteria are established and cases fitting the criteria are included as they become available) or retrospective (in which criteria are established for selecting cases from historical records for inclusion in the study).

Thomas[3] offers the following definition of case study: "Case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods. The case that is the subject of the inquiry will be an instance of a class of phenomena that provides an analytical frame — an object — within which the study is conducted and which the case illuminates and explicates."

Another suggestion is that case study should be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context. Case study research can mean single and multiple case studies, can include quantitative evidence, relies on multiple sources of evidence, and benefits from the prior development of theoretical propositions. Case studies should not be confused with qualitative research and they can be based on any mix of quantitative and qualitative evidence. Single-subject research provides the statistical framework for making inferences from quantitative case-study data.[2][4] This is also supported and well-formulated in (Lamnek, 2005): "The case study is a research approach, situated between concrete data taking techniques and methodologic paradigms”[1]

Case studies are used ‘to explain the causal links in real-life interventions that are too complex for the survey or experimental strategies’ [4]. It also ‘investigates a contemporary phenomenon within its real life context especially when the boundaries between phenomenon and context are not clearly visible’ [4]. The main purpose of a case study is to explain, describe, illustrate, explore and evaluate phenomena.

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Author of Glossary Entry VTT

3.21 Civil Society

”The space in between government and private sector, including all citizens. It is also known as the third sector. Civil Society itself is traditionally defined as any actor working toward common good and social objectives, outside of the state and of the market.”

Author of Glossary Entry Glossary CONSIDER project

3.22 Civil Society Organizations (CSOs)

”CSOs are non-governmental organizations that are generally not-for-profit, not representing commercial interests, and that pursue a common purpose for the public interest.”

Author of Glossary Entry Glossary CONSIDER project

3.23 Code of conduct

Principles, values, standards, or rules of behaviour that guide the decisions, procedures and systems of an organization in a way that (a) contributes to the welfare of its key stakeholders, and (b) respects the rights of all constituents affected by its operations.

Reference

PAIB Committee, 2007. Defining and Developing an Effective Code of Conduct for Organizations. IFAC. See on http://www.ifac.org/publications-resources/defining-and-developing-effective-code-conduct-organizations

Author of Glossary Entry Res-AgorA Project

3.24 Conflict of Interest

Conflict of interest: a situation in which some person (whether an individual or corporate body) is in a relationship with another requiring exercise of judgment in the other’s behalf and has a special (“secondary” or “unusual”) interest tending to interfere with the proper exercise of such judgment.

Conflict of interest is not simply bias or a conflict between interests. Bias is a deflection of judgment in a determinate direction; a conflict of interest is, in contrast, a tendency toward bias that might or might not be realized. A conflict between interests (conflict of interests or conflicting interests) is any situation in which two or more interests conflict, whether within

one person or between persons. Conflicting interests only become a conflict of interest if somebody asks for one's judgement. So, for example, I hold a large share in a certain business, but am otherwise uninvolved in their activities. The business wants to recruit a new director. My 22-year-old nephew applies. I may have a bias. Not only do I like my nephew but am also inclined, without much evidence, to believe he would make a fabulous director. That's not a conflict of interest; I simply assume something about my nephew's abilities. If I were less partial, I would realise that he is unlikely to be a good director without some job experience. I do have conflicting interests, though: If the business does well, I benefit financially (something serving my long-term interests). If my nephew gets a job, the family may be happy (serving another long-term interest) but the business may fail. Hence, one of my interests conflicts with another, though I do not have a conflict of interest. In contrast, I would have a conflict of interest if the Executive Board asked me to serve on the appointing committee. If I agreed to serve, I would have to exercise judgment on the company's behalf while I had an interest tending to make my judgment less reliable than it would otherwise be. Unless I disclosed the conflict of interest, I would betray the trust of the Executive Board. But even if I did disclose the conflict, I would remain a less reliable member of the appointing committee than I would be if my nephew were not involved. I would still have a conflict of interest. Insofar as RRI involves bringing interested parties into the research and innovation process, it may create conflicts of interest for researchers or innovators that would otherwise be absent, for example, by bringing in someone who would pressure researchers to follow one approach rather than another for a reason extraneous to the research itself.

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Author of Glossary Entry Michael Davis

3.25 Context

"Context" is a key component of any interpretation: In order to understand a phenomenon or give sense to it, social scientists and anthropologists gather its surrounding features. In other words, contextualization "involves making connections and, by implication, disconnections" (Dilley 2002: 438-439). For instance, a context can be "political or "economic", but the concept can also indicate different levels of (micro or macro) analysis, such as the "situation", a particular "society", a specific state or even the "world-system" (Dilley 2002: 438).

Thus, contextualization is also problematic because it results from prior interpretation, and from already existing theoretical perspectives: How are the surrounding features selected? Which connections are regarded as relevant, while others are ignored? Hence, various scholars have developed the "view that context is generated and negotiated in the course of social interaction and exchange" (Dilley 2002: 439). For instance, Harold Garfinkel (1984) put forward what was seen in sociology as a radical re-specification of context, saying that it is locally created and sustained by participants. This was from an ethno-methodological perspective. Furthermore, in conversation analysis, Heritage (2004: 223) elaborates upon how utterances participants make are "context shaped", and how participants also "create (or maintain or review) a context for the next person's talk" (emphases in the original).

References

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Author of Glossary Entry UOXF

3.26 Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) is a self-regulating process integrated in the management of firms, discussed for at least three decades as a response to economic and technological changes. It is defined as commitment of firms to legal or ethical norms regulating their practices whereby they take into account the "social responsibility" of their activities i.e. their impact on environment, health, safety, management practices or the access to the resources they produce. In getting involved in a CSR process, firms undertake to comply with national or international legal norms (Human rights, laws relating to child labor) but also ethical norms (ISO norms or the Global Reporting Initiative, for instance). CSR rests

upon a strong focus on the stakeholders' interests opposed to that of the shareholders: it is supposed that managerial decisions not only impact the earning of investors but also "exert externalities on a number of "natural stakeholders" who have an innate relationship with the firm: employees, customers, suppliers, communities where the firm's plants are located, potential pollutes, and so forth." (Tirole, 2001, p. 3), but also regulators, local communities, non-governmental organizations (NGOs), civil society organizations (CSOs) or 'the public' at large (Groves et al., 2011).

One of the strongest issues raised while theorizing CSR relates to the trade-off corporate managers have to face between competitiveness and the compliance with ethical and legal norms external to their concern for profit maximization. What would be the incentives to enter in CSR process (when there is no mandatory legal norm)? Two lines of answer can be distinguished. First, many studies on incentives and on efficiency of social responsibility have tried to show the positive impact of social responsibility on innovation and firm competitiveness (for instance, Porter and van Linden (1995)) as well as the negative impact of not taking their social impact into account. On another side, Margolis and Walsh (2001) claim that no significant correlation can be established between CSR engagement and financial performance. As outlined by Vogel (2005), this would imply to implement social responsibility as any other aspect of management (such as advertising) taking into account the risk involved regarding returns on investment. In this view, taking the responsibility of their activities will be undertaken by firms whatever its impact on competitiveness or benefits.

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Author of Glossary Entry UPD

3.27 Culture

A basic component of any culture is "meaning", and culture exists whenever people refer to one another in a "meaningful" way (Weber 1921/1980: 1-2). Cultures can be considered as systems of interrelated signs ("codes") created and interpreted by humans. It can also be argued that humans are caught up in these "webs of significance" (Geertz 1973: 5, 9). Often, culture involves conflict: A semiotic "confusion of tongues" can easily turn into a severe physical combat (Geertz 1973: 7-9). Many cultural codes do change over time, but usually

slowly.

Despite globalization and regionalization (e.g., the European Union) one important form of culture remains the nation state (cf. Sassen 2006). However, culture, including national culture, should not be regarded as a clearly delimited container of meaning, or as a powerful superstructure that imposes meanings onto helpless individuals. Instead, it can be considered as a flexible repertoire, or "toolkit" of "habits, skills and styles from which people construct 'strategies of actions'" in ordinary life (Swidler 1986: 273). In a similar way it can be argued that culture, or cultural belonging, is not inherited in a naturalistic, biological sense. It is rather part of continuous learning processes of individuals who are, or feel, more or less determined by existing societal expectations (e.g., Miller 1997: 112-113).

The systems of meaning and the practices of experts, such as those of scientists and IT professionals, are considered as "epistemic cultures" (Knorr Cetina 1999). Moreover, some authors argue that European and Western societies typically use scientific and technological knowledge to build "centres of calculations" in order to exercise "long distance control" (Latour 1987; Law 1986). In their view, the history of epistemic cultures is closely connected to the establishment of (colonial) power and domination. Furthermore, apart from epistemic cultures other kinds and levels of cultures exist, such as corporate culture or subcultures.

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Author of Glossary Entry UOXF

3.28 Data protection

The complex of principles, norms, procedures, rights of individuals, methods and institutional means and instrument regulating and restricting the collection, processing and use of personal data, in order to the persons concerned

3.29 Data protection impact assessment

System Developers and Data Controllers that process personal data need to understand the principles of data protection framework and apply the principles of privacy-by-design in new products, services and applications.

Data protection impact assessment (DPIA) is equated with checking the legal requirements spelled out in the European data protection framework". In theory DPIA is conceived primarily as a compliance check and in this perspective restricted in scope compared to a Privacy Impact Assessment.

The European Commission has been using this term in its RFID Recommendation and, later, in its Communication on revision of the Data Protection (2010). In the Draft General Data Protection Regulation (GDPR), DPIA is introduced as a distinct obligation. In order to enhance compliance with the data protection framework in cases where the processing operations are likely to result in a high risk for the rights and freedoms of individuals, the controller should be responsible for the carrying out of a data protection impact assessment to evaluate, in particular, the origin, nature, particularity and severity of this risk.

Under certain circumstances the DPIA is explicitly understood as a tool of prior checking as – according to the Draft GDPR - it has to be carried out prior to the processing, where this is of a type that is likely to result in a high risk for the rights and freedoms of individuals, in particular when using new technologies and taking into account the nature, scope, context and purposes of the processing. Such risks are discrimination, identity theft or fraud, financial loss, damage to the reputation, unauthorized reversal of pseudonymisation, loss of confidentiality of data protected by professional secrecy or any other significant economic or social disadvantage. Used in this way DPIA shares a common approach with Privacy Impact Assessment in that it has to take place during the early life of a project including personal data processing and in that it should run alongside the project as an iterative process.

A DPIA includes the envisaged processing operations, an assessment of the risks to the rights and freedoms of data subjects, the measures envisaged to address the risks, safeguards, security measures and mechanisms to ensure the protection of personal data. The outcome of the assessment is to be taken into account when determining the appropriate measures to be taken in order to demonstrate that the processing of personal data is in compliance with the data protection framework.

Although focused on compliance test, DPIA includes also more qualitative elements and requirements that have to do with legality, legitimacy, participation and, especially, proportionality, i.e key considerations in determining whether informational privacy and other related fundamental rights are respected. Even if primarily legal the tool of DPIA is

providing a sound basis for socio-political decision making and a method to deal with the legitimacy of the project and to make decisions more responsible and accountable. Assessing processing and adhering to legal requirements can help minimize such issues and risks, as fundamental rights can be viewed as being expressions of generally accepted social standards and norms.

Useful for: Fundamental Rights Legislation, Policy, Technology Design/ Deployment, Responsible handling of personal data

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Author of Glossary Entry Author: Lilian Mitrou, Spiros Kokolakis (Univ of the Aegean).

3.30 Deliberation

Contrary to impulse, deliberation consists in the suspension of a possible act (it could be a complex action or process) to examine to accomplish it or not and according to different ways. Therefore it is a careful discussion. Deliberation rests on comparison of different motives (different courses of action and anticipated assessments of them). Following Aristotle's Rhetoric it concerns future possible actions, when law is concerned with past ones.

We can deliberate for different reasons. Among these are (1) conflicts (whether of opinions, ethical views, or interests), (2) descriptive or normative uncertainties, and (3) tensions around the need to act (or not act) individually or collectively (Reber, 2012).

Considering RRI, we will focus here on political definition of deliberation and more precisely on the theory of deliberative democracy (TDD). Political theories of deliberative democracy, or more generally the important role dedicated to deliberation in politics have imposed themselves recently in contemporary political philosophy. Despite interpretative quarrels, this theory could be provisionally described in this way: « The notion of deliberative

democracy is rooted in the intuitive ideal of a democratic association within which the justification of the terms and conditions of association proceeds through public argumentation and reasoning among equal citizens. In such a political order, citizens share a commitment to solving problems of collective choice through public reasoning and consider their basic laws legitimate if they furnish the frame for public and free deliberation. » (Cohen 1989)

This theory is opposed to conceptions of democracy that want to insist on bargaining, aggregation of preferences or a more inclusive participation (participatory democracy). To some extent, participation could be opposed to deliberation, regarding the question of the quality of the debate. Thus TDD defends a more ambitious conception of citizens, their interactions, and the political community. We recognize in this theory different virtues, including normative ones. Its defenders expect that political representatives or people involved in mini-publics (Goodin and Dryzek, 2006) have the capacity to justify and perhaps argue for their opinions and decisions. They expect citizens to be able to justify their choices, and not to stay with their often vague preferences, like in rational choice theory or in most of the economical theories. TDD makes a plea for citizens to have the capacity to search for and collectively formulate the common good within public deliberations that link common good, justification and legitimacy, and respect citizens' autonomy.

There are many theoretical and practical debates around deliberative democracy. It is not immune to controversies. Simone Chambers signals at the same time the profusion and the interpretative quarrels (Chambers, 2003): How to evaluate deliberation (see below), the prioritization of freedom and opportunity, questions of reciprocity, publicity and decision making processes, core goals, and whether deliberative democracy only cultivates respect or civility between rivals? Of course TDD has been attacked by some critics, generally or in part, including by Young, Sanders, Hauptmann, Basu, Sunstein, Shapiro and Mouffe.

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Author of Glossary Entry UPD

3.31 Digital divide

Gap that extists between people or countries with access to ICTs and those with little to none.

Author of Glossary Entry ETICA Project

3.32 Digital Forensics

The use of scientifically derived and proven methods toward the preservation, collection, validation, identification, analysis, interpretation, documentation and presentation of digital evidence derived from digital sources for the purpose of facilitating or furthering the reconstruction of events found to be criminal, or helping to anticipate unauthorized actions shown to be disruptive to planned operations

Reference

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Author of Glossary Entry FRAUNHOFER

3.33 Ecosystem

Here we refer to ecosystems build up by organisations. Not by organisms which is the original meaning of the concept. Following citation is from Wikipedia:

“The concept first appeared in James F. Moore's May/June 1993 Harvard Business Review article, titled "Predators and Prey: A New Ecology of Competition"

Moore defined "business ecosystem" as:

“An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles.”

Moore used several ecological metaphors, suggesting that the firm is embedded in a (business) environment, that it needs to coevolve with other companies, and that “the particular niche a business occupies is challenged by newly arriving species. ”This meant that companies need to become proactive in developing mutually beneficial ("symbiotic") relationships with customers, suppliers, and even competitors.

Using ecological metaphors to describe business structure and operations is increasingly common especially within the field of information technology (IT). For example, J. Bradford DeLong, a professor of economics at the University of California, Berkeley, has written that "business ecosystems" describe “the pattern of launching new technologies that has emerged from Silicon Valley”.[5][6] He defines business ecology as “a more productive set of processes for developing and commercializing new technologies” that is characterized by the “rapid prototyping, short product-development cycles, early test marketing, options-based compensation, venture funding, early corporate independence”.[7] DeLong also has expressed that the new way is likely to endure “because it's a better business ecology than the legendarily lugubrious model refined at Xerox Parc—a more productive set of processes for rapidly developing and commercializing new technologies”

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http://en.wikipedia.org/wiki/Business_ecosystem

Author of Glossary Entry VTT

3.34 Efficiency

Efficiency in general describes the extent to which time, effort or cost is well used for the intended task or purpose. It is often used with the specific purpose of relaying the capability of a specific application of effort to produce a specific outcome effectively with a minimum

amount or quantity of waste, expense, or unnecessary effort. "Efficiency" has widely varying meanings in different disciplines.

Author of Glossary Entry NAMUR

ELSA/ELSI

The acronym ELSI (in the U.S.) or ELSA (in Europe) refers to research activities that

anticipate and address ethical, legal and social implications (ELSI) or aspects (ELSA) of emerging life sciences, notably genomics

Reference

Chadwick, Ruth, and Hub Zwart. "From ELSA to Responsible Research and Promisomics." Life Sciences, Society and Policy 9, no. 1 (May 15, 2013): 1–3. doi:10.1186/2195-7819-9-3.

Author of Glossary Entry Res-AgorA Project

3.35 Emerging ICTs

Technologies that are currently being developed and that hold a realistic potential to become reality within the next 10 to 15 years.

Author of Glossary Entry ETICA

3.36 Engineering (and engineer)

There is no good formal definition of engineering because, like other professions, engineering is a self-defining institution continually redrawing its boundaries as conditions change within and outside. Here are three commonly used definitions, each good enough for most practical purposes, but nonetheless open to counter-example:

• "Business, government, academic, or individual efforts in which knowledge of mathematics and/or natural science is employed in research, development, design, manufacturing, systems engineering, or technical operations with the objective of creating and/or delivering systems, products, processes, and/or services of a technical nature and content intended for use." The National Research Council, p. 36.

• Engineering is the application of "knowledge of the mathematical and natural sciences gained by study, experience, and practice to develop ways to economically utilize the materials and forces of nature for the benefit of humankind." National Society of Professional Engineers, p. 3.

• "Engineering is the application of scientific, economic, social, and practical knowledge in order to design, build, and maintain structures, machines, devices, systems, materials and processes. It may encompass using insights to conceive, model and scale an appropriate

solution to a problem or objective." http://en.wikipedia.org/wiki/Engineering (Nov. 16, 2013)

What most definitions have in common is understanding engineering as a certain practice (involving mathematics and science) concerned with helping people and things work together better. Engineering is never "value free". The relevant values are now often expressed in a "code of ethics" (as well as implied in engineering's technical standards). Though, like science, engineering does generate considerable public knowledge, its aim is to help people in certain ways. In this respect, engineering is quite distinct from science (understood as the pursuit of knowledge whether for its own sake or for power over nature). There are many branches of engineering, the largest of which are: civil, biomedical, chemical, electrical, mechanical, and materials engineering. There are also many activities called "engineering" that are not strictly engineering, for example, "social engineering", "genetic engineering", and "financial engineering". There are even some activities, such as "marine engineering", that are both, that is, one activity by that name is what ordinary sailors do (look after machinery on a ship) while another activity by that name is engineering proper (the design of mechanical systems for ships).

An engineer strictly speaking (a "professional engineer") can be identified by some combination of academic credentials (a curriculum yielding a bachelor's degree in engineering) and experience of the appropriate kind (doing certain work reasonably well). The engineering curriculum is much the same the world over. A "Professional Engineer" ("PE") is an engineer strictly so called who, in addition to being an engineer, is licensed by a government agency. In some countries, such as Canada, all professional engineers are required to be licensed; in others, such as the US, some are; and in others, such as the Netherlands, none are.

Engineers are creators of technology, but they are not its only creators. Among other creators of technology are: architects, chemists, computer scientists, industrial designers, geneticists, machinists, physicians, technicians, and even amateur inventors. The closer research gets to practical innovation, the more likely it is that engineers will be involved—to ensure safety, reliability, usefulness, and economy. While engineers typically create technology (through "engineering design"), they also routinely engage in other forms of technical work, especially, forensics, inspection, management, and testing. Though engineers should welcome RRI (because it serves the purpose of engineering), they may in fact prove hostile if RRI is presented as a demand without any obvious way to carry it out. Engineers need detailed technical standards to carry out general policies (such as RRI), standards they typically write or at least help to write.

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Author of Glossary Entry Michael Davis

3.37 Ethics/Ethical/Moral

Ethics can be defined as “the study of the concepts involved in practical reasoning: good right, duty, obligation, virtue, freedom, rationality, choice.” (Oxford Dictionary of Philosophy). Three different epistemological levels of thinking have to be distinguished. First, ethics includes “the general study of goodness, the general study of right action [and] applied ethics” (The Cambridge Dictionary of Philosophy) i.e. it designates the different norms and principles of the good and the bad that are settled to rule human choices, actions and behaviours. This includes the principles of morality and all the regional rules related to a particular object (bioethics, business ethics, etc.). Related to that are the moral theories, or normative ethics, which study how the good and the bad has to be defined. This includes, for instance, consequentialism according to which the goodness of principles and actions depends on their consequences; deontology (where what counts is the goodness of the intention or the respect of universal principles or duties) or virtue ethics for which the moral subject focuses “her attention on the cultivation of her (or other’s) virtues” which are independent of other moral concepts (The Cambridge Dictionary of Philosophy). Moral theories differ about the sources of normativity they emphasize (i.e. the kind of moral reason allowed to adopt a principle). The third level of thinking related with ethics concerns “the attempt to understand the metaphysical, epistemological, semantic, and psychological, presuppositions and commitments of moral thought, talk, and practice” (Stanford Encyclopaedia of Philosophy). This is sometimes labelled as metaethics and includes investigation on the moral language, studies on the epistemic status of border areas of enquiry such as moral psychology and more generally a reflection on the epistemic structure of a moral theory or a moral principle.

If ethics is often related but distinguished from ‘morality’ (The Cambridge Dictionary of Philosophy; Ricoeur, Dictionnaire d’éthique et de philosophie morale), we will consider the

adjectives 'moral' and 'ethical' as synonymous.

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Author of Glossary Entry UPD

3.38 Evaluation

Initial and very general definition of evaluation could be like it has been put forward in the Wikipedia: "Evaluation is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards. It can assist an organization to assess any aim, realisable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed. The primary purpose of evaluation, in addition to gaining insight into prior or existing initiatives, is to enable reflection and assist in the identification of future change." (Wikipedia, 12.3.2013)

Various kinds of evaluations and evaluation practices have increased tremendously since the 1980s. Some observers even called this development as a rise of "evaluative state". (Neave 1998). Often this has been connected to the rise of accountability pressures and so called New Public Management (NPM), which as public management paradigm shifted the focus of public administration from detailed regulation and steering more towards goal setting. The principal-agent dilemma needed now a new solution and new control mechanisms were needed. The solution to the dilemma was detailed evaluation of activities (e.g. Chelimsky 1997). Within short period of time starting from the end of the 1980s and especially in the 1990s evaluations boomed. However, the evolution of the evaluation culture has not been stimulated only by the pressure of accountability, but also by the needs of strategic thinking and change, as well as by the needs of decision-making (Chelimsky 1997). Sometimes evaluations are conducted more or less only for political reasons. Then evaluation would be used merely for making an impression on financiers and policymakers or legitimate a decision that has already been done (Rossi, Freeman, Lipsey 1999).

Currently various kinds of evaluations are business as usual as consequences of policy actions are anticipated (ex-ante evaluation) or performance and goal achievement are assessed (ex post evaluation). Usually evaluations are categorized either as formative or summative evaluations. Formative evaluation (Scriven 1991) focuses on improving some action model. It is used e.g. to help a programme to perform better. Summative evaluation, in turn, focuses

on creation of overall judgement of about the performance and worth of the action. Recently it has been suggested that developmental evaluation would be a new type of evaluation in addition to more traditional summative and formative evaluations (Patton 2011).

Typically evaluations are based on logic model thinking. Logic models represent a linear perspective of a system, in which inputs, activities, outputs, outcomes and impacts as well as logical relationship and pathways between different components are presented. (Dyehouse et al. 2009). Logic model approach works in simple and predictable situations, but it has significant downsides in complex and dynamic situations (Patton 2011). Recently it has been suggested that systems thinking offers an alternative to linear model. System thinking can provide a more explicit analysis of the system components and their interaction. (Dyehouse et al. 2009).

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Author of Glossary Entry VTT

3.39 Governance

"the dynamic interrelation of involved (mostly organized) actors within and between organisations, their resources, interests and power, fora for debate and arenas for negotiation between actors, rules of the game, and policy instruments applied helping to achieve legitimate agreements" (see also Kuhlmann 2001; Benz 2006; Braun 2006).

Author of Glossary Entry Res-Agora

3.40 Grid of Analysis

A series of parameters used to assess an empirical issue, scenario, etc.

Author of Glossary Entry NAMUR

3.41 Home Safety

Home safety refers to the prevention of accidents around the home, including amongst others fire safety and electrical safety.

Reference

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Author of Glossary Entry FRAUNHOFER

3.42 Inclusive innovation

"Inclusive innovation is the means by which new goods and services are developed for and/or by the billions living on the lowest incomes" (Foster and Heeks, 2013:1)

There are a variety of similar terms that are employed in different contexts:

o pro-poor innovation

o below the radar innovation

o bottom of the pyramid innovation

o grassroots innovation

o frugal innovation.

(Horton, 2008; Kaplinsky et al 2009; Smith et al, 2012)

All of these terms refer to the production and delivery of innovative solutions to the problems of the poorest and most marginalised communities and income groups globally.

Inclusive innovation mirrors a wider concern and growing interest in "inclusive growth" – growth which would be of particular benefit to the very poor.

It is possible to conceive of a number of different levels at which "inclusivity" could potentially operate:

- In the definition of the problems to be addressed through innovation being relevant to the poor;

- In the process of innovation itself where the poor are actively engaged in some manner in the development and application of innovative solutions to their problems;
- In the adoption and assimilation of innovative solutions whereby the poor acquire the capacities to identify and absorb innovative solutions to their problems;
- In the impact of innovation such that the innovation outputs enhance the consumption and/or incomes of the poor. (Foster and Heeks, 2013).

The expanding incomes of millions of poor consumers that is most evident in China, but also in many other countries of the world, has attracted business and notably the large global corporations to innovate so as to meet the needs of this fast growing market – resulting in the reorientation of business strategies for innovation. (Pralahad, 2009). Here innovation may be of benefit to the poor but the poor relate to innovation solely as consumers – passive recipients of innovation. Many protagonists and advocates of inclusive innovation would however look to the inclusion of poorer people as active participants in the processes of innovation (Cozzens, S and Sutz, J. (2012). This perspective defines inclusive innovation also in terms process. It seeks innovative activity that, in some way, has the potential to enhance the capacities of poor people such that they are not the mere passive recipients of innovation but are actively engaged and through this engagement are in some way "empowered." This perspective "…sees technology projects as seeding progressive social transformation in communities" (Smith, Fressoli, Thomas, 2013)

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3.43 Information asset

"knowledge or data that has value to the organization"

Author of Glossary Entry ISO/IEC 27000:2009

3.44 Information security

Information Security refers to the preservation of the confidentiality, integrity and availability of information, where confidentiality is the property that information is not made available or disclosed to unauthorized individuals, entities, or processes, integrity is the property of accuracy and completeness and availability is the property of the information being accessible and usable upon demand by an authorized entity. In addition, other properties, such as authenticity (i.e. the property that an entity is what it is claims to be), accountability, non-repudiation (i.e. ability to prove the occurrence of a claimed event or action and its originating entities) and reliability (i.e. the property of consistent intended behaviour and results) can also be involved.

Over the past two decades the use ICT has become increasingly pervasive and pertains to all aspects of individuals' activities. Large amounts of information are produced through each interaction with electronic devices (computers, tablets, smart phones). Technological developments such as the cloud, personalization of devices, the Internet of Things, the Web 2.0, electronic identity systems render information security a critical issue not only for individuals and enterprises but also for states, as many countries invest on electronic governance and/or employ ICTs for their critical infrastructure.

Due to the networked and pervasive nature of ICTs, information security incidents (i.e. single or series of unwanted or unexpected events that have a significant probability of threatening information security) are constantly increasing, while, at the same time, security threats (i.e. potential causes of unwanted incident, which may result in harm to information systems or organizations) are evolving.

Current and emerging security issues and the wide availability of innovative security technologies and designs pose great challenges, thus it is vital that ICT research and innovation formulate suitable and viable security policies. However, the increased need to safeguard information security is often realized at the cost of individual rights e.g. through the use of surveillance measures. It is thus important to provide directions to policy- makers, state representatives, computer scientists and ICT industry, as well as to academia and researchers on how to achieve an ethical equilibrium between information security protection and individual rights. These directions can contribute to formulating a balanced information security approach to respond to current and emerging information security challenges, while, at the same time the principles or responsible research are fulfilled.

Reference

Author, Submission Date: Maria Karyda, Lilian Mitrou – University of the Aegean

- ISO/IEC 27000:2014, Information technology — Security techniques — Information security management systems — Overview and vocabulary.

Author of Glossary Entry ISO/IEC 27000:2009

3.45 Information security incident

"single or a series of unwanted or unexpected information security events that have a significantprobability of compromising business operations and threatening information security"

Author of Glossary Entry ISO/IEC 27000:2009

3.46 Innovation/Innovation networks

Innovation, the creation of new, technologically feasible, commercially realisable products, processes and organisational structures (Schumpeter, 1912; Fagerberg, Mowery and Nelson, 2006), is the result of the continuous interactions of innovative organisations such as universities, research institutes, firms such as multi-national corporations and small-to-medium-sized enterprises, government agencies, venture capitalists and others. These organisations exchange and generate knowledge by drawing on networks of relationships (innovation networks) that are embedded in institutional frameworks on the local, regional, national and international level (Ahrweiler 2010). For innovations to emerge, agents require not only financial resources to be invested in R&D, but the ability to recombine their own with external knowledge, to design interfaces to related knowledge fields and to meet customer needs. Because agents engaged in innovation processes are confronted with a high degree of complexity, which is related to their competitors' behaviours, the overall knowledge development, and dynamic changes in their customer needs, it is very unlikely that single firms will master all relevant knowledge fields in isolation, not to mention pushing ahead the technological frontier in all relevant areas. Innovation networks are considered to be an organizational form of R&D which allows for mutual knowledge exchange and cross-fertilization effects among the heterogeneous actors involved. As innovation is recognized as the driving factor of economic growth, an important part of economic policy today focuses on innovation. Not surprisingly political instruments often attach significant importance to supporting innovation networks as they are considered to be an ideal framework for creative knowledge development without well specified (technological) goals.

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Author of Glossary Entry NAMUR

3.47 Integrated platforms

The term integrated platforms are defined as refers to computer software which integrates different applications and services.

Author of Glossary Entry FRAUNHOFER

3.48 Integrity

Innovation, the creation of new, technologically feasible, commercially realisable products, processes and organisational structures (Schumpeter, 1912; Fagerberg, Mowery and Nelson, 2006), is the result of the continuous interactions of innovative organisations such as universities, research institutes, firms such as multi-national corporations and small-to-medium-sized enterprises, government agencies, venture capitalists and others. These organisations exchange and generate knowledge by drawing on networks of relationships (innovation networks) that are embedded in institutional frameworks on the local, regional, national and international level (Ahrweiler 2010). For innovations to emerge, agents require not only financial resources to be invested in R&D, but the ability to recombine their own with external knowledge, to design interfaces to related knowledge fields and to meet customer needs. Because agents engaged in innovation processes are confronted with a high degree of complexity, which is related to their competitors' behaviours, the overall knowledge development, and dynamic changes in their customer needs, it is very unlikely that single firms will master all relevant knowledge fields in isolation, not to mention pushing

ahead the technological frontier in all relevant areas. Innovation networks are considered to be an organizational form of R&D which allows for mutual knowledge exchange and cross-fertilization effects among the heterogeneous actors involved. As innovation is recognized as the driving factor of economic growth, an important part of economic policy today focuses on innovation. Not surprisingly political instruments often attach significant importance to supporting innovation networks as they are considered to be an ideal framework for creative knowledge development without well specified (technological) goals.

Author of Glossary Entry ISO/IEC 27000:2009

3.49 Intellectual Merit

Intellectual merit: A term of art used by the US's National Science Foundation (NSF) to refer to those aspects of proposed research likely to improve scientific knowledge or understanding. The term replaced the criteria of research competence and merit of the research. Any assessment of intellectual merit should answer the following five questions:

1. What is the potential for the proposed activity to [advance] knowledge and understanding within its own field or across different fields…?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

4. How well qualified is the individual, team, or organization to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

For NSF, intellectual merit is paired with another standard of evaluation, "broader impact" (essentially any benefit to society beyond advancing scientific knowledge or understanding). While interpreting "broader impact" seems to have proved troublesome from its first introduction in 1997, interpreting "intellectual merit" has not.

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Author of Glossary Entry Michael Davis

3.50 Internet of things

The Internet of Things (IoT) can be defined as a new and still emerging paradigm that addresses the integration of diverse communication solutions and technologies, the interaction between objects as well as their environment, but also acting and reacting autonomously in an appropriate manner (Medaglia and Serbanati 2010: 389 ff.). Since the founders of the Auto-ID Center at MIT coined the term 'Internet of Things' (Santucci and CONNECT 2010), the concept has widely been employed by researchers and practitioners to describe the combination of the real world with the virtual world of information technology (Bullinger and Ten Hompel 2007; Mattern and Floerkemeier 2010) through the implementation of automatic identification technologies, real-time locating systems, sensors and actuators. However, today different academic disciplines and practitioners' networks emphasize and debate different aspects, which makes the terms anything but self-evident.

"The reason of today apparent fuzziness around this term is a consequence of the name ''Internet of Things" itself, which syntactically is composed of two terms. The first one pushes towards a network oriented vision of IoT, while the second one moves the focus on generic ''objects" to be integrated into a common framework. Differences, sometimes substantial, in the IoT visions raise from the fact that stakeholders, business alliances, research and standardization bodies start approaching the issue from either an ''Internet oriented" or a ''Things oriented" perspective, depending on their specific interests, finalities and backgrounds." (Atzori, Iera, and Morabito 2010: 2)

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Author of Glossary Entry Louisa Grabner (Fraunhofer IPK)

3.51 Life Cycle Assessment

Life Cycle Assessment (LCA) provides mechanisms and methods of quantifying the diverse effects on the environment caused by products throughout their entire life cycle. LCA aims to compare the full range of environmental effects assignable to products and services in order

to improve processes, support policy and provide a sound basis for informed decisions

Reference

ISO 14040: 1997

Author of Glossary Entry FRAUNHOFER

3.52 Methods

"Methods are cognitively stable procedures to reach a goal or knowledge."

Author of Glossary Entry CONSIDER project glossary

3.53 Misconduct (research/scientific)

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. (a) Fabrication is making up data or results and recording or reporting them. (b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record. (c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit. (d) Research misconduct does not include honest error or differences of opinion.

Reference

The Office of Research Integrity, 2011. See on https://ori.hhs.gov/definition-misconduct accessed June 12, 2015.

Author of Glossary Entry Res-AgorA Project

3.54 Moral Pluralism

Moral pluralism is a third way between moral relativism and moral monism. We can speak of moral pluralism or ethical pluralism. More than linguistic habits or philosophical choices, moral and ethics are focusing on different levels (1. social behaviours, 2. moral references, 3. moral theories, 4. meta-ethics). Here moral pluralism concerns the meta-ethical level. It defends the possibility and importance of discussing normative claims per se as defendable positions. Against a monistic position it recognizes the value and importance of rival normative options (for example between moral values or systems of moral values). Against relativism, it does not want to delegate the discussion of normative issues to entities outside the realm of ethics and to reduce ethical issues to group loyalties, cognitive bias, interests, or religious or national particularities. Moral pluralism is based on the recognition of the moral pluralism of values (Kekes, 1993), or, largely, moral theories (Reber, 2006; Kagan, 1998; Becker, 1992). The latter integrates the first one, which is more frequent among moral

philosophers.

The existence of moral pluralism of theories can be traced back a) to the existence of different ethical moral theories like utilitarianism, deontology, or virtue ethics (for a summary see Rachels, 1998; Dreier, 2006). It could also be explained because of the b) existence of different normative elements (from different theories or of the same one).

We can summarize moral pluralism of theories in the following multilevel table of possible ways (Reber, 2011a) of ethical assessments in a context of justification (distinguished from motivation or application).

1) Types of entities assessed in moral perspective:

They are the types of entities or objects (often abstract) which attract attention and which are focused on character traits, acts, feelings, institutions, behavioural norms (individual or collective), processes, rules and foundational theories.

2) Normative factors:

They enter into the ethical assessments on the basis of the following elements: a perspective oriented by the good, the right, equality or equity; evil to be avoided; optimistic or pessimistic assessment or commitments towards the future; consequences and other results; restrictions concerning what is allowed or forbidden (rights converging with ethics); general obligations and contracts (regarding all or particulars); promises; principles; norms; values; virtues.

3) Background in foundational normative theories:

They help to justify factors, to generalize them, to manage them in case of conflicts.

Theories could be strongly monist, defending only one normative factor (for example utility); weakly monist, defending only one factor but also some other types of assessment; weakly pluralist defending several factors and only one type of assessment; strongly pluralist defending several factors and types of assessment.

In the case of monism there should be a rule which explains to retain only one entity to assess and only one normative factor (simple monism) or to rank them before the others (complex monism).

In the case of pluralist systems, it should be explained why the selection or the rankings are arbitrary or could be different (make counter-proposals).

Conflict management could be handled through a personal point of view, impersonal or collective one. Theory could target the promotion or maximisation (or arrive to a point of excellence) of the selected factor (or factors).

This management could comprise optional dimensions or, on the contrary, what goes beyond the duty or the obligation (subrogatory).

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Author of Glossary Entry UPD

3.55 Motion Analysis

The visual analysis of human motion attempts to detect, track and identify people, and to interpret human behaviours, from image sequences involving humans. Motion analysis is the science of comparing sequential still images captured from photographing a body in motion in order to study the kinematics (i.e., the motions themselves) and the kinetics (i.e., the external and internal forces).

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Author of Glossary Entry FRAUNHOFER

3.56 Nanotechnology

The design, characterization, production, and application of structures, devices, and systems by controlled manipulation of size and shape at the nanometer scale (atomic, molecular, and macromolecular scale) that produces structures, devices, and systems with at least one novel/superior characteristic or property.

Reference

Raj Bawa, S.R. Bawa, Stephen B. Maebius, Ted Flynn, Chiming Wei, Protecting new ideas and inventions in nanomedicine with patents, Nanomedicine: Nanotechnology, Biology and

Medicine, Volume 1, Issue 2, June 2005, Pages 150-158

Author of Glossary Entry FRAUNHOFER

3.57 New Public Management

New Public Management is a public sector's government and leadership paradigm that was introduced in the 1980's especially in England but also in other countries like US, Australia and New Zealand. Later it was also disseminated to other countries like Finland, Sweden and Netherlands, where public management reforms have been, however, usually more modest than in Anglo-Saxon countries. These administrative changes have been based on the assumption that public sector's operations and service production are inefficient and ineffective and that this would lead to increasing taxation and declining standards of public service. The central drivers of reform therefore, were to stop increasing costs and improve performance. (Dawson & Dargie 2002).

With varying emphasis the reform has included such elements as stress on private sector styles of management, measures of performance, and output controls. New Public Management has also had the impact of lessening the previous differences between the public and private sector (Pollitt 1993; Pollitt & Summa 1995). Pollitt (1995) has proposed that there are certain principles that in varying combinations are found in NPM reform ideology. These principles include: 1. Efficiency, 2. Decentralization, 3. Introduction of market and quasi-market mechanisms, 4. Disaggregating traditional bureaucracies into separate agencies, 5. Application of performance targets, productivity measurement and evaluation, 6. Shifting basis for public employment, 7.Separating the function of providing public services from that of purchasing them, 8. Increasing emphasis on values like "quality" and "use-orientation".

There is no shared understanding of the reasons for the development of NPM. Some researchers have explained it as being due to a country's poor economic performance and fiscal stress, whilst others have referred to party politics and especially to the rise of the'New Right'. However, It has been also pointed out that there is no simple causal relationship between poor economic performance and NPM, or between political orientation and NPM. For instance, Sweden had high economic performance and left-wing governments during the 1980s, but it also advocated New Public Management (Hood 1995).

There are several ways that NPM has manifested itself in the management and steering of public R&D organizations. Most research performing organizations are expected to behave like market actors in the marketplace of research services. This goal is, in turn, supported by new steering mechanisms emphasising the use of competitive funding mechanisms, performance targets, productivity measurement and evaluation. The efficient use of public resources also necessitates social "usability" and relevance from research. (Dimmen A., Kyvik S. 1998)

Recently there have been views expressed that NPM is now passing by. In general this may be due to various views, which have emphasized citizen participation, the increasing role of

networks and their governance, as well as complex system views, all of which have questioned the continuing validity of the NPM (Wikipedia, 12.3.2013). Dunleavy et al. (2005) have put forward the view that digital governance and wider participation structures are substituting NPM. Despite this, it seems that the central values and criteria of the NPM are still strong. E.g. efficiency and effectiveness of public services and administration are central objectives for governments in the middle of economic constraints and fiscal challenges. Relevance to the GREAT project

The perspective of NPM is relevant for RRI due to the fact that it involves the idea of public target setting and control of actors via assessment or evaluation of activities. It forms the general framework where RRI ideas are implemented in public administration. RRI also emphases values like “quality”, “use-orientation” and “societal impact”, which are of central issues within NPM. It can be also considered, whether RRI forms just another performance criteria for the R&D actors alongside the existing ones thus adding performance as another form of control over their actions? The latter implies a meta-critical or reflective perspective to the project.

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Author of Glossary Entry VTT

3.58 Non-governmental Organization

”NGOs are not- for-profit organizations that work outside of the government.”

Author of Glossary Entry CONSIDER project glossary

3.59 Non-repudiation

"ability to prove the occurrence of a claimed event or action and its originating entities, in order to resolve disputes about the occurrence or non-occurrence of the event or action and involvement of entities in the event"

Author of Glossary Entry ISO/IEC 27000:2009

3.60 Normativity/Norm

Norms are sentences or sentence meanings with practical, i.e. action-oriented (rather than descriptive, explanatory, or expressive) import, the most common of which are commands, permissions, and prohibitions. Another popular account of norms describes them as reasons to act, believe or feel.

Orders and permissions express norms. Such norm sentences do not describe how the world is, rather they prescribe how the world should be. Imperative sentences are the most obvious way to express norms, but declarative sentences also do it very often, as is the case with many laws. Generally, whether an expression is a norm does not depend on its form, on the type of sentence it is expressed with, but only on the meaning of the expression.

Those norms purporting to create obligations (or duties) and permissions are called deontic norms (see also deontic logic). The concept of deontic norm is already an extension of a previous concept of norm, which would only include imperatives, that is, norms purporting to create duties. The understanding that permissions are norms in the same way was an important step in ethics and philosophy of law.

In addition to deontic norms, many other varieties have been identified. For instance, some constitutions establish the national anthem. These norms do not directly create any duty or permission. They create a "national symbol". Other norms create nations themselves or political and administrative regions within a nation. The action orientation of such norms is less obvious than in the case of a command or permission, but is essential for understanding the relevance of issuing such norms: When a folk song becomes a "national anthem" the meaning of singing one and the same song changes; likewise, when a piece of land becomes an administrative region, this has legal consequences for many activities taking place on that territory; and without these consequences concerning action, the norms would be irrelevant. A more obviously action-oriented variety of such constitutive norms (as opposed to deontic or regulatory norms) establishes social institutions which give rise to new, previously inexistent types of actions or activities (a standard example is the institution of marriage without which "getting married" would not be a feasible action; another is the rules constituting a game: without the norms of soccer, there would not exist such an action as executing an indirect free kick).

Any convention can create a norm, although the relation between both is not settled.

There is a significant discussion about (legal) norms that give someone the power to create other norms. They are called power-conferring norms or norms of competence. Some

authors argue that they are still deontic norms, while others argue for a close connection between them and institutional facts (see Raz 1975, Ruiter 1993).

One major characteristic of norms is that, unlike propositions, they are not descriptively true or false, since norms do not purport to describe anything, but to prescribe, create or change something. Some people say they are "prescriptively true" or false. Whereas the truth of a descriptive statement is purportedly based on its correspondence to reality, some philosophers, beginning with Aristotle, assert that the (prescriptive) truth of a prescriptive statement is based on its correspondence to right desire. Other philosophers maintain that norms are ultimately neither true or false, but only successful or unsuccessful (valid or invalid), as their propositional content obtains or not (see also John Searle and speech act).

Another purported feature of norms, it is often argued, is that they never regard only natural properties or entities. Norms always bring something artificial, conventional, institutional or "unworldly". This might be related to Hume's assertion that it is not possible to derive ought from is and to G.E. Moore's claim that there is a naturalistic fallacy when one tries to analyse "good" and "bad" in terms of a natural concept. In aesthetics, it has also been argued that it is impossible to derive an aesthetical predicate from a non-aesthetical one. The acceptability of non-natural properties, however, is strongly debated in present day philosophy. Some authors deny their existence, some others try to reduce them to natural ones, on which the former supervene.

Other thinkers (Adler, 1986) assert that norms can be natural in a different sense than that of "corresponding to something proceeding from the object of the prescription as a strictly internal source of action". Rather, those who assert the existence of natural prescriptions say norms can suit a natural need on the part of the prescribed entity. More to the point, however, is the putting forward of the notion that just as descriptive statements being considered true are conditioned upon certain self-evident descriptive truths suiting the nature of reality (such as: it is impossible for the same thing to be and not be at the same time and in the same manner), a prescriptive truth can suit the nature of the will through the authority of it being based upon self-evident prescriptive truths (such as: one ought to desire what is really good for one and nothing else).

Recent works maintain that normativity has an important role in several different philosophical subjects, not only in ethics and philosophy of law (see Dancy, 2000).

Author of Glossary Entry NAMUR

3.61 Participation

Refers to a wide range of practices to include the notion of encouraging, involving and the inclusion of individuals, groups of people or communities to be part of a process.

Author of Glossary Entry VTT

3.62 Participatory Technology Assessment

Participatory Technology Assessment (pTA) is a qualitative (scientific) method for determining the attitudes, interests, and patterns of argumentation used by laypersons with regard to complex issues of science and technology policy. Participatory technology assessment in this regard is supposed to improve the knowledge basis of policy decisions.

Science and technology policy has been among the first policy fields where the need for participation was articulated, initiated by the 'participatory revolution' in the 1960s (Nelkin 1984). Since then, pTA developed and practically implemented innovative forms of citizen participation. Prominent examples that nowadays can be found in the numerous "participatory toolboxes" comprise models such as Citizen Panels (Amelung 2012), citizens' foresight formats, scenario workshops or stakeholder dialogues (Abelson et al. 2003).

In line with RRI pTA points to the growing significance of (participatory) technology assessment methods in order to deal with the publics' as well as stakeholders' concerns, critique and doubts to new developments on science and technology in general. In particular, pTA aims to establish means to answer questions of uncertainty and inequality in the modern reflexive society, and as a new interactive development in policy analysis. As such, the relevance of pTA for RRI lies in the process dimension. The institutional approval and promotion of pTA therefore paves way for an implementation of core pillars of RRI, i.e. anticipation, reflexivity, inclusion and responsiveness (cp. Stilgoe, Owen, and Macnaghten 2013).

Participatory TA-Methods are designed to provide process support for direct, interactive inclusion of affected social actors in scientific and technological development. Target groups comprise a range of RRI actors such as interest groups, consumers and members of the general public, along with professional experts and policy makers. Today, many national TA organizations as well as the European TA board are experimenting and implementing participatory methods, in order to improve interaction between the public, experts, stakeholders and policy-makers (Dalferth 2008; European Citizen Action Service 2010; Joss and Bellucci 2002).

At the core of pTA, participation is not only a random means for the assessment of scientific or technological impacts but rather an essential part of its conception. The problem with participation is the fact that it—However, as an attempt to incorporate democratic governance of technology policy participation first has to provide the basis and conditions for its implementation. Habermas noted long ago that essential "empirical conditions for the application of the pragmatist model are lacking," including enlightened public debate.While experts and political decision makers still hold firmly onto a "bureaucratized exercise of power", public debate is essentially lacking the necessary conditions for public debate and the application of extensive participatory inclusion of all affected parties that goes beyond mere information and consultation practices (Irwin 2001, 2014).

Approaches of pTA acknowledge the role of alternative rationalities that have to be included into S&T development throughout the entire process, to make their outcomes more robust. In particular, it emphasizes that laypeople are in fact capable of dealing with expert knowledge in a rational manner and of reflecting on and grounding their own standpoint on

ethical issues in the light of this knowledge (Einsiedel, Jelsøe, and Breck 2001; Joss and Bellucci 2002; Renn, Webler, and Wiedemann 1995; Zimmer 2002).

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Author of Glossary Entry FRAUNHOFER

3.63 Pattern recognition

Pattern recognition techniques are able to automatically interpret complex behavioural patterns generated when humans interact with machines or with others.

Reference

A. K. Jain, A. Ross and S. Prabhakar, "An Introduction to Biometric Recognition," IEEE

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Author of Glossary Entry FRAUNHOFER

3.64 Personal data

Any information relating to an identified or identifiable natural person (the data subject).

Author of Glossary Entry Definition in Data Protection Directive of the European Union (Directive 95/46/EC)

3.65 Policy

Policy is a shared vision and plan of ideas and actions to the specifically determined goals and intentions. However this is a very general definition of policy there are also the challenge that means that more detailed definitions are required according to the specific contexts.

In general public policy seeks to achieve a desired goal that is considered to be in the best interest of all members of society. [1] The question is still: who the policy makers are, for what purposes, sharing whose intentions and values?

Torjman (2005) states that: 'public policy represents a decision, made by a publicly elected or designated body, which is deemed to be in the public interest'.

Policy development involves the selection of choices about the most appropriate means to a desired end. A policy decision is the result of a method, which in theory at least, considers a range of options and the potential impact of each. The weighing of options takes into account various factors, including:

- Who benefits? (the more the better)
- Who might be negatively affected? (the fewer the better)
- Time required to implement a solution
- Associated cost and financing
- Political complexities of a federated government structure.

An example of reasoning for policy decisions is that of the European Union whereby The Treaty of Lisbon defines policies for various segments of life – "Policies for a better life".[2]

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Author of Glossary Entry VTT

3.66 Policy Advice

The term "policy advice" stands for the targeted knowledge transfer between policy makers (actors) and advising experts. Simplified, this transfer involves a two-way communication. First, issues which require a policy decision are communicated from the actors to the advisors (e.g., challenging questions on bioethical issues put forward by the parliament). Subsequently, guiding knowledge is provided from the advising party.

The process aims at informed choices by the actors and thereby the formulation of reasonable policies (see also "Policy" within this glossary). The actors typically come from the executive and legislative branches of the political sphere and from policy administration, but also from civil society, economy, science and/or humanities, depending upon the specific contexts and problems at stake. Advisory bodies can be recognised individual experts or specific institutions, such as think tanks or experts' commissions.

Whilst policy advice is not a new phenomenon, its importance has grown considerably since modernity especially in democratic societies. The reason for this is twofold:

(1) Scientific and technological progress offers new but often confusing options for innovation while making socio-technological life-worlds progressively complex. This complexity challenges decision makers especially with regard to significant uncertainties on the realisation of intended consequences of their choices as well as on related possibly harmful side-effects of action.

(2) Corresponding chances and risks might be unevenly distributed between different societal groups; a problem of justice.

Appropriate advice can therefore contribute to the reduction of ambiguity of policy decisions and thereby broaden societal acceptance.

A common approach for policy advice is described by Kamp (2014). According to this approach, policy advice will be given at different levels:

(1) the simplest form of advice aims at finding, adapting and securing the appropriate means to the ends of the actor.

(2) In particular cases, the application of certain means might be either restricted by societal norms and values or followed by inacceptable side-effects. However, they may also collide with implicit secondary aims of the actor, which have to be explicated. Following this step, the advice has to adapt the proposed means and measures to both, external and internal factors. The consideration of side-effects and secondary aims might thus result in finding alternative actors' strategies without major restrictions.

(3) However, this outcome cannot be guaranteed in all cases, which is why only certain actors' aims might turn out to be achievable at the same time. Therefore, the relevant

(secondary) aims have to be prioritised for their selection and for subsequent finding of related comprehensive acting strategies.

Concluding, policy advice is a sophisticated task. The complexity, uncertainty and ambiguity of possible choices are reasons why policy advice often needs iterative reflection between experts and their clients. It is therefore rarely realised on an ad-hoc basis, today.

Providing policy advice is not un-contentious. The considerable interpretation demands of modern knowledge and the practical utility prospects of externally funded research have strong evaluative and normative implications from different societal perspectives, which might challenge the advisors' impartialities (Habermas 1969; notably pp. 120-145). Especially, the settings of commissioned consultancy might cause advisory dilemmas due to conflicts of interests, thus leading to lobbyism. Publicly funded policy advice is instead in need of experts as "honest brokers". Corresponding guidance for good practise is still evolving (see for instance Weingart et al. 2008).

The final success of policy advice depends on the performance of the knowledge transfer between the advisory parties, the quality of the expert's knowledge and the realisation of the acquired acting knowledge.

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Author of Glossary Entry Stephan Lingner

3.67 Power

Power can be considered as the "[a]bility to act or affect something strongly" and as the "[c]ontrol or authority over others" (Oxford English Dictionary 2013). There are various forms of power, overt as well as subtle ones. For instance, a hierarchy is a particular way of distributing power in an organization. If organizational hierarchies are backed by claims of formal as well other types of rationality, they appear legitimate, at least in "modern" societies (cf. Weber 1921/1980: 122-130). Furthermore, discourses can be powerful (e.g., Foucault 1971). Moreover, national and international funding agencies can exert power by awarding or denying financial resources. Power can also be executed indirectly when it is imbedded in the design of artefacts, including technologies. However, people can often find ways to circumvent such design features and develop their own usages. This user agency can

be regarded as a countervailing power to the “politics of artefacts” (Winner 1980; Oudshoorn/Pinch 2003). According to the above definition, there are different overt and subtle forms of power that nest in research and innovation processes. We should identify these varieties in our empirical studies and study their consequences for “responsible” behaviour. For instance, a researcher or IT professional might not be able to act in a more “responsible” way (e.g., account for wider societal expectations) because he is in a low position in terms of the organizational hierarchy, or because his wage depends entirely on short-term external funds.

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Author of Glossary Entry UOXF

3.68 Precaution

Precaution is a. an action taken in advance to protect against possible danger, failure, or injury; a safeguard b. Caution practiced in advance; forethought or circumspection.

Precaution according to www.dictionary.com is a measure taken in advance to avert possible evil or to secure good results; and b. caution employed beforehand; prudent foresight

Precaution may be defined as "caution in advance," "caution practised in the context of uncertainty," or informed prudence. All definitions have two key elements:

• An expression of a need by decision-makers to anticipate harm before it occurs. Within this element lies an implicit reversal of the onus of proof: under the precautionary principle it is the responsibility of an activity proponent to establish that the proposed activity will not (or is very unlikely to) result in significant harm.

• The establishment of an obligation, if the level of harm may be high, for action to prevent or minimise such harm even when the absence of scientific certainty makes it difficult to predict the likelihood of harm occurring, or the level of harm should it occur. The need for control measures increases with both the level of possible harm and the degree of uncertainty.

The precautionary principle or precautionary approach states if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not

harmful falls on those taking an act.

Paragraph 2 of article 191 of the Lisbon Treaty states that "Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay."

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Author of Glossary Entry SIGNOSIS

3.69 Precautionary Principle

The meta-norm of precautionary principle (PP) founds its first coherent formal shape in the Vorsorgeprinzip, enunciated in German environmental policy in the early 1980s. Strictly speaking, the German word focuses more on anticipation than responsibility, attention or care. There has been proposed a simple definition of PP, one that has been widely adopted in the regulations regarding marine pollution, climate change and biodiversity loss, dangerous chemicals, and genetically modified organisms (GMOs). After the World Charter for Nature was adopted by the United Nations General Assembly in 1982 and the first mention of PP, one archetypal and globally influential formulation of the concept appeared as Article 15 of the 1992 Rio Declaration on Environment and Development. That section holds: In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (UNEP, 2007)/ There is a statement in one of the main documents on the Precautionary Principle for the European Policy, the Communication from the Commission on the Precautionary Principle (EC, 2000). It says very strongly that "An assessment of the potential consequences of inaction should be considered and may be used as a trigger by decision-makers. The decision to wait or not to wait for new scientific data

before considering possible measures should be taken by decision-makers with a maximum of transparency. The absence of scientific proof of the existence of a cause-effect relationship, a quantifiable dose/response relationship or a quantitative evaluation of the probability of emergence of adverse effects following exposure should not be used to justify inaction. Even if scientific advice is supported only by a minority fraction of the scientific community" (idem, art. 6.2., p. 16).

Even those who feel skeptical toward the precautionary principle recognize its weaker definition, because "its requirement [says] that bounds be put on the uncertainty surrounding scientific knowledge (...) when there is a very great uncertainty regarding the likely impact of technology" (Morris, 2000, pp. 14-15).

Compared with the traditional decision criteria facing uncertainty, in applying the PP to practical (policy) issues (Reber, 2009), the different considerations are manifestly matched, namely those for: economics, legal (rights), risks of damages, and technologies. One novelty of the criteria in PP is its characterizations of this meta-principle as "serious and irreversible damage," a "lack of full scientific certainty" and the impossibility to postpone, based on those conditions. The last point here is clearer in Article 10 of the Cartagena Protocol on Biosafety, ratified in June 2003. The Decision Procedure therein states: "10.6. Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of potential adverse effects of a living modified organism (...) shall not prevent that Party from taking a decision, (...) in order to avoid or minimize such potential adverse effects." (Annexe A, (Myers & Raffensperger, 2006, p. 323).

Indeed PP installs a new relationship between scientific uncertainty and policy decision (Stirling, 1999). The reverse use of scientific uncertainty, in terms of what should be assessed and simply often used as an excuse for governments to avoid making beneficial but drastic decisions, could be possible. Because of its possible arbitrary application, however, some political and law philosophers' prefer the classical form of risk/benefit assessment to the precautionary principle (Sunstein, 2005), pretend that PP has not a set of criteria to guide its implication (Gardiner, 2006), when others are very hostile toward it (Morris, 2000).

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Author of Glossary Entry UPD

3.70 Privacy

It is relatively easy to state the benefits of privacy from the perspective of the individual. Rossiter (1958) considers that privacy provides the individual with 'independence, free will, secure autonomy, dignity and resolve against the whole world' (Rossiter, 1958 p.24). The concept of independence and resolve against the world does however appear rather confrontational and does not seem to appreciate the need for co-operation and participation. Nor is it able to take into account the nature of today's information society whereby individuals who have the need to participate for a wide variety of purposes, must also give up some of their privacy and personal information in order to do so. Concerns about privacy can include fears for its loss, invasion or violation, which certainly give an indication of its importance even if privacy as a term remains a slippery term to define. How individuals see the world they live in, will inevitably have an effect on what they perceive to be a valid

definition of privacy. This is further complicated by the changes to perception over time or during particular life-stages.

Understanding the need for privacy goes some way towards developing a definition that can be utilized as a standard across the GREAT project. Definitions tend to be derived from a wide range of perspectives, including rights based, normative, descriptive, or imbued with some kind of property right (Hunter 1995). One of the earliest and perhaps most famous attempts in modern times to define privacy is 'The right to be let alone' (Warren and Brandeis, 1890 p.205). This provides a non-intrusion 'freedom from' definition but does not address the 'freedom to' aspect of privacy. Later, Westin (1967) saw privacy as 'The claim of individuals, groups or institutions to determine for themselves when, how, and to what extent information about them is communicated to others' (Westin, 1967 p.7), but this only provided limitations on informational privacy and did not consider for example bodily privacy. Gavison (1980) expanded the scope of privacy to include 'the limitation of others' access to an individual with three key elements: secrecy, anonymity and solitude' (Gavison, 1980 p.421) but then failed to consider beyond the focus on the individual and seclusion theory.

Moor's (1990, 1997) suggests a restricted access/limited control (RALC) theory of privacy which, whilst still chiefly concerned with the individual, also provides an approach that sees privacy as 'protected from intrusion, interference, and information access by others' (Moor 1997). This approach will be utilized as a way of normalizing understanding of privacy within the GREAT project, as RALC theory has the ability to 'distinguish between the condition of privacy and a right to privacy and between a loss of privacy (in a descriptive sense) and a violation or invasion of privacy (in a normative sense)' (Tavani 2007 p. 19). This provides the multi-faceted and therefore inclusive and wide-ranging understanding of privacy that should be a requisite for the governance of any responsible research and innovation activity.

Moreover, recent developments mean that by mid 2013, the EU will have finalized its proposed data protection legislation which is intended to harmonize data protection standards across the whole of the EU member states. This will have the significant impact on EU Research and Innovation projects in the future and means that awareness of the importance of privacy protection will become increasingly significant and reinforce the need for RRI.

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Author of Glossary Entry DMU

3.71 Privacy by design

Privacy by Design (PbD) is a concept, demand and guideline for technology design processes, which aims to enhance sensibility about data protection and provide tangible guidelines for its implementation. In brief, PbD describes an approach to incorporate considerations about privacy and data protection into IT systems and technological products at an early stage of their development. Developing in the sense of PbD means to directly implement data protection into technology. A related concept is known as Privacy by Default, which refers to the idea of increasing user-friendliness by means of data protecting default settings. PbD, however, is said to go beyond basic forms of protection by limiting the amount of data collection to a necessary minimum right from the beginning (cf. Schaar 2010).

In the USA, the approach has been elaborated in the 1990s by Dr. Ann Cavoukian, former Information and Privacy Commissioner of Ontario. Cavoukian articulates seven characteristics of PbD, which are: Proactive design, privacy settings as default, embedding privacy into the process, full functionality, end-to-end security, transparency and respect to user privacy. (Cf. Cavoukian 2011) Other sources partially differ or supplement these characteristics. Especially data minimization is claimed to be another key issue of PbD. (Rest et al. 2012; Gürses et al. 2011)

In Europe the concept is discussed since the early 2000s data protection became an issue of global policy and steady subject of interest. (Cf. Rest et al. 2012) PbD, in this sense, can be read as response to public concerns about data protection, particularily, since in the course of digitalization and big data, more and more applications make use of personal information. In this context, the handling and processing of data became a huge societal challenge. Examples of current debates about privacy are manifold, ranging from, inter alia, RFID technology to smart devices, geo data or biometrics.

The European Commission addresses increasing demands for reliable standards on privacy by integrating the PbD approach into existing plans to reform data protection regulation (95/46/EG). These attempts, however, have not been embedded in law up until today and have been criticized as vague for lacking binding forms of implementation in practice (van Rest et al. 2012; Gürses et al. 2011).

PbD, in sum, highlights the idea that privacy is about more than regulation only, but can be rather conceptualized as a matter of responsibility concerning people in research, planning and development. Responsible innovation in this sense means to avoid potential privacy

violations at an early stage of development, instead of handling privacy as an issue to be tackled subsequently. In doing so, a societal demand for privacy standards and data safety is taken seriously.

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Author of Glossary Entry Alissa Sprenger (Fraunhofer IPK)

3.72 Privacy impact assessment

Designing and development of technologies is a process characterized by choices and decisions that primarily focus on functional efficiency and serviceability without taking into account human rights aspects of their deployment. Impact assessments have been suggested as a useful tool for technology developers to help them to consider potential negative consequences of particular elements of a technology design. One of the objectives of an impact assessment is to engage stakeholders in order to identify, discuss and find ways of dealing with the issues arising from the development of new technologies.

As Privacy Impact Assessment (hereafter PIA) is understood a methodology/ methodologies for considering and assessing the impacts of a project, policy, programme, service, product or other initiative on privacy. The fundamental right to privacy is enshrined in the EU Treaties and in the EU Charter of Fundamental Rights.

PIA is a tool that can be used to identify privacy risks. PIAs are defined and employed in different ways but they have in common recognition of the need to involve in the

assessment process stakeholders interested in or affected by a risk, including citizens. At the core of most PIA methodologies lies a series of open and closed questions that are meant to raise awareness of privacy issues and to help find suitable solutions and take remedial actions in order to minimize negative effects and mitigate risks. Therefore PIAs have to be conducted/ considered at the design phase and in any case as early in the development cycle as possible. Stakeholders are to be engaged from the outset as a way of gathering their views and ideas about how any intrusive privacy impacts and harms can be avoided or mitigated. In this perspective PIAs are related to privacy by/in design that asserts that privacy has to be ”embedded ” into the design of the technology or system.

At the basis of the adoption of privacy impact assessment is the assumption that technological design decisions should support values and fundamental rights. Technological development has to be in line with social and legal standards and agendas aiming at ensuring not only compliance but also social acceptance. PIAs must comply with (more than just data protection) legislation. Organizations have to consider industry standards, codes of conduct and privacy policy statements. Compliance and anticipation requires actors engaged in research and innovation to consider the social and legal contexts and impacts of their work and where necessary control of risks and impacts. PIAs are considered as tools to produce knowledge and as element of risk management.

The literature concerning PIA has concentrated till now mostly on procedural issues. Attention has to be paid to the envisaged outcome of an impact assessment: Impact assessment represents a tool of/for technology and research governance, being an element of responsibility and respective decision making. Impact assessments are often understood as instruments to bring rationality and responsibility into decision making processes concerning conflicting goals and values.

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3.73 Product Data Management

Product Data Management manages the data related to a specific product during its entire life cycle. It is an engineering discipline that includes different methods and tools. The data content involves the structures of the products, including lists of their components, and product configurations that identify all artifacts belonging to a particular product version. It also supports procedures during the product life cycle and it deals with the development as well as production infrastructure. Furthermore the stored data includes engineering data such as CAD models, drawings and other documents. Thus PDM promotes data exchange among all participants who are engaged in the development or use of a product.

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Author of Glossary Entry FRAUNHOFER

3.74 Product-Service Systems (PSS)

A product-service system (PSS), also known as a function-oriented business model, is a business model, developed in academia, that is aimed at providing sustainability of both consumption and production.

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3.75 Proportionality principle

The Proportionality principle is a three-part test based on the criteria of suitability, i.e., 1) whether the measure in question can fulfil necessity, 2) whether another less intrusive measure cannot fulfil the desired purpose with equal effectiveness; and appropriateness, 3) whether the measure in question stands in a reasonable relationship to the intrusions it will cause

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3.76 Reflexivity

"Reflexivity refers to the ability for participants to evaluate their own positions with respect to how they conceive of their own values, norms and so on."

Author of Glossary Entry Glossary CONSIDER project

3.77 Research

The Oxford online dictionary considers research to be 'the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions'. The UK Research Excellence Framework however provides a more detailed definition of research as including 'work of direct relevance to the needs of commerce, industry, and to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes, including design and construction.' (HEFCE 2012)

The purpose of undertaking research may be an attempt to develop new theories, products or services or it may be undertaken in a way that directly addresses existing or emerging needs or problems or is undertaken to establish, confirm or reaffirm the results of previous work, either to reinforce its validity or to advance knowledge to a new level. (Morgan, 2007, Bryman, 2004, Cresswell, 1998). It may also be necessary to undertake research that tests the validity of instruments, procedures, or experiments prior or subsequent to their adoption. In this way better understanding of predicted outcomes may be achieved or new outcomes may be discovered resulting from research undertaken after implementation (Morgan, 2007)

Research therefore has the intention of advancing human knowledge through utilising a range of tools, instruments and approaches. Controversies will inevitably arise where philosophical approaches conflict across disciplines (Bryman, 2004). For example epistemological differences between how we understand and relate to the world alongside philosophical concerns about the nature of existence and assumptions about beliefs (ontology) may result in intractable or highly complex differences in perception of validity. Further, different paradigms that indicate a world-view or 'stance' will likely impact on the methodologies employed to undertake research investigations. As Popper indicates, 'It is comparatively easy to agree on observations of physical phenomena, harder to agree on observations of social or mental phenomena, and difficult in the extreme to reach agreement on matters of theology or ethics' (Popper 1959).

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3.78 Responsibilisation

Responsibilisation strategies do characterise governance approaches to research and innovation activities regulation based on the idea of "predisposing actors to assume responsibility for their action" (Dorbeck-Jung, Shelley-Egan 2013). The meaning of "assuming responsibility" has to be clarified as responsibility is "a syndrome of concepts" (Vincent 2011) variously interconnected (e.g. Davis 2012, van de Poel 2011, Stahl 2004). The different meanings of responsibility do turn around two basic ideas: that of the ascription (imputation) of responsibility, which sketches responsibility as essentially passive (being held responsible for something), and that of the voluntary assumption of responsibility, which sketches responsibility as essentially active (voluntarily assuming responsibility over a certain state of affairs).

The distinction between the active and the passive modalities of responsibility in its turn entails the distinction between the temporal directions of responsibility, namely the retrospective and the prospective (Cane 2002). Retrospective responsibility, or "historic responsibility" (Bovens 1988), is backward-looking, i.e. past-oriented, and is essentially linked to the idea of a reaction (be it on the form of sanction, compensation or justification). Prospective responsibility is forward-looking, i.e. future-oriented, and is essentially linked to the idea of assuming and exercising responsibility, certainly in the sense of complying with some pre-established duties, but also by (pro)actively assuming responsibilities when specific duties are not (or cannot) be established in advance.

Therefore here we can maintain, with some unavoidable simplifications, that responsibility can be equally understood in terms of:

- obligation to bear the consequences of an action (liability);

- capacity to act taking into account one's duties and subsequently giving an account of it (accountability);

- disposition to go beyond the strict limits of what is mandated by the law, without relying on general pre-established rules nor waiting for ex-post accounts (responsiveness).

When talking about responsibilisation, the idea of "assuming responsibility" has to be intended in terms of responsiveness, more than in terms of accountability or liability. In

contrast with liability or accountability, responsiveness implies behaviour and practice that extend over and above legal requirements and which therefore has to be fulfilled with voluntary, extra-legal engagements: this takes responsibility far from the logic of responding to a charge (reaction) typically associated to legal responsibility, and gets it closer to the logic of responding to a call (response) not linked to legal duties and obligations: "Responsiveness refers to a situation where there is neither presumption of sufficient knowledge and control nor reliance on ex-post accounts and adjustment of self-established courses of action, but rather a receptive attitude to external inputs to help in deciding what to do" (Pellizzoni 2004, 557).

R&I governance approaches based on responsibilisation do require a proactive commitment towards common societal goals by the researchers and the innovators. "Responsibilisation - namely expecting and assuming the reflexive moral capacities of various social actors - is the practical link that connects the ideal-typical scheme of governance to actual practices on the ground" (Shamir 2008).

As a technique of governance, responsibilisation is based on the self-regulatory capacity of those whose activities have to be regulated, in particular by stimulating them to internalise social values and to ensure that these values are built into self-regulatory activities. In particular, responsibilisation strategies are centred on the adoption and the practical implementation of (self-)regulatory instruments such as codes of conduct, guidelines, technical standards, reporting, audits, and so on. This type of regulatory instruments promote the integration of different levels of governance, granting diversity and decentralization, aiming at enhancing participation and power sharing between those whose activities are to be (self-)regulated and the stakeholders.

All those features do characterise responsibilisation as a future-oriented and active assumption of responsibility (Gorgoni 2016), so that the definition of responsibilisation could be recasted as follows: "predisposing actors to voluntarily engage their responsibility for the environmental and societal outcomes of their action at an early stage, beyond the strict limits of what is mandated by the law".

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Author of Glossary Entry Res-AgorA Project

3.79 Responsibility

It might be strange to present an entrance entitled "responsibility". Indeed, every piece of analysis on RRI should be focused on different elements of responsibility. Firstly we have seen that is rarely the case. Secondly we defend a pluralistic normative approach of responsibility that has consequences on the RRI analysis. One of the assets of this approach is the coherence between responsibility and RRI and the fact that we hopefully do not miss the point of responsibility.

Both the Corporate Social Responsibility (CSR) and current RRI – more often Responsible innovation - literature are limited by their inexplicit conception of responsibility. And yet, moral philosophy (i.e. Fisher and Ravizza, 1998) provides at least ten or eleven different meanings of the concept, offering a variety of pathways for practical implementation. As synthetically, but only partially, presented by van de Poel (2011) and Vincent (2011), borrowing from Hart (1968), responsibility can be understood as a:

1) role ((Hart, 1968; van de Poel, 2011), 2) task, 3) capacity, 4) authority, 5) virtue (Jonas, 1984), (care; Groves, 2006; Grinbaum and Groves, 2013; Kelty, 2009; van den Hoven, 2013), 6) responsiveness, (Owen et alii, 2012, 2013; Blok, 2014), 7) obligation, 8) accountability

(Grunwald, 2011; Bovens, 1998, 2010; Bovens et alii, 2014), 9) blameworthiness (Strawson, 1962; McKenna, 2012; Raz, 2011); 10) liability. Some authors add 11) causes or outcomes (Hart, 1968; Vincent, 2011), making both meanings equal (Perry, 2000). However, responsibility as a cause raises difficulties in moral philosophy as the freedom of either an individual or a collective entity is shelved when a deterministic conception of action is adopted (Fischer, 1999).

There is no need to choose only one meaning of responsibility among this set since various conceptions can be included to form an appropriate framework for RRI. To start, three meanings of responsibility can be of particular interest for RRI. First an RRI framework can draw on responsibility conceived as responsiveness (an ability of individuals and organization to adapt to changing environments and requirements of other stakeholders). Then, there is responsibility as a virtue (or as care), which implies that social actors of innovation and research (but also NGO's and the civil society) commit themselves to respond to the needs of others (created by the emergence of science and technology). Worth to mention is finally the idea of responsibility as an internal accountability, which can be viewed as an active performance of individuals to engage in a learning dialogue (explaining the reasons behind decisions to those who are concerned with enhancing the sustainability of activities and opening the possibility of better cooperation between various stakeholders).

Besides that, while implementing RRI, it is important to distinguish between negative and positive understandings of responsibility. Negative understandings such as "liability", a type of (external) accountability (Bovens, 1998) or "blameworthiness" are backward looking (e.g. when we have to pay for a damage we caused). They are meant to induce appropriate behaviour through the threat of possible sanctions. For RRI, positive conceptions of responsibility would be more adequate since they can be both backward and forward looking (allowing for future oriented actions).

Relevance to the GREAT project (300 words, 341)

RRI has become a powerful tenet of the European Commission discourse on science and society. And yet, the concept has remained surprisingly under-theoretically developed by RRI advocates, who appear to be more interested in investigating the "ingredients" or "pillars" of responsibility than the normative dimension of it. In order to fill this gap, we have tried to consider 'moral responsibility'. The very definition of "responsibility" has never been considered systematically, although this vagueness hinders RRI's practical relevance. In order to fill this gap, we have investigated some of the many dimensions of the concept (Pellé and Reber, 2015a, 2015b). However, we have not advocated a single normative understanding of responsibility. On the contrary, we have defended a pluralistic conceptual view thus avoiding, on the one hand, a monistic approach (where a single moral element - or hierarchy of normative elements - is relevant) and, on the other hand, a relativistic perspective (dependent on non-moral reasons, that are factors or causes only), which would eclipse the normative discussion (Reber and Sève (dir.), 2006).

Strong constructivist analysts expect that definitions of responsibility will emerge from processes and practices, rather than embracing a normative approach to understand the moral dimension encapsulated in the idea of responsibility (see Berthelot, 2007, for a pluralist and balanced overview of different sociological approaches). However the constructivist

approach creates more problems than solutions, as definitions of responsibility stemming from the observation of actors and practitioners are unclear and do not support the cause of responsibility. Because defenders of this constructivist approach refuse to discuss the normative dimensions and requirements of responsibility, this might be called a relativistic approach. By contrast, acknowledging the polysemic character of responsibility does not evade the moral dimension of responsibility and helps to avoid an overly narrow and monistic definition, which risks becoming idiosyncratic, ad hoc and partial. This normative approach is meta-ethical: it goes beyond the level of applied ethics, at which a single possible position is advocated (Reber, 2011). However, choosing between the various aspects of responsibility in specific contexts remains an issue.

Recommendations and Practical Consequences (200 words, 343)

Responsibility is not new in research funding and practises and in innovation as well. Some recent evolutions integrate responsibility into these processes. For instance, integrity and ethical reviews in research or new paradigms and innovation conceived as a collective process – a "multiplayer game" – involving a whole network of actors, a complex system of interactions between them and an institutional, social and political environment, are current nowadays. Governance approaches of responsible innovation precisely seek to organise the possibility of a collegiate design of innovation, when Responsible research seeks to make ethical reviews more inclusive. Innovation is conceived as a complex process that results on the one side, from forces that favour a limited conception of responsibility (when it is reduced to liability or when innovation is only driven by the quest for economic benefits without taking other parameters into account). On the other side, innovation practices evolve rapidly, and recently, they relied on the need for a co-shaping of technology and products including the persons to whom they are designed. In addition, current understanding of innovation emphasised the role of responsiveness in successful organisations. These elements can be taken as building blocks toward an understanding of responsible innovation and research governance.

The "negative" conceptions of responsibility are insufficient when considering innovation and research because: a) they fail to include a normative involvement, b) they may dilute responsibility, c) they are understood to be without agent, and d) they are restricted to the notion of external accountability.

In RRI literature, the meaning of responsibility is sometimes reduced to responsiveness alone, while ten other understandings are also available, which have different practical relevance according to the context. Therefore, we have proposed to consider a conceptual mapping of the various meanings of responsibility and argued that RRI should connect both negative and legal-oriented understandings of responsibility with more positive and prospective aspects.

By unveiling the potential and limits of th+D100ese conceptions, we aim to improve the implementation of RRI and help RRI social actors to choose what conception – or what combinations of conceptions – best fit the context.

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Author of Glossary Entry Sciences PO

3.80 Responsible conduct of research

Responsible conduct in research is conduct that meets the public and researchers' expectations to follow many rules and commonly accepted practices as researchers go about their work advancing knowledge and putting knowledge to work.

Reference

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Author of Glossary Entry Res-AgorA Project

Responsible development of technology

Balancing of efforts to maximize the technology's positive contributions and minimize its negative consequences.

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Author of Glossary Entry Res-AgorA Project

3.81 Responsible innovation

Responsible innovation is an iterative process throughout which the project's impacts on social, economic and environmental factors are, where possible, measured and otherwise taken into account at each step of development of the project, thereby guaranteeing control over, or at least awareness of, the innovation's impacts throughout the entire lifecycle. In the case of impacts which are not accurately measurable prior to the launch but are considered to potentially become critical risk factors once the project is on the market, a number of hypotheses should be formulated in order to be tested post-launch to determine whether the product should be re-integrated into a previous step of the process for amendment aiming to minimize negative impacts

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Author of Glossary Entry Res-AgorA Project

3.82 Responsible Research and Innovation (RRI)

Responsible Research and Innovation (RRI) is a transparent, interactive process by which researchers, innovators, and other societal actors become mutually responsive to each other with a view to embedding scientific and technological advances in society in societally desirable ways (including, but not limited to, ways that are sustainable and ethically acceptable).

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3.83 Right to informational self-determination

the right of individuals to determine for themselves on the communication and use of their data (when, how, to what extent, and for what purposes information about them is allowed to be used and communicated to others.

Author of Glossary Entry German Federal Constitutional Court - Population Census Decision (1983)

3.84 Risk

"combination of the probability of an event and its consequence"

Author of Glossary Entry ISO/IEC 27000:2009

3.85 Risk (Information security)

Risk is defined as the effect of uncertainty on objectives [ISO Guide 73:2009], where an effect is a deviation (positive or negative) from the expected. Thus, risk is related to deficiency of information related to the understanding or knowledge of an event, its consequence, or likelihood. The level or magnitude of a risk is expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

Risk analysis is a process that aims to comprehend the nature of risk and to determine the level of risk; it provides the basis for risk evaluation upon which decisions on risk treatment are based. Risk assessment is the overall process of risk identification, risk analysis and risk evaluation. Risk evaluation is the process of comparing the results of risk analysis with risk criteria (against which the significance of risk is evaluated) to determine whether the risk and/or its magnitude is acceptable or tolerable. Risk acceptance denotes an informed decision to take a particular risk, while residulal risk (or retained risk) is the risk remaining after risk treatment. Risk treatment can involve: avoiding the risk; taking or increasing risk in order to pursue an opportunity; removing the risk source; changing the likelihood of the risk; changing its consequences; sharing the risk with another party (e.g. by insurance) and retaining the risk by informed choice.

According to Owen et al (2013) a key characteristic of RRI is to reflect on: 'the underlying purposes, motivations and potential impacts, what is known and what is not known, and associated uncertainties, risks, areas of ignorance, assumptions, questions and dilemmas'. Thus, it is important to be able to anticipate both positive and negative implications of research proposals and innovations, especially in the early stages. Risk analysis, evaluation and treatment techniques are important tools that RRI need to embrace and promote, as innovations often result to wider social, ethical, environmental or commercial impacts than anticipated by researchers and sponsors. A reflexive RRI framework can anticipate negative consequences, manage for them in advance and adapt when problems arise.

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Author, Submission Date: Spiros Kokolakis, Lilian Mitrou (University of the Aegean)

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Author of Glossary Entry ISO/IEC 27000:2009

3.86 Risk assessment

Risk assessment is the assessment of threats to, impacts on and vulnerabilities of information and information processing facilities and the likelihood of their occurrence. Risk modelling is about the modelling and quantification of risk. (ISO/IEC 27001 and ISO/IEC 27002)

Author of Glossary Entry FRAUNHOFER

3.87 Science

In the broadest sense relevant to RRI, science is systematic, publicly defensible knowledge in general. In this sense, mathematics, engineering, law, and even theology are as much sciences as physics, chemistry, and biology are. But, over the last century or so, the meaning of science has narrowed. Science now more often refers only to those forms of science (in the first sense) that seek to describe, understand, or explain some aspect of the temporal world, including the bodies, minds, and activities of living things. (See, for example, Nagel, 1961; Kuhn, 1962.) It is in this sense that physics, psychology, economics, and even history are sciences but mathematics, engineering, and computer science are not. Mathematics is not because its concern is (primarily) entities that do not exist in time (numbers, angles, sets, and so on); engineering is not because its concern is (primarily) not describing, understanding, or explaining the temporal world but improving it; computer science is not because its concern is humanly constructed abstract objects (actual or possible software), not the temporal world (not even physical computers). What these two senses of science have in common is that in both science is primarily a set of propositions or body of knowledge, an intellectual achievement.

Recently, however, science has come to refer as well, or instead, to an institution, that is, the collection of research communities that together produce science (in the second sense)—or, at least, tries to. Science in this cooperative sense is a social, as well as an intellectual, achievement. (See, for example, Longino, 1990.) It is in this third sense that, for example, some mathematicians, engineers, and computer scientists are properly described as scientists because they belong to the research community of a particular science (for example, the mathematicians, engineers, and computer scientists who help to construct and operate the Hadron collider or interpret its results).

Generally, scientific research communities are distinguishable from other research communities that also seek systematic knowledge of the temporal world in seeming to follow relatively reliable methods of inquiry. So, for example, astrology, phrenology, and the like do now not count as sciences in this sense while anthropology, climatology, and the like do. To say that science (in this sense) has relatively reliable methods is not to say that there is a single “scientific method”, much less that the method of science is perfected, fixed, or invariable across disciplines. Science has no single method of inquiry, just a collection of

methods that seem to be more reliable than others for this or that science (or sub-science). Thus, deduction, simulation, controlled experiments, systematic observation, and standardized surveys all seem to be relatively reliable methods of inquiry—and therefore scientific—while dreaming, relying on biased reports, intuiting, and so on do not. Some methods may be more useful in one science; others, in another. For example, controlled experiment is much easier in physics, chemistry, or biology than in archeology, geography, or political science. (Kitchner, 2003; Wylie, 2002)

Since reliability is a matter of degree, the exact boundary between science and would-be science (whether a pseudo-science, failed science, or candidate science) is subject to debate. How reliable must a method be before it is reliable enough to count as "scientific" for the purpose of distinguishing a science properly so called from a would-be science? A would-be science is a research community that claims to be scientific but generally relies for defense of its claims on methods that have proved relatively unreliable or, at least, have yet to prove reliable. (Ove, 1996)

Sciences are sometimes divided into "pure" and "applied", "natural" and "human", or "physical" and "social". While perhaps useful for certain practical purposes, such as creating convenient departments in a large grant-making agency, these divisions do not seem to be fundamental, or even useful, for understanding science. Consider, for example, synthetic biology. Is it pure or applied, natural or human, physical or social? Synthetic biology is pure insofar as it is about the possible arrangements of elements into molecules, but applied insofar as it actually seeks to build complex molecules associated with life. It is natural insofar as the building blocks it works with are naturally occurring, but human insofar as some of the molecules it builds exist nowhere in nature but are human—and, indeed, social—constructions.

Science, in any of these three senses, may exist in many places and times. Science may, however, also fail to exist in some places and times. A particular culture may know a great deal about the world but have no science. To be a science (in any of the three senses distinguished here), the knowledge in question must be systematic, not a mere collection of facts, data, or information. Of course, how much system the knowledge must have to count as "systematic" is another question open to debate.

The three senses of science (systematic publicly defensible knowledge in general, such knowledge only of the temporal world, and communities that produce such knowledge) are relevant to PROGRESS in two ways. First, they are a reminder that much of RRI is about more than science in either the second or third sense—and perhaps even the first. RRI is about improving the human life, not just about describing, understanding, or explaining anything. Science (in the second or third sense) has only a subsidiary role in RRI, that is, shedding enough light in an otherwise dark space to allow the work of useful invention to go on there. Much of RRI (the research as well as the development) may be the work of engineers, industrial designers, marketers, lawyers, accountants, technical writers, and the like who, if "scientists" at all, are so only in the first sense of science. They may contribute to RRI without contributing to science (in the second or third sense).

Second, the three senses are also a reminder that the grant-making agencies that administer RRI may, given their purposes, have to interpret "science" more broadly than would otherwise be appropriate. So, an agency concerned with the support of "science" might, if

assigned the task of encouraging RRI, have to fund much of the process by which "pure research" turns into useful innovation. It might therefore have to fund the engineers, industrial designers, marketers, and so on necessary to such innovation even if they come into the process only after the science has been done (science in any of the three senses).

Author of Glossary Entry Michael Davis

3.88 Science and technology Studies (STS)

The notion Science and Technology Studies (STS) describes a field of research engaging in social studies about the interaction between science, technology and society. Interest in this relation especially grew in 20th century's controversies about impacts and risks of technology and research. As an academic field the STS build a comparatively new discipline comprising interdisciplinary areas of research. Today's scholarships focus on two key issues, the essence and practices of science and technology itself as well as their impact on a broader societal context.

Although STS merges various streams, the term is most often referred to its social-constructive branch, also known as Social Construction of Technology (SCOT). It became institutionalized and widely known by a couple of educational programs and research centers build up in the 1980s mainly in the USA and Europe. At that time, two frequently quoted key works had been published: The Social Shaping of Technology edited by Donald MacKenzie and Judy Wajcman in 1985 and The Social Construction of Technological Systems edited by E. Bijker, Thomas P. Hughes und Trevor J. Pinch in 1987. Both take a social-constructivist perspective on technology by pointing on the ambiguous and interpretable character of facts and technological products. In this view, technology should be considered as socially produced rather than simply given. (Cf. Bijker et al. 1987)

The approach originates from the research of knowledge and is particularly associated with Thomas Kuhn's 1962 publication The Structure of Scientific Revolutions. Kuhn argues that scientific revolutions should be understood as social change of paradigm rather than being objective discoveries of nature. (Cf. Kuhn 1962) Various subsequent studies under the framework of STS referred to his and related works from research of knowledge and developed them further by making the concept applicable to artefacts and technology. Besides the social-constructive stream, the so-called Actor Network Theory (ANT) became a second well-known branch of this development. (—> See Actor Network Theory)

In spite of different paths and emphasizes, studies in the field of STS share a common characteristic of placing an empirical focus in line with ethnomethodological research paradigms. In doing so, numerous case studies about innovation processes and technological genesis have been produced in this field. One claim of their research is to follow the actors and gain insights directly from what is relevant to them. In terms of questioning what is supposed to be self-evident and avoid becoming a spokesperson, STS is said to be about opening and visualizing technological black boxes.

However not directly referring to the political concept of RRI, responsibility of research and innovation is a central theme of STS. By strengthening a reflexive view on science and

innovation and making their nature an object of research itself, STS points on the relation between design processes and their societal context. Responsibility in this view is about identifying "relevant social groups" (Bjiker et al. 1987) and learning about the nature of development processes from their perspective. Taking into consideration current developments regarding expanding networks of influential actors, recent works from STS put a particular focus on questions of governance and participation. In doing so, STS provides various points of reference for ethical considerations regarding the processes of fact making and innovation.

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Author of Glossary Entry Alissa Sprenger (Fraunhofer IPK)

3.89 Signal technologies

Signal & information technologies are technologies that process diverse signals and transform interpret as well as interpret transform the signals into information in order to operate systems for a wide range of tasks

Reference

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Author of Glossary Entry FRAUNHOFER

3.90 Simulation Model

A simulation model is a "running model" that produces artificial data about the structures and behaviours of a target (e.g. a social system), where empirical target data and artificial model data are sufficiently similar to serve the purpose of the modeller. The advantage of a

simulation model of the target is that it allows experimenting with structural and behavioural change (cf. Doran and Gilbert 1994).

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Author of Glossary Entry NAMUR

3.91 Smart Grid

Smart grids are self-healing networks equipped with dynamic optimization techniques that use real-time measurements to minimize network losses, maintain voltage levels, increase reliability, and improve asset management. The term smart grid refers to the entire power grid from generation, through transmission and distribution infrastructure all the way down to a wide array of electricity consumers. The systems use two-way digital communication technology to gather and process data.

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Author of Glossary Entry FRAUNHOFER

3.92 Social engineering (security)

The term social engineering is used in different contexts and can be classified as controversial, not only with regard to its meaning, but also concerning the impacts of its underlying concept. In many contexts today, social engineering has a rather negative connotation. The term expresses the idea that human behavior can be influenced or even manipulated in various ways.

Recently, social engineering became a well-known phenomenon in the field of security and hacking, standing for an intended manipulation of persons, groups or company members in order take advantage of human deficiencies for criminal intents. Social engineering therefore, is a concern of security protection in a widely networked modern society. (Cf. Hadnagy 2010)

Beyond its technical context, the notion has a broader meaning in political science, where it is defined as planning capability to direct a society in certain ways, often by means of technical solutions or political power. Oxford Online Dictionary defines social engineering as “the application of sociological principles to specific social problems.” (OXF Online Dictionary 2015) This also includes an intended ordering or restructuring of society or smaller societal groups. In its most dramatic sense, social engineering is related to the terror of dictatorial regimes and has been tragically attempted during the NS period. Yet, in a more general

sense, the expression also refers to a technocratic perspective arguing that human well-being could be increased under rational control. (Cf. Alexander & Schmidt 1996)

An academic discussion about social engineering has been particularly brought up by Karl Popper, who gave a two-fold definition by distinguishing between „piecemeal social engineering" and „utopian social engineering". While the former is argued to be a reasonable and helpful method against social ills, Popper defines the latter as dangerous and likely to increase human suffering. (Cf. Popper 1971: 147) In doing so, Popper sharply criticized the idea of manipulating a society in the name of ideological goals, however advocated a moderated form of social engineering. Although highly controversial, this dualistic division between good and bad forms of social engineering is often referred to, when it comes to questions about how to tackle modern risks and social challenges. (Cf. Etzemüller 2010)

Taking these challenges into account, not only the term's connotation is ambiguous, but also its scope of application. Examples of social engineering can be found in various contexts ranging from planned cities to transport policies or governmental birth control. Defining where social engineering begins and at which point it should be stemmed, can be understand as a societal task and both, its difficulty and its complexity, find expression in debates about responsibility.

Above all, social engineering is about the question of who is allowed to become a spokesperson for others and to which extent? Responsible processes of research and innovation can contribute to stay aware of these questions by integrating future stakeholders at an early stage of planning and development.

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3.93 Social Impact Assessment (SIA)

”A methodology to review the social effects of infrastructure projects and other development interventions

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3.94 Stakeholder

According to Friedman and Miles (2006: i-ii, 4), the stakeholder concept was originally developed by Freeman (1984: 31) and had a rather narrow focus on corporate strategy and morality: It would have referred to "any group or individual who can affect or is affected by the achievement of the organization objectives". Since then, the term has grown massively in popularity among policymakers, regulators, NGOs and the media (Friedman/Miles 2006: 3).

At the same time, many authors widened the initial "organization-centric" view and abandoned the focus on achieving organizational objectives (Friedman/Miles 2006: 4, 9). It is argued that there are at least 435 different definitions today (Miles 2012: 287). For instance, some definitions account for "individuals or groups who are affected by unintended consequences" of an organization's activities and products (Friedman/Miles 2006: 4, 9). One of the broadest definitions was developed by Starik (1994) who considers that in order to account for phenomena such as environmental impacts, future generations should also be seen as stakeholders, for example. Moreover, he includes non-human and immaterial or mental entities such as rocks or "community" (Friedman/Miles 2006: 9, 11). Starik's definition can also be considered as a normative one because it "draws attention to categories of potential stakeholders that may be overlooked in current organization practice". "Strategic" definitions, in turn, focus more clearly on organizational goals (Friedman/Miles 2006: 12).

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Author of Glossary Entry UOXF

3.95 Strategic Intelligence

Strategic Intelligence: In the context of research and innovation-related policy and governance, Strategic Intelligence (SI) comprises a set of sources of information (often distributed and heterogeneous), involving explorative and empirical as well as analytical (theoretical, heuristic, methodological) tools, employed to produce 'multi-perspective' insight in the actual or potential costs and effects of public or private policy and management to be 'injected' and 'digested' in political fora and arenas, facilitating policy and organisational learning. Well known SI tools are evaluation studies, performance measurement, benchmarking initiatives, foresight exercises, or technology assessments.

SI avoids maintaining one unequivocal "truth" about a given research or innovation (policy) theme, granting access to multiplicity of actors' and stakeholders' values and interests involved in governance and policymaking and facilitating mutual learning about the perspectives of competing actors and their interest through a more 'objective' formulation of diverging perceptions, by offering appropriate indicators, analyses and information-processing mechanisms.

Consequently, SI can be conceived as a means to facilitate 'governance practitioners' concerned with the identification, development and implementation of measures and procedures transforming research and innovation in a way that responsibility becomes an institutionalized ambition. In practical terms, the use of SI tools may lead, inter alia, to concrete products such as practical guidelines and repositories with 'ideal types' of responsibility-related governance, manuals for training and monitoring the performance and impact of measures.

Distributed Strategic Intelligence: Analysts, policymakers and other actors involved in responsible research and innovation governance use or have access only to a small share of relevant SI. Such assets, nevertheless, may exist within a wide variety of institutional settings and at many organisational levels, though scattered across the globe. As a consequence, they are difficult to find, access and use. An architecture and infrastructures of distributed intelligence would allow access, and create inter-operability across locations and types of intelligence, including a distribution of responsibilities with horizontal as well as vertical connections, in a non-hierarchical manner. Such an architecture of distributed SI would, at least, limit the public cost and strengthen the "robustness" of intelligence exercises.

Fora of Strategic Intelligence: Governing towards responsible research and innovation will need conscious deliberation and moderation, for example in (a) case of open confrontation with incompatible interests and values involved and (b) in cases in which the geographical or epistemological distance between actor groups is too big. In case (a) of "hot" contestation and irreconcilable clash of interests, a moderating organisation can build up trust by establishing fora for debate, drawing on distributed SI, organising discursive processes, enabling learning. The moderator needs to be seen as neutral as regards the content and outcome of the conversation and needs to have SI and resources to inform and guide the process. In case (b), actors are, for a variety of reasons, not able or willing to connect and communicate. This has to do with the heterogeneity of framings and perceptions, with limited capabilities and capacities or with a lack of awareness or interest. Fora of (distributed) SI can facilitate intermediation, provide linkages between instruments and actors, between

diverse communities, and can translate from transnational down to local contexts and adapt issues to local contexts, explain, educate and mobilise. Again, intermediators must be credible and their function and own interests must be transparent.

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3.96 Surveillance

Surveillance is the monitoring of the behaviour, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting them [1].

In the context of the Responsibility project, the ethical and privacy dimensions of the term surveillance have been handled in the deliverables “D3.3 Briefings Report” and “D6.2 Discussion Document: Security policy implication on RRI for Security for Security” rather than the technical dimension of it. [2]

The ethical and privacy concerns rise immensely when the surveillance actions are performed by a government on a wide scale and in public areas. A bigger outcry by the civil community is also registered when public funds are issued for calls to research projects that aim to develop a surveillance system under the premises of safety and urban security. One of the most prominent examples was the project INDECT [3] where the consequences of the imprudent approval of all the tasks and aims of that endeavour, which included monitoring and processing information from web sites, discussion forums, file servers, peer-to-peer networks and even individual computers, led to an unprecedented movement of outrage from the civil community and the media. Out of the experience from this project, national programs for security and safety like the ones started by the German Federal Ministry of Education and Research (BMBF) have issued accompanying social scientific research calls in order to observe, advice, and “monitor” the technical project calls to avoid the European Commission experience with INDECT. These actions have been crystalized for example by approving the

project MuViT which accompanied the ADIS project [4].

Moreover, the EU has set with H2020, the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years, standards by promising mission-oriented actions that integrate the demands of different end-users (citizens, businesses, civil society organizations and administrations, including national and international authorities, civil protection, law enforcement, border guards, etc.) in order to take into account the evolution of security threats and privacy protection, and the necessary societal aspects [5].

One approach to address the ambiguities and ethical impacts inherently linked with surveillance is the relatively new concept of responsible research and innovation (RRI). RRI focuses on the time frame between the initial phases of research strategy formulation and the point at which individuals and organizations use products and services based on research output. The key component of RRI is the development of greater democratic accountability within the innovation lifecycle [6]. The concept of RRI also includes an inter- and transdisciplinary approach. Projects bring together actors from industry, civil society and research to ensure a more responsive, adaptive and integrated management of the innovation process. Additionally an on-going public debate and monitoring public opinion is needed for the legitimacy of research funding and particular scientific and technological advance [7].

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Author of Glossary Entry Mohamad Ajami (Fraunhofer IPK)

3.97 Sustainability

Called on intensively for two decades as a means to constrain economic activities, the adjective 'sustainable' refers to 1) the ability "to be maintained at a certain rate of level" and 2) a way of "conserving an ecological balance by avoiding depletion of natural resources" (Oxford Dictionary). The World Commission on Environment and Development Report known as the Brundtland Report (1987, p. 8) has provided a widely used definition of sustainable development focused on the second aspect: it promotes "a development which meets the needs of the present without compromising the ability of future generations to meet their own needs."

Indeed, the concern for sustainability emerged originally together with ecological issues and with a special focus on future generation to ensure a fair intergenerational share of resources. But as claimed by Dummond and Marsden (1999), sustainability not only concern agriculture and natural resources, but extends its relevance to activities such as urbanism, tourism, architecture, but also management, finance or political decisions (socially constructed resources).

In terms of ethics, sustainability is often conceived in a substantive way as set of good practices (empirically grounded as with the concept of biomass) or more abstract as it is illustrated, for instance by Hodge and Dunn's (1992) distinction between the prevention of catastrophe for human society and the promotion of society in harmony with ecosystem. As contended by Thompson (2010) sustainability can be conceived as resource sufficiency ("are there enough resources?") or as functional integrity ("is my conduct threatening the system's stability?"), this latter meaning coming closer from a last dimensions of sustainability as being "able to be upheld or defended" (Oxford Dictionary). But other normative criteria such as social justice consideration have been added to the concern for sufficiency or durability (Allen and Sachs, 1993). If we seek to provide a general definition of sustainability, we could say that it is a virtue of a system to maintain elements for which it is socially considered that they have to be preserved.

Finally, sustainability is sometimes related to responsibility as a feature of the latter, as in von Schomberg's (2013) where responsibility includes European Constitution's endeavor to achieve sustainable development.

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Author of Glossary Entry UPD

3.98 Sustainable Manufacturing

The notion of sustainable manufacturing encompasses the sustainable manufacturing of products as well as the manufacturing of sustainable products. Hence, its emphasis is taking into account the full sustainability life cycle issues related to the products manufactured. [1]

Sustainability is and will be a crucial issue for the present and future generations. The current assumption that natural resources are infinite is no longer acceptable. From now on, the awareness of the termination of this assumption means that all related behavioural models must be changed. This is a very impressive endeavour that embraces all fields especially research and Innovation. Fortunately, nature and the environment are capable of recovering from this drastic depletion of resources, provided immediate actions are done from the first stages of moulding ideas and creating products. Manufacturing, as the main pillar of the civilised lifestyle, will be strongly affected by the sustainability issues and it will play an important role in establishing a sustainable way ahead. Research and innovation, on which the manufacturing is largely create on, are asked, together with culture and economy, to give the tools and options for building new solutions towards a sustainable manufacturing concept. Generally speaking, new technology, new business models and new lifestyle models will be the cornerstones of the new sustainable world and this will be particularly true for what concerns the manufacturing sector [2]. Research and development will play a crucial role to this concern, having the responsibility to offer appropriate options to the society for answering the above-mentioned needs. This cooperation between the society and the research and innovation community lies in the core of RRI.

The Responsibility project with its partners from University Malaysia Sarawak and University of Chile gave the main inputs into the theme of Sustainable Manufacturing through the Workshops that were organized by the Responsibility project and held in Malaysia and Chile. The first one in Kuching, Malaysia carried the title “First Asia Pacific Responsible Business Innovation” , where the RESPONSIBILITY project aimed to learn from invited participants and listen about business concerns and ideas. During the workshop, the preservation and sustainability of the rainforest and natural resources were highlighted as the core issue in that region. The project also exchanged views on new proposals about RRI tools, engagement processes, operation and shared value to society. The second workshop in Santiago de Chile, Chile with the title “Responsible Research and Innovation in Mining” presented the issues that the mining research and industry are tackling towards water sustainability and the type of assistance RRI tools such as an Observatory and a Forum can give to the research community in Chile.

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Author of Glossary Entry Mohamad Ajami (Fraunhofer IPK)

3.99 Taxonomy

A taxonomy is a classification, or rather, a particular system of classification that is closely related to a particular body of knowledge and theories (e.g., botany; cf. Oxford English Dictionary 2013). According to Foucault, taxonomic thinking as a particular way of producing knowledge started in the course of the 17th century (Foucault 1966). The basic operations are division (dividing the world in clearly separated entities) and “subsumption” (categorization, and defining a hierarchical order for all entities created; Handelman 1981: 9). Any statistics such as those produced in the natural and social sciencies as well as in public administration presuppose taxonomic thinking (cf. Desrosières 1998: 237 et seqq.).

A few authors have argued that temporal dynamics (e.g., historical change) and ambiguity (e.g., hybrid identities) cannot be represented easily by a taxonomic approach, though (cf. Bowker/Star 1999). Furthermore, the hierarchical order of a taxonomy can often be doubted. For instance, in a given empirical domain or field of expertise some participants might consider a problem as a minor issue (i.e., a “lower level” entity subordinated to a more general and more important problem), whereas for other participants it is key and structures all of their other concerns or activities.

Despite these existing critical views taxonomies continue to be very useful means of knowledge that help depicting and structuring reality systematically. Narratives, metaphors or case studies are alternative modes of understanding the world that can balance their mentioned occasional deficiencies. Moreover, a given taxonomy can be adapted to changing circumstances, so it can actually be flexible in practice. In addition, in practice taxonomies are often contextualized by some sort of methodology that explains the choice and the order of the included categories (meta-data). Thus, in practice it is often acknowledged that a taxonomy is a product of a certain historically, culturally and theoretically contingent mindset.

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Author of Glossary Entry UOXF

3.100 Technology

Technology: any useful artifact embedded in a social network that designs, builds, distributes, maintains, uses, and disposes of such things—and, by extension, such a network as a whole. So, for example, while a hammer lost in space is only an artifact, a hammer at work in a factory is technology (part of a technological network).

Technology so understood is never "value free"; it is, by definition, part of a social network and social networks, being purposive systems, must have ends in view and other values helping to shape the design, building, distribution, maintenance, use, and disposal of its artifacts (values ordinarily including morality).

This is probably the sense of "technology" most relevant to RRI. After all, the innovations in question in RRI are technological in the sense that, whatever they prove to be, they are intended to be useful artifacts properly embedded in society. Since some criticism of RRI may rely on one of several other senses of technology, it is worth listing the most prominent here—to avoid confusion and provide a vocabulary for making the relevant distinctions.

1. Despite its Greek roots (techne = art, skill; and logos=study, account), the word "technology" seems to date from no earlier than the 1600s. It then meant the scientific study of skill or craft, for example, the observation of a brick maker to learn the secrets of brick-making. Like the rest of science then (from archeology to zoology), technology was typically an avocation of gentlemen, those with enough wealth that they did not need to work for a living. The aim of technology in this sense was knowledge, not practice.

2. Early in the 19th century, "technology" developed a new sense, one that soon crystalized in the polytechnic, a school for the study of certain "techniques", not historic crafts but the new craft now called "engineering". Engineering was both scientific and mathematical in ways traditional crafts were not. The polytechnic was a school of advanced education but one that, doing without Latin (as well as Hebrew and Greek), was separate from the university. Technology in this sense did not include (even if it might use) the products of law, medicine, or any of the other forms of practical knowledge that the university taught. Once Latin ceased to be necessary for a university education, the way was open for polytechnics to become technological universities and for universities to establish schools of technology (whether so called or called instead schools of engineering, applied science, or the like).

3. Related to this early 19th century sense of technology, are three others. First (3a), there is technology as tool, especially any tool requiring special training to repair or manage. In this sense, a hammer would not be technology but an automobile or computer would be. From this sense (a tool too complex for ordinary people to repair), it is only a small step to thinking of technology as a "black box", an incomprehensible force that operates on "society" more or less from the outside (or, at least, seems to). It is in this black-box sense (3b) that critics of technology might claim that "technology rules our lives" or that technology is opposed to

humanity. It is also only in this sense (or one close to it) that it is an open question whether technology is ever “value free”.

A third sense of “technology”, the most recent (3c), is technology as “cutting edge” tools, that is, those tools that seem most innovative. For a half century, any development having to do with computers has been called “technology” in this limited sense. Now “genetic engineering” and “nanotechnology” are as well. This sense of “technology” generally relies on a narrowing of one or another of the other senses of “technology” described here.

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Author of Glossary Entry Michael Davis and Kelly Laas

3.101 Technology Assessment

Technology assessment (TA) has been defined as a form of policy research that examines short- and long-term consequences (for example, societal, economic, ethical, legal) of the application of technology. The goal of technology assessment was said to be to provide policy makers with information on policy alternatives.

TA aims at the analysis and evaluation of scientific and technological advance and its consequences for individuals, society and the environment. Its roots emerged in the early environmental crises of the western world in the 1960s and 1970s. Even today, in the 21st century, the tension between technologic and societal development is unresolved. Hence, there is still a need for TA.

TA-relevant problems and conflicts about certain new or emerging technologies centre on their uncertain and possibly harmful side-effects and on perceived unequal distributions of corresponding chances and risks within society. At the same time, TA has to appreciate the societal chances of technology development and to unravel any barriers of desirable innovation, which might for instance stem from outdated regulations or public misconceptions. Ultimately, TA aims at the formulation of reasonable technology options and/or corresponding recommendations for research and innovation policy or technology regulation. In this way, it is a means for decision support in the relevant fields of policy advice (see also “Policy Advice” within this glossary).

TA is mostly organized in inter-, respectively trans-disciplinary settings in order to accomplish its complex mission at the interface of science and society. Apart from the subject-matter of related sciences, the main contributing disciplines are social sciences, epistemology, ethics and jurisprudence all of which reflect upon the issue at stake. Corresponding TA projects are

mostly conducted along the following lines:

(1) problem definition,

(2) stock-tacking of the matter from different disciplinary or stakeholder perspectives,

(3) inter- or trans-disciplinary reflection of the initial survey,

(4) conclusions for the acting level, drawn from a.m. critical reflections,

(5) dissemination and transfer of the results to the addressees.

TA was first institutionalised at the "Office of Technology Assessment (OTA)" in the USA. The OTA was shut down later, but TA-institutions had meanwhile been set up in most European countries (Banta 2009). Beyond relevant institutions at the national level the "European Technology Assessment Group (ETAG)" conducts TA-studies on behalf of the European Parliament. Another prominent TA-network is the "EPTA (European Parliamentary Technology Assessment)".

Institutionalised TA is not a methodological monolith. Different perspectives and approaches developed, which correspond to specific problem areas, assessment methodologies and target groups (v. Est/Brom 2004). For instance, national facilities of parliamentary technology assessment (PTA) aim specifically at policy advice for the legislative power (Ganzefles/v. Est 2012). By contrast, health technology assessment (HTA) deals with the challenges of medical technology and its growing intervention depth into human life. HTA's clients are not only the legislator, but also the practitioners in this field.

The process of mostly expert-based TA was criticised as lacking broader legitimation. This gave room for the advent of participatory TA (pTA), which foresees the inclusion of lay people in the TA assessments. pTA is especially favourable, where contextual and local knowledge is essential or where individual interests are directly affected. This type of TA is, for example, adequate prior to site selection decisions of industrial plants. By contrast, the strength of the experts' approach lies in reflecting those TA problems, which address more fundamental questions and/or long-term issues of science and society.

There is also a continuum of TA in a narrower sense towards more general academic "Science and Technology Studies" (STS) or towards classical risk analysis in health institutions. The one-sided and risk averse focus of some early TA approaches had been blamed as "technology arrestment" while being blind for positive outcomes of technological innovation. This observation gave, for instance, rise to the comprehensive concept of innovation and technology analysis (ITA) in Germany.

Another general problem of TA and its appropriate assessment horizon is known as the "Collinridge dilemma", which is characterised on the one hand by the locked-in problem of technology governance ex post and on the other hand by the principally incomplete or uncertain decision basis from ex ante evaluation (Collinridge 1980). A practical way out of this dilemma is offered by constructive TA (CTA), which tries to embed itself deeply into the whole technological development process in a systematic way. Similar or further conceptions are "real-time TA", "vision assessment" and "prospective TA" (Grin/Grunwald 2000; Liebert/Schmidt 2010). However, the diversity of the above mentioned TA approaches should not be understood in terms of exclusiveness: Some of the above mentioned TA categories have an orthogonal relation to each other, which, for instance, would allow for HTA and PTA

assessments at the same time.

Sceptics sometimes ask whether TA has any significant impact on technology development and innovation. In many cases, a clear proof for either thesis is hard to find. The reason behind it is that impact measures and evidence are often missing. However, the specific self-attribution of the roles of TA institutions within certain innovation processes might give some indication about their (suspected) effectiveness (Decker/Ladikas 2004).

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Author of Glossary Entry Stephan Lingner/EA, FRAUNHOFER

3.102 Transparency

In public and political discourse, transparency is often positively associated with democracy, freedom and accountability. For instance, it is frequently assumed that "more information leads to improved democratic systems" (Lew 2011: 101). Thus, transparent behaviour is often regarded as a virtue. It implies making aspects of processes and procedures visible to all relevant parties so that they have a clear and fair representation of what has occurred. Consequently, many people have recognized that "access to, and control over information is

linked to the function of power" (Lew 2011: 101).

However, more information can also mean less understanding and distrust. Moreover, proponents of transparency and the information society might underestimate that a lot of knowledge in expert systems and organisations is situated and tacit. This knowledge might get less effective if it is made explicit in a compulsive way (Strathern 2000: 313-314; Lew 2011: 102).

In a literal sense, something is "transparent" when it is pervious to light. Accordingly, transparency refers "to the state or quality of transmitting or allowing the passage" of any content "without distortion" (Oxford English Dictionary 2013). For instance, slides used with overhead projectors are called "transparencies". The slide is a medium that carries a picture, diagram etc. which is made visible by some background light. Once the light is on, the observer's attention can easily shift from the medium (slide) to the content (picture, diagram).

This shift of attention is related to a paradox that is theoretically relevant. Apart from the light, the medium (slide) is the basic condition for seeing and knowing the content at all. Yet, the more sophisticated (effective) the medium, the more it "disappears" from the observer's point of view. This paradox applies to most infrastructures and media as well as to the production of knowledge in general. For instance, it has been argued that there is no "transparency", but only "cultural transparency" (Wenger 1991; Star/Bowker 2002). According to this approach, processes or artefacts are never transparent per se. Their presumed clearness always depends on complex infrastructures of different media as well as people's historical and current practices. As long as this complex web works, it appears invisible. But once it breaks down or the cultural frame of reference shifts, the practices and artefacts can get opaque and incomprehensible. At the same time, the web (i.e., infrastructures, media and supportive practices) has gotten visible.

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Author of Glossary Entry UOXF

3.103 Values

According to most dictionaries, the term "value" has several senses, including color value, linguistic value, mathematical value, and musical value. The three senses most relevant to RRI seem to be:

First, "value" may refer to the entity valued: "Among our values are money, football, and sex." In this sense, nothing is a value unless someone values it. Universal values are what everyone values, whether as an end (such as health or pleasure), a means (adequate medical care or protection from bad weather), or both (exercise or companionship).

Second, "value" may refer to the standard by which something is to be valued, for example, usefulness (the pragmatist's standard of value), money (the economist's standard of value), or beauty (the aesthete's standard of value). "Value pluralism" is the view either that some people value some things while others do not, or that standards of value in actual use differ from one person to another, or that there are no universal standards of value (that is, no standards that everyone should adopt, even at their rational best). While the first two interpretations of value pluralism are factual claims that seem to be true, the third is controversial—in part at least because it is probably not factual. A "theory of value" is a controversial claim (or set of claims) about what the standard of value is or should be (for example, that pleasure is the sole measure of what is good or that pleasure, beauty, truth and justice are all good in themselves and incommensurable). The term "value judgment", though reasonably interpreted as any application of a standard (that is, as an evaluation), is usually used with the implication that value pluralism in its controversial sense is true and that any "value judgment" is arbitrary or at least subjective. This use of "value judgment" is itself controversial.

Third, "value" can refer to the consequence of applying a standard to an entity (yielding an "evaluation"), for example, "The value of my car is less than a euro" or "Whatever the market says, by the standard of beauty, this building has great value." An entity may be valuable in this third sense even if no one values it. It is valuable, has value, and is a value if, according to the standard in question, it should be valued.

The word "values" may refer either to the plural of one of these three senses or some other ("usefulness and beauty are both values") or may instead refer to what a person, group, or organization happens to treat as fundamental, or at least important, standards or evaluations ("These are our values"). In this sense, "European values" might include human rights, justice, equality, privacy, and so on. These are European values if, but only if, Europeans in general, or at least Europe as an organized entity, judge those standards to be worth a great deal of

effort to enforce or those states of affairs to be worth a great deal of effort to achieve.

Given the diversity of meaning that "value" has, it may seem prudent to avoid use of both "value" and "values" in any discussion of RRI. Yet, though prudent, such avoidance is not possible. The term, usually plural, is already deeply embedded in Europe's vocabulary. So, for example, one important definition of RRI says (in part) that it is "to effectively evaluate both outcomes and options in terms of moral values (including, but not limited to wellbeing, justice, equality, privacy, autonomy, safety, security, sustainability, accountability, democracy and efficiency)". (Directorate-General 2013, 55-56, Italics added.) Here "values" seems to mean "standards". On the other hand, von Schomberg, 2013, p. 10, has suggested that the term "socially desirable" in his definition of RRI be interpreted (in part) to include "European values", quoting a number of European officials using the term in all its ambiguity, for example, "'Europe is a community of Values' (Van Rompuy, First European Council President, 19 November 2009)."

So, the best advice seems to be to ask which sense of "value" is meant when avoiding the term altogether impractical.

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Author of Glossary Entry Michael Davis