

# Responsible-Industry



Responsible-Industry  
GA 609817



<b>Country reports on testing and evaluation: <i>Synthesis of the testing activities and focus groups</i></b>			
Deliverable No.		<b>D2.7</b>	
Workpackage No.	<b>2</b>	Workpackage Title	<b>Implementation</b>
Task No.	<b>4</b>	Task Title	<b>Testing and Industry Evaluation</b>
Start Date:	<b>2017-04-10</b>	Revision Date:	<b>2017-07-14</b>
Authors		<b>Michael Obach, Kate Chatfield, Ainaro Garzo, Catherine Flick</b>	
Contributors		<b>All consortium members</b>	
Status (F: final; D: draft; RD: revised draft)		<b>F</b>	
Distribution		<b>Public</b>	
Document ID / File Name		<b>D2.7-Country_Reports.pdf</b>	



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 609817.

## Table of content

1	Executive Summary .....	4
2	Introduction.....	5
3	Country reports.....	7
3.1	Cyprus .....	8
	Metadata.....	8
	Companies' profiles .....	8
	Conception of RRI .....	8
	Current Practice in RRI.....	9
	Problems and impediments.....	9
	Feedback on framework .....	10
	Dissemination: how can the framework be realised? .....	10
	Further results and insights .....	11
3.2	Denmark .....	11
	Metadata.....	11
	Area/driver for research and innovation .....	11
	Conception of RRI .....	12
	Current Practice in RRI.....	12
	Problems and impediments.....	13
3.3	Finland .....	14
	Metadata.....	14
	Conception of RRI .....	14
	Current Practice in RRI.....	15
	Problems and impediments.....	16
	Feedback on framework .....	16
	Dissemination: how can the framework be realised? .....	16
3.4	Germany .....	17
	Metadata.....	17
	Area/driver for research and innovation .....	18
	Conception of RRI .....	18
	Current Practice in RRI of sector .....	19
	Problems and impediments.....	21
	Feedback on framework .....	21
	Dissemination: how can the framework be realised? .....	23
	Further results and insights .....	23
3.5	Italy.....	24
	Metadata.....	24
	Area/driver for research and innovation .....	24
	Current Practice in RRI.....	25
	Problems and impediments.....	26
	Gaps in practice .....	26
	Discussions .....	27
	Further results and insights .....	30

---

3.6	Netherlands .....	31
	Metadata.....	31
	Area/driver for research and innovation .....	31
	Conception of RRI .....	32
	Current Practice in RRI.....	32
	Practise of the sector .....	32
	Feedback on framework .....	33
3.7	Spain .....	33
	Metadata.....	33
	Area/driver for research and innovation .....	34
	Conception of RRI .....	34
	Current Practice in RRI.....	34
	Problems and impediments.....	35
	Gaps in practice and discussion.....	36
	Discussions .....	37
	Feedback on framework .....	37
	Dissemination: how can the framework be realised? .....	38
3.8	UK.....	38
	Metadata.....	38
	Area/driver for research and innovation .....	38
	Conception of RRI .....	39
	Current Practice in RRI.....	39
	Problems and impediments.....	40
	Gaps in practice .....	40
	Feedback on framework .....	41
	Dissemination: how can the framework be realised? .....	43
	Further insights and surprising findings.....	44
3.9	China, Japan, the U.S.A.....	44
	Metadata.....	44
	Conception of RRI .....	44
4	Conclusions .....	46
5	Acknowledgements.....	50
6	List of Abbreviations .....	51

# 1 Executive Summary

The European Coordination and Support Action (CSA) *Responsible-Industry* designed, tested and optimised a Framework for an Exemplar Implementation Plan of Responsible Research and Innovation (RRI) in Industry during the period from 2014 to 2017. This was done to demonstrate how industry can work productively together with societal actors and integrate principles and methodologies of RRI into research and innovation processes. The project focussed on the role that research and innovation in information and communication technologies can play in addressing the challenge of health, demographic change and wellbeing.

This document is a synthesis of the outcomes from discussions about RRI applied in ICT for health, demographic change and wellbeing in general and in particular about draft versions of the Framework in 15 Focus Groups (FG) of relevant stakeholders in this field – such as researchers, innovators, designers, and managers from several types of companies and moreover policy makers, civil society organisations and elderly people. The FGs were organised in Cyprus, Denmark, Finland, Germany, Italy, the Netherlands and the UK. Furthermore, this report contains input from experts from Japan, China and the U.S.A., and the results of collaboratively testing the Implementation Plan in five case studies in small and large companies in Denmark (pilot study), Finland and Spain.

The consortium – which consisted of nine project partners *Associazione Italiana Per La Ricerca Industriale (AIRI)*, *De Montfort University*, *Euclid Network*, *Fundación TECNALIA Research & Innovation*, *Karlsruhe Institute of Technology*, *Teknologian Tutkimuskeskus VTT*, *University of Central Lancashire-Cyprus (UCLanCY)*, *University of Southern Denmark*, and *University of Twente* – engaged from the start of project with all relevant stakeholder groups.

Even though RRI was a new term to all participants in FGs and case studies, they were aware of concepts like stakeholder involvement, risk analysis, and personal data protection, and in particular those subjects that were regulated by laws, such as personal data protection.

Researchers and designers of the companies that took part in the studies considered stakeholder engagement and especially end-user engagement as crucial for their designs and developments, and their later success on the markets. Examples of identified barriers and risks were insufficient communication among members of the supply chains, the end users, and other stakeholders, high investment costs in terms of time and money, a prioritisation of economic aspects in research and innovation activities, and issues related to the application of the legislation and regulations regarding personal data protection that were considered too strict by some people.

The feedback led to significant improvements of the Framework and its dissemination strategies.

## 2 Introduction

The main objective of the European Coordination and Support Action (CSA) **Responsible-Industry** has been to design, to test and to optimise a **Framework for an Exemplar Implementation Plan of Responsible Research and Innovation (RRI)** in Industry to demonstrate how industry can work productively together with societal actors and integrate principles and methodologies of RRI into research and innovation processes. To achieve maximum impact where it is most needed, this framework is focusing on the grand challenge of **health, demographic change and wellbeing** and in particular the role that research and innovation in **information and communication technologies** (ICT) can play in addressing this challenge.

The framework aims at being considered as a useful tool for practitioners who use it in their day-to-day work of **research and innovation** (R&I) and also in the strategic planning of the top-level management. Moreover, the framework should be agreed with other stakeholders that are involved, such as policy makers, CSOs, end users and moreover the general public.

Therefore, the Responsible-Industry project engaged from its beginning with all relevant stakeholder groups to discuss its features and applicability, to identify limitations, bottlenecks, improvements, and changes. The first drafts of the framework were informed by a large-scale **Delphi study, 30 interviews with researchers<sup>1</sup>, innovators and managers from industry and several “bottom-up” case studies** that resulted in five show cases of good practises of RRI in industry. Later versions of the framework of the RRI implementation plan were discussed in two international **stakeholder workshops** and 15 **Focus Groups (FG)**. Furthermore, they were tested in five **case studies** with companies that covered a considerable range of different sizes (from small start-up companies to huge multi-national, global players), types (hardware and software *app* development, services and consulting), and geographical distribution, i.e. in Cyprus, Denmark, Finland, Germany, Italy, Spain, the Netherlands and the UK, and there was some input from experts from Japan, China and the U.S.A. provided numerous facts and insights. The members of the global network were asked to provide a written comment on the implementation plan and its relevance in their respective socio-economic environments. Finally, the latest versions of the framework were published on the project website ([www.responsible-industry.eu](http://www.responsible-industry.eu)) for comments and self-assessment.<sup>2</sup>

A first edition of the Framework for implementing Responsible Research and Innovation (RRI) in Information and Communication Technologies (ICT) for an ageing society was published in two versions: a shorter *Executive Brief* and a *Full*

---

<sup>1</sup> See e.g. Chatfield, K.; Iatridis, K.; Stahl, B.C.; Paspallis, N. Innovating Responsibly in ICT for Ageing: Drivers, Obstacles and Implementation. Sustainability 2017, 9, 971.

<sup>2</sup> More information about the stakeholder workshops and the comments on the implementation plan from members of the global network is available in the deliverables D4.3 and D4.4 on this web page: <http://www.responsible-industry.eu/dissemination/deliverables>

report (see Figure 1). A revised edition of the Framework in three target-group oriented volumes was published at the end of the project taking into account the valuable feedback from many stakeholders, compare chapter 4.



*Figure 1: Executive Brief (left) and Full report (right) of the Framework for implementing Responsible Research and Innovation (RRI) in Information and Communication Technologies (ICT) for an ageing society.*

The methodology and the results of the five in-depth case studies in Denmark (pilot case), Finland and Spain (full case studies) are discussed extensively in publications in journals and in the corresponding deliverables on the website ([www.responsible-industry.eu/dissemination/deliverables](http://www.responsible-industry.eu/dissemination/deliverables)). More specifically, the case studies protocol is described in detail in this document: <http://www.responsible-industry.eu/dissemination/deliverables/D3.1-CaseStudyProtocol.pdf?attredirects=0&d=1>

For the 15 Focus Groups in Cyprus, Denmark, Finland, Germany, Italy, the Netherlands and the UK, small groups of researchers, innovators, designers, managers, policy makers, civil society organisations (CSOs) were acquainted and brought in contact in “industry driven focus groups” to deepen RRI issues, using the draft versions of the framework of the implementation plan as a base for discussion.

This document presents and discusses the main outcomes of both, the focus groups and the case studies.

### 3 Country reports

This chapter reports on the activities and the findings of testing the Framework for implementing RRI in ICT companies that work in the fields of health, well-being and ageing in 2015, 2016, and 2017.

There were 15 Focus groups in Cyprus, Denmark, Finland, Germany, Italy, the Netherlands, the UK, and four Test cases in Finland and Spain and one Pilot Test case in Denmark, moreover interviews, presentations and written communications with selected experts from other technologically advanced and economically strong countries, namely China, Japan, and the U.S.A. The contributions of each project partner in these activities are shown in Table 1.

One project partner is located in Cyprus and it was initially planned to have one of the Focus groups there, but when the consortium searched for Cypriot companies from the sector of ICT for ageing, the number of potential participants that fulfilled all defined criteria was so small that it was decided that the partner UCLan Cyprus did their first focus group with a German company instead of a Cypriot company, where some contacts with volunteers for participating already existed.

**Table 1: Overview over the testing activities in the project *Responsible-Industry* and the partner with the main responsibility.** \*All partners participated in and contributed to the two international stakeholder workshops, but KIT was responsible for their organisation, execution and analysis.

Partner	Focus Groups	Test Cases	Fact finding session in Non-EU countries	Workshops
AIRI	3	-	-	-
DMU	1+1(pilot)	-	-	-
EN	1	-	-	-
TECNALIA	-	2	-	-
KIT	2	-	3	3*
VTT	1	2	-	-
UCLanCY	3	-	-	-
SDU	1	1 (pilot)	-	-
UT	2	-	-	-
<b>Total</b>	<b>15</b>	<b>5</b>	<b>3</b>	<b>3</b>

Each one of the following sections contains a subset of the following subsections: Metadata (Project partners, Date, Type of organisation or participant, Analysis), Area/driver for research and innovation, Conception of RRI, Current Practice in RRI, Conception of RRI, Problems and impediments, Gaps in practice, RRI activities, Discussions, Feedback on framework, Dissemination (“how can the framework be realised?”) and, finally, Further results and insights.

## 3.1 Cyprus

### *Metadata*

Project partner: University of Central Lancashire-Cyprus

Method: Focus Groups

Dates: 10 March 2016, 26 April 2016

Participants: 2 SMEs working in ICT for health-related applications

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick.

### *Companies' profiles*

One of the two SMEs from Cyprus that participated in Focus Groups developed software so that the **patients' health record** could be accessed online by their medical doctors, laboratories, and diagnostic centres. However, the only stakeholder who had access to all data of his or her health record was the patient.

The other SME created **websites and smartphone applications** for other companies, i.e. by means of a business to business model (B2B).

### *Conception of RRI*

The FG participants were not familiar with the term Responsible Research and Innovation and its abbreviation RRI before.

It was stated that in the case of a website developed by the SME, the **legally responsible** entity was their customer who owned the website. They believed that their customer had to be 'sensitive' towards their users and the public, while the developer had to be 'sensitive' to their business partner.

In particular, **involvement** of large numbers **of users** (e.g. 200-2000) was regarded as being time consuming, so that only smaller, targeted samples from experienced users and users in the target group were asked about their preferences and needs.

The participants from the ICT firms correlated ethics and responsibility with **data protection**.

Some participants believed in the **self-regulation** of the market, so that application of data protection would be rewarded or punished by the customers and insufficient care for the users' privacy could lead to financial penalties.

Other people thought that the **government** could play a role as driver for RRI. If RRI could help Cypriot companies to become better and more sustainable, then the government should enact a law. As a consequence, the companies would be forced to find the required resources (including financing) to comply this law.

The employees of one of the companies believed that they were contributing to sustainability and environment protection by fostering digital, **paperless** communication.

---

## *Current Practice in RRI*

Regarding **stakeholder involvement**, the employees of one of the two SMEs reported that a first step in a new project was to analyse the **requirements** of the customers. After this analysis and following the **design** phase the customer had the opportunity to provide **feedback** to the design. They were **testing** their new developments and upgrades with end users and engineers from *Cyprus University of Technology* in a test environment. Testers could provide feedback and report problems or feature requests.

The participants of the Focus Group from one of the two small Cypriot ICT companies reported that they were not following any standardised procedures from **ISO norms** on the matter, but that they were applying some “**rules of thumb**”, for example for necessary data backups, storing sensitive data in a specific place, restricting access to personal data, and getting consent from the customer for using their data.

It was claimed that in their SME all employees did **risk analysis** at all levels, because in small companies “everybody would be responsible for everything.”

The participants believed that **data security breaches** could lead to serious problems for the **reputation** of an ICT firm. Therefore security-relevant processes in the last year were being evaluated more frequently than before to prevent data security problems and to improve the system.

## *Problems and impediments*

It turned out that, according to the opinion of the FG participants, decision makers in SMEs may be motivated to implement and to apply RRI, but that they often had **limited infrastructure** and **resources** to do so.

One major concern of one participant was, based on his observations, an **insufficient communication** among several major stakeholders of healthcare in Cyprus, even in cases that were for the patients literally a matter of life and death.

Another person had the opinion that **economic interests** often prevailed over other motivations. He claimed that, according to his perceptions, “the mentality in Cyprus is like ‘I don’t care about my patients – I only care about money.’ This is the mentality in Cyprus (70-80% of the doctors in Cyprus).”

Some FG participants said that in Cyprus, medical doctors (MD) and in particular general practitioners still lagged behind the state of the art of applied computer sciences – often not even using a Personal Computer – and the use of the Internet. Instead of using **Electronic Health Records**, most MDs were still working with reports and file cards in **paper format**. Furthermore, it was criticized that the patients mostly did not receive any **reports** from their doctors. It was suggested that **medical associations** should help to change this situation.

Furthermore, the participants proposed that the **government** should play an important role as driver for implementing RRI by “forcing all companies to have an ethical plan”. However, companies that were not able to dedicate resources to this plan would need guidance and coaching.

The participants said that to leverage the implementation of RRI, companies that did not comply with ethical and sustainable practices should be publicly **denounced**.

One main challenge identified by the FG participants regarding RRI was the issue of **open access** and **transparency** on one hand and privacy protection and security on the other hand. One person said for instance: “How far can I really be transparent and pass information onto the public without endangering the security of the entire service? No, in my opinion that can only be on paper: we do this and that, but how it is protected and which specific conditions I have, that cannot be transparent and public.”

Whilst there are some obvious advantages to the adoption of RRI principles, the FG members also believed that there were some challenges, especially concerning **data protection** within the software inhibiting data unauthorized access and which would be especially relevant for the new mobile devices. Another concern was that the main purpose of their company was to make **profit**. Moreover, they had the opinion that there were some conflicts between profit and **ethics**. While the main benefit of end user engagement was thought to be useful for risk limitation, the application of “ethical stuff” in general and in particular ethics approvals for field trials with end users were considered to be problematic for a company without having any direct benefits, being time consuming and “a lot of work.”

Furthermore, especially for small companies it was considered to be difficult to find ways to take transparency issues up. Moreover, some people associated transparency with communication *within* the company, thinking that personal communication between employees played a crucial role in this regard.

It turned out that in a B2B relationship, **requests from key account customers** were believed to be a potential driver for implementing RRI. One person remarked: “For us as a profit-making company these aspects always play a role. If we know, ok this is an important customer [...] and they say we have a fundamental problem with the system then we’re more likely to deal with it than if a small customer calls us.”

Another problematic part may be **education** because again “there is no direct benefit from doing this”, even though in one case training was considered to have beneficial side effects being “a cheap way of doing marketing.”

### *Feedback on framework*

Referring to Figure 4 “*Activities to be undertaken for the integration of RRI along the whole value chain*” on page 24 of the Executive Brief document, the FG participants reported that, although they had a small company with limited resources, they applied all steps from agenda setting, research and design, prototyping and pilot testing with user groups and marketing.

### *Dissemination: how can the framework be realised?*

Most participants from both focus groups in Cyprus suggested that a **website** would be the best channel to disseminate the RRI framework, because it was considered to be more concise, easy to use and accessible to most people from

the target groups, and moreover keywords and other search terms could be found faster than in a printed document.

However, one participant held the view that other media beyond the website were useful too. He argued that people who would not visit the website could be reached through **radio** (e.g. while driving or doing other activities) and **television**. People may visit a website, but they would not read all information.

### *Further results and insights*

One participant complained that in their small company with only a few people everybody had already a huge **workload** and it was difficult to comply with all existing standards. So, he was afraid that implementing RRI could easily lead to an overload of work. However, another person believed that the **size of a company** would not matter for successfully implementing RRI. He said that the difference between small and large companies would only be the time dedicated to each activity. For example, prototyping and demonstration phases would be much shorter for smaller companies due to more restricted resources, but the implementation of RRI should be possible anyhow.

## **3.2 Denmark**

### *Metadata*

Project partner: SDU

Methods: Focus Group, interviews in pilot case study

Date: 2 May 2016

Participants: Large company in ageing society

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick.

### *Area/driver for research and innovation*

The **focus group** (FG) consisted of employees of a large company that manufactured products for elderly users: a sales engineer, a key account manager, a manager from the R&D department, and a member of *Corporate Market Intelligence*.

The company collaborated with original equipment manufacturers (OEMs) and applied a business to business model (B2B). Hence it had **no direct contact to the end users** of their products.

The **portfolio** of products ranged from lifts that facilitated patients leaving their beds or going to the toilet, special lights attached to beds, to a so-called "*Intelligent Bed*" that aimed at allowing elderly people living longer in their homes before eventually need to move to nursing homes or similar. This kind of bed should assist nurses and caregivers, and provided some information, e.g. if the patient had left the bed.

---

## *Conception of RRI*

A first fact that came to mind to the participants in the context of **stakeholder engagement** was a close collaboration with customers in all countries where customers were located. In research and development with key account clients, the **co-development** was advanced and comprised also the product development phase.

## *Current Practice in RRI*

Early stakeholder involvement was extensively discussed during the Focus Group. One **motivation** for engaging with stakeholders was to meet the expectations from end users to create and sell successful products. When developing new products, collaborations with bigger and well-known customers were of special interest, which allowed having a larger budget during product development and a stronger launch phase of the product with a bigger market.

Certain key products were **tested extensively** with **users**, both internally and externally. In the case of one product the development, testing and optimisation process started more than six years before launching it on the market. A local nursing home provided feedback reports. The method to get feedback from **end users** in Denmark and Germany was by interviews performed by an external service provider linked to the local university. The main purpose was to get **feedback** from the end users before the product was launched onto the market, even though, according to the FG participants, feedback from end users through the distributors to the manufacturer worked well before.

There were some differences in the involvement of suppliers and customers. Regarding **suppliers**, a *Production Part Approval Process (PPAP)* was established to guarantee components of high quality. There was a list of documents to ensure suppliers provided high quality for all products.

Furthermore, **suppliers** were participating in the **design stage**, e.g. in meetings or by email, but without following any formal procedure. For mechanical parts they were involved during the tooling work, while for electrical parts they were usually contacted only in **later stages**, never taking part in the concept development.

The **customers** used to be motivated to be **involved** in the product development early on and intended to influence on the price, functionality or usability of the products. According to one FG participant, successful, innovative products are necessary for success and a leading position on the market, and any successful idea should lead to a very simple, low priced, and stable product. Especially for intelligent beds, the approach to avoid such problems is being in close contact with customers and end users.

Customers were engaged in **early stages** by means of start-up meetings, “because they have their own opinions, in our early stage of our new product, and then their feedbacks are useful for creating basic specifications and finalizing the basic specifications of the product, before going into final development or any final production.”

The FG participants reported on the process of capturing their customer’s expectations, preferences and aversions by a market-research technique called

**Voice Of the Customer (VOC)**. The customers are selected for this process by the project team that, in the early stages like idea creation, makes a guess of which kind of customers may be interested in this future product. Furthermore, local sales managers have their say so that typically 5-10 customers from around the world participate in VOC meetings for new products.

While account managers used to have weekly meetings with their suppliers to monitor the advances in their projects, other project groups did not have any direct connection to standard **customers** other than some occasional meetings. With key account customers however there was frequent online communication or even direct personal communication.

The **sales department** was working with customers closely in their subsidiaries or between subsidiaries, sales managers and customers. Furthermore, key accounts located all over the world had an individual key account manager. There was a close connection between key accounts, R&D department, and engineers.

The mission and vision of the company was to improve the conditions of people's life. One person said: "It is true that money is important but we still have this mission to improve people's quality of life! That's been here all the time and is still a main driver of the company that should be a **purpose** of our products."

**Launching new products** onto the market may fail from time to time. For example once, following a request from some business partners, the company manufactured "green" products that had lower energy consumption than other competing products, but the end users did not accept these products. One participant guessed that they "didn't meet the users' requests completely" and that "the market may not be ready for the new product."

Another **motivation for R&D** was to be one step ahead of their competitors.

**Product development** was organised in clearly separated project phases with corresponding milestones.

### *Problems and impediments*

One **barrier** to talk to the end users of their products is that the distributors, i.e. their customers, were located in the value chain between the manufacturer and the end users. However, the manufacturer was informed about any problem with their products by the distributors and resellers.

The FG participants agreed that **face to face meetings** are the best way to share knowledge or to show the customers preliminary results. More information exchange and more dialogue was proposed as an improvement.

It was criticized that customers often focussed less on functionality of a new product and more on its price.

One of the major **challenges** identified by the FG participants was to communicate with the right person of the stakeholder, independently whether it was an SME or a large enterprise. Some customers did not have a right person for these purposes, sometimes because the contact person may not be competent having the right title but not the right qualification in this job in this company.

Regarding **transparency** among the value chain stakeholders, the company had an open dialogue with some customers. However, others were not fully open to

them holding back knowledge that could be interesting to other, competing, customers.

In any case, the company that participated in the Focus Group managed the **communication** between their suppliers and their customers, so that there was hardly a direct communication between not directly connected entities in the supply chain.

An important topic is data protection and the users' privacy. Collected **personal data** was used by the company, but not shared with third parties. There were agreements with customers and key accounts in this regard.

The company had specific platforms for **risk assessment**. Customers were informed about potential risks, which has been especially important for the supply of components to customers which were medical suppliers and who were required to apply the necessary risk management.

### 3.3 Finland

#### *Metadata*

Project partner: VTT

Methods: Focus group, workshop, semi-structured interviews during case studies

Dates: 9 March 2016, 31 May 2016, 9 September 2016, 19 September 2016, 26, October 2016, 20 December 2016, 4 January 2017, 30 January 2017

Participants: in focus group interdisciplinary group (research, public sector, companies); in case studies company representatives in various positions

Analysis: Semi-structured interview was transcribed in full; analysis was undertaken by E. Yaghmaei, Veikko Ikonen and Markus Mäkinen.

#### *Conception of RRI*

The participants from the companies of the Focus Group (FG) and case studies were not **aware** of the term RRI prior to these sessions but some elements of the framework were familiar to them and which existed in at least one company as "**governance and innovation**, and compliance." Participating in a collaborative project that piloted products and services in real life context "helped [them] to notice that new innovative products and services needs to be tried out and tested in practice" and that "following the use and receiving feedback from the field is very important."

The SME (case study) commented that RRI was not a familiar term or concept, but some dimensions of it were implemented as a consequence of the company's focus on **customer-centred thinking** and quality. Even though areas for improvement were identified, there was a lack of resources as technical development and marketing the services used to consume the most of the time.

The interviewees from the large multinational company commented that the RRI principles and values were well known among them. However, the meaning of RRI was not clear to them. The interviewees argued that understanding the **RRI**

**pillars** was strongly subjective and influenced by the background of the reader. The workshop in the second round of interviews clarified the concept and dimensions, but some of them said that they would still like to have a clearer definition of RRI.

### *Current Practice in RRI*

It turned out that joint research projects can help **disseminate good practises** and provide opportunities for learning and updating of knowledge. The collaboration in research projects helped the company to bridge the gap to the end users, because due to their business-to-business (B2B) model, they usually did not have direct contact to the end users of their products.

**End-user involvement** was considered useful and even necessary as it was stated by one participant: “We want to use and look for new technologies to be utilised in this context, but based on end-user needs and customers [...] requirements are collected and based on these we are looking for partners (technology providers). And for example with this project we have been able to do all this – meaning to familiarise ourselves with various new solutions.”

It was considered important to receive experiences from customers out of an “operating environment”, e.g. for learning which set of features a new product should have.

The SME engaged employees to meet customer needs. They implemented a program in which every office employee spent at least one shift observing a home care nurse working in the real environment.

This company also collected and analysed every customer contact. Even the top management team participated in this activity. The aim was to improve the service by learning from users.

**Governance** and innovation were associated to policy.

The participants in the Focus Group who had took part in a collaborative pilot project said that the concepts of **compliance and ethics**, as well as the user perspective, had been brought up.

“**RRI feedback**” was defined by one person as the communication in relation to various systems and practises. This included the opportunity to test products or their prototypes in a real life context, i.e. “a kind of intermediate space where there is no market yet; space for semi-ready products or services.” Such a confidential space for “organising the use of technologies” could include both, users and industry, but moreover the city administration could be involved in “taking some products for the kind of trial/test, and also [elderly] people could test these and decide after if they want to buy the product or contract the service.”

The multinational large company listed several practises in which they engaged with several stakeholder groups. They had established a campus for start-up companies next to their main office in Finland, where different companies could **co-create innovations**. Moreover, regulation in many market areas required comprehensive **testing** with different **user groups** to verify safe use of the product. Finally, there was an ongoing interaction with consultants, research organisations and public projects to augment their knowledge.

The SME that participated in the Finnish case study worked closely with **customers and end users** of the provided service. They aimed at performing as a platform between customers or end users and third party developers.

Both companies also pointed out that the healthcare markets had strict **regulations** that determined guidelines for product development and working processes. The large, multi-national company had cooperations with hospitals, where proofs of concept or new products were tested with end users. Employees were also encouraged to participate in the innovation process by offering rewards for good innovations. They also had a department whose responsibility was to support employees to innovate on products.

### *Problems and impediments*

One problem that was mentioned during the Focus Group was caused by very short development cycles of technologies so that there might be people who could be **marginalised** because they could not keep up with the **speed of digitalisation**. For example, once a user has learned how to use a device or a software application, there is often already a new version that has to be understood how to use. The concern was that understanding of technologies would remain very low for instance for elderly people or people with low income. These issues were thought to be linked to stakeholder engagement and ethics.

### *Feedback on framework*

Risk identification and risk management were carefully considered due to regulation. **Regulation** demands evidence that the device is safe to use, works as described and end users are able to use the device. Simulations and other test and analyses were in an important role in risk identification and management.

The interviewees believed that they were contributing to a better future and a better society. To achieve a **better future**, they aimed at satisfying needs for healthcare professionals as well as end users.

Technology was assessed by interviewing customers and observing the environment where the device would be used.

### *Dissemination: how can the framework be realised?*

The importance of selecting diverse and adequate **channels** to reach the different target group was underlined. Two (first edition) or three (second edition) **booklets** on the Framework were considered neither sufficient nor adequate for all target groups. It was suggested that for e.g. businessmen or CEOs with a full agenda, some kind of sales **video** of five minutes would be a good way to raise interest and to open various perspectives. If this video was interesting to them, then they might be motivated to read the booklet designed for their target group. As leaders and managers are a heterogeneous group with many different preferences, it was proposed to use various channels to reach most of them, for instance a **combination of modern audio-visual contents and traditional communication**.

### *Further results and insights*

The Focus Group participants appreciated that during the projects on RRI stakeholders that worked in activities of the **whole value chain** were involved representing “expertise from many companies and from various areas.”

It was suggested that there should be **longer lasting collaboration** in this sense, not only during the sometimes short duration of one project.

Feedback and suggestions for improvements in the companies and the university should be collected at **grass-roots level** from employees, where they may play an “extremely important role.”

**Experiments with end users** were considered important. One example that was discussed during the Focus Group was the manifold applications of **service robots** in health and social care services or cleaning service. Another field of potential issues regarding acceptance was localisation technologies of people and storing data on the internet (“the cloud”). These concerns were important to them since they developed robotics that could detect anomalies from patterns of daily activities of elderly and disable people. If an anomaly was detected, a video connection was opened automatically. Moreover, how frequently a person was using some devices or stayed in the different rooms of their home was also monitored. One purpose was to detect falls.

As a collaboration with an association of people with memory disorders and their relatives had shown that it required much time during many workshops with them to gain the required mutual trust so that they would provide **honest feedback** expressing their real feelings and thoughts about products and services without any bias based on being afraid of seeming to be too direct or even rude and without saying what they thought would please the tester.

The interviewees of the case study said that regulation was strict in healthcare compared to other business areas and that producing high quality products required extensive **assessment**. Therefore risk identification and risk management were part of the design and maintenance operations. The company also trained their customers to use their devices correctly.

The staff members of the large multinational company who participated in the case study of the present project reported that they must annually pass an **ethical instructions test**. They also had a **public compliance policy** for employees. Furthermore, the company had created a tool to assess the environmental impact of their products.

Both companies stated that **risk identification and risk management** were key activities for healthcare companies due to regulation and standards.

## **3.4 Germany**

### *Metadata*

Project partners: KIT (2 FGs) and UClanCY (1 FG)

Method: Focus Groups

Dates: 7 January 2016, 29 September 2016, February and May 2016

Participants: A large company and two SMEs in the field of ICT

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick.

### *Area/driver for research and innovation*

The largest of the three companies that participated in Focus Groups in Germany has been developing **technologies for the Internet** for almost 20 years, focussing on digital communities and interacted with smaller and medium sized companies often on a local level.

Another company whose employees participated in a different Focus Group had developed and implemented **ICT systems for care planning**. It also worked in several governmental-funded research projects together with universities and foundations to research and develops prototypes.

A third company was an SME that had invented, produced and supplied a **social alarm used in the home of elderly people** living alone. It was a spin-off company of a non-profit organization with an explicit Christian heritage and ethos.

### *Conception of RRI*

The members of all three FGs were not aware of the term RRI prior to this project. However, all of them were highly **aware** of issues related to RRI, such as data privacy, but they believed they had been engaged in RRI activity since the beginning, in particular through **user involvement** and stressed moreover the importance of engaging with their customers and their surroundings, which were reported to be sometimes difficult.

At least one of the companies was ISO 2001 certified. The corresponding annual audit used to address topics such as the strategy for the company and for developments, transparent communication in the company and to customers, and customer satisfaction polls.

The participants of the Focus Groups underlined the importance of **raising awareness** for issues of RRI also as a way to **motivate companies** and people stating that *“it is important to bring it into the minds of people to sensitise them.”*

However, they also emphasized on the importance of these issues being supported from the **top management** of a company stating that *“[responsible behaviour] can only come from the top [management], this can’t be done by individual people [...]. If the CEOs don’t direct this, then an individual person will never attempt to implement it.”*

For the members of the FG it seemed normal to take aspects of RRI into consideration when doing their work. As they had long-standing experience with ICT solutions, they were aware of issues like **data protection**, either because the customers brought them up or because they had them on their agenda.

Members of another FG believed that doing work in the area of **ageing society** as well as the ways they developed technologies would be closely related to RRI. Also the collaborations in research projects between the company and universities and foundations used to create situations in which there was

exchange also regarding possible problems or issues of technological developments for specific groups (e.g. people with dementia). Furthermore, they referred to tools, such as ISO norms, that controlled their work.

One **motivation for applying RRI** in companies by means of **engaging end users** in focus groups and field trials, following milestone plans, among others, was to **limit risks** when developing new products and services. The investment in these cases could be relatively high and an investment without financial return may ruin the company. Therefore, every product development must lead to a successful product. User feedback at all stages of product development is one factor to believe that the product at the end of the R&I process is to a high degree what their customers want and accept.

Moreover, **consultation** was considered to be crucial to ensure that the end product is not just useful to the end user but also that it is technically and economically feasible for the provider to develop and to commercialise the product.

There was a strong impression that **ethical awareness in one of the small companies had increased** over time, because one participant said: “Today we are talking about ethics right from the beginning, when we design the product, what is possible, legally okay, data protection. There was a process in the past years. The first projects it felt more like a burden upon people that had to deal with, today it is part of the normal development process. People think about these issues right from the start of the design”.

### *Current Practice in RRI of sector*

The participants said that research projects often required **ethics committees**, especially in those projects in which sensitive user data is collected, such as location data that is necessary to locate people with dementia in case of an emergency.

A main issue of practice was that taking RRI into account needs to go together with economic interests and financial constraints. Employees of one company expressed this dilemma as follows: “We are an industry company - and we aren’t paid for acting as missionaries to people, so that they somehow pay more attention, because they have to pay us in the end.”

The companies that participated in the Focus Groups, and probably the whole ICT sector, were aware of the importance of responsible behaviour of companies and individuals in aspects like **privacy protection and data security**. It was said that “customers’ satisfaction especially in our area depends mainly on how responsible we are with their data or information that we get, how we use the feedback [...] without this it doesn’t work in the health care area [...] so it’s part of our DNA, otherwise we won’t be around very long.”

For the company engagement especially with their customers is a long-standing tradition: “So we have had to do [**customer engagement**] always, because we offer services. In the past you may have sold a product. That’s maybe easy, you plug in a TV. And today you offer services that are always changing. Because we make platforms and work on this in principle, [...] this has been a long tradition for us.”

Also the **changing media landscape** has influenced their engagement to a certain degree: “with the social media it has become significantly more, it is the input from the direct, let’s say end-user feedback. This wasn’t possible before, except if I called there or sent an email. Now, if I don’t like something, I write it on Facebook or I tweet about it. And that works a lot faster and then you let that influence and ‘canalise’ in your product much faster.”

The participants seemed to have a high awareness of changing situations regarding how they **interact with customers or also local communities**. Since they were involved in developing up-to-date solutions in ICT they had to be aware of the ever-changing landscape. Therefore, they had included this experience in their product development as well as in their consultations. In the discussion in the FG it became clear that ICT companies seem to have a high level of sensitivity regarding possibilities and limits of new developments.

Another company that participated in a Focus Group had a research project about **unauthorized access of personal data**. This approach was mentioned as a way to deal with issues of data protection through technical solutions: “We have a research project in which we build a data protection “guardian” that is installed in between a smart home solution and the network and which then try to find out whether data is going through the network of which the person living there doesn’t actually want this data to leave him, and then it blocks it for example. So for us data protection, data security is an extremely big topic. [...] we also have to protect ourselves legally.”

For the company it was important to inform users especially because different users are more or less used to dealing with technologies. Moreover, understanding which data is used within the health care system was crucial to them. One person stated: “In our projects from the supply area where we try to optimize certain processes, it’s a kind of slope of knowledge of lay people dealing with technology of what’s actually behind all of it. [...] it is already a challenge to explain to the normal user how with the internet of things data is aggregated and how certain profiles, etc. are comprised. It is not easy to communicate this to a not technology experienced person [...] we also have to gain information on which player in the health system is even allowed to have which information [...] for us it was interesting to find out, what we have to be aware of.”

**User engagement** is crucial for the funding of R&I projects. The funder plays an important role in this case. The **German Ministry for Education and Research** encourages user engagement in projects funded by this institution. The participants said that for the past five years, funding from this institution required the participation of a partner who applied technology to their products and services. All their R&D projects used to begin with engaging users to know their needs and requirements by means of focus groups, interviews, semi-structured interviews, among others.

The **pairing of user needs with technical understanding is key** in this process, as one person stated: “We have eight staff members in this research. All of them are researchers, even though they are the social alarm operators. We can see both sides. We can see what people want and we can see what is possible from a technical perspective and we can bring this together.”

Consultation with the end users continued through field trials with prototypes and the prototype was adjusted in response to this evaluation of the prototype in situ. It was said: “Most of the research products start with the requirement then we develop the prototype, then we evaluate, sometimes with field trials. Then we re-engineer, then [we do] new field trials...”

**Ethical approval and data protection** were important aspects. One comment was: “In the research projects we are doing we always have the ethics committee included and everything has to be approved. There is always a special part about privacy and data protection. This ensures there are no problems with this in the research project.”

In the design of the access to **private data** of their devices, which could reveal much information on the users’ habits, it was important that no data about the users and their usage of the devices could leave the users’ homes, except in the case of emergency.

### *Problems and impediments*

Two problems were identified:

- Where knowledge is the focus rather than user demand.
- Where the potential to make profit conflicts with responsible practice. For example one participant reported a case in which an investor proposed a business model for a new product that should collect and sell data based on end user profiles.

### *Feedback on framework*

When looking at the diagram ‘Key responsibilities for RRI within the organization’ the participants said that this kind of structure was normal for them, even without explicitly having this implemented in their company. Yet it showed here that the term RRI remains very abstract for them (e.g. RRI monitoring).

Regarding the framework, the FG participants considered it to be useful, but a difficulty of such a framework was that it cannot model all processes within a company, especially in the case of very complex processes.

Participants of the FG reported that they did not like the extensive usage of **abbreviations**.

The FG members believed that the framework documents and in particular the diagrams in it could be helpful as a kind of **checklist** for companies. One participant said: “Suddenly it becomes an important topic. It has a name, it has a title, it has a colour, it maybe hangs somewhere. Someone might ask about it. It is just more. And a checklist has something good: it is two-dimensional, it is usually not too long. It is almost refreshing, to look at such a thing because there is an output, a trigger [...] here is a task and it could be done this way. Do it.”

The CEO of a small company was particularly positively impressed with the **figures and charts** in the booklets. The target group who should be addressed first are the CEOs and the other top-level management, who could define and establish processes accordingly.

The CEO liked especially **figures 4 and 5**, because they showed an overview over the steps in the process, some details of what has to be done in each step, and some of the advantages for implementing RRI. The latter seemed most important to him, because a company may consider the application of the RRI framework just as additional work, but they also have to see the benefits.

Looking at diagram “**Users and stakeholder engagement**”, the FG members believed that all was relevant to them, especially the first steps: “The first four steps at least are a rather good description of how most of the research projects work here. We have risks impacts at the beginning of the project, participatory design, pilot studies and we test the prototypes. So this is actually what we do”.

However, they believed there should be **more feedback loops**, that the process is more actually less linear than portrayed here: “There is feedback that is not just going from A to B. It is several partners working on each product, they talk to each other, so between the partners there is exchange. Sometimes disagreements that have to be resolved.”

The diagram entitled “**Stakeholders involvement in the different phases of risk/impact assessment**” was difficult to understand.

A major concern was that the end users were only placed at the beginning of the diagram and were not involved during the whole process.

But they did accept that all of these things happened and all informed the **risk assessment**. For them the researchers were part of the project and they used a university ethics committee.

It was suggested to consider an additional stakeholder group in some projects: “Some projects also have **advisory boards** with mixed constituency so they might have medical advisors as well as others.”

This diagram says that it marks the point at which the main stakeholders should have their input but the members of this FG stated that this did not make sense to them.

There was consensus that the framework documents have to **be practical and easy to understand**. There should be ready-to-use tools (e.g. forms) available that could be used for each step. Furthermore, it was suggested to use **templates**.

The **Executive Brief**, i.e. the shorter version of the two versions of the framework document of the implementation plan, was regarded to be a bit too long for this purpose and there was a question about whether it could be broken down and tailored more specifically to the different kinds of readers who would use it.

Concerning the **graphical design**, one participant found it attractive, but another person found the cartoon-like drawn people looked weird.

The idea of **videos** was not really appreciated. However, **downloads** of documents in PDF format were considered useful.

The **downloadable documents** should be tailored into several documents for the different target groups, so that they could download and access only what they needed. For example, researchers in charge of end-user engagement should access the website and download a document that has a guideline about what they have to do with all the templates in it.

---

### *Dissemination: how can the framework be realised?*

Regarding the use and distribution of the framework in a **booklet format**, the participants said they **preferred a website** because it was considered to be more practical and could be updated more easily and more often.

The participants thought a **website** would be a useful format to reach out to more people. Furthermore, the readers could easily and rapidly access specific parts that they were most interested in. Another advantage of an online document is that hyperlinks could be integrated to access other webpages or multimedia contents, and to download additional information.

However, some advantages of a handbook were also discussed, for instance to have the contents at hand in one book without the need to be online or to click through the pages of a website.

Beyond the format, in order to get people to use the framework it is important to communicate it well and to target the right people within an organisation: "People, expertise, communication play a big role. But of course someone in the company has to realize it. That is an idea. Which tools can we use in order to get people to use this in the future as a normal thing and that they then only act in this way? That would be the vision. [...] in the end it doesn't matter so much whether it is a piece of paper or an internet website. One has to motivate people to transport this who are hopefully also in a higher position or an innovator in a company."

The participants mentioned the importance to **use existing organisations to disseminate**, e.g. the service-providing company *VDI/VDE Innovation + Technik GmbH* [Association of German Engineers] could take this into their networks.

Regarding 'Users and stakeholder engagement', the participants wondered if this was a useful way of structuring it. Moreover, it seemed very dependent on the specific situation if they used engagement.

One CEO believed firmly that the framework documents should be firstly aimed at the **higher management** of a company, in particular at the CEO. It should be a very **short** document, an executive summary that mainly points out the **advantages**, maybe with some examples and real cases. Furthermore, it was suggested to have an **interactive website** that allowed to implement certain aspects of RRI and that would generate a **personalised plan** and customised guidelines so that the user knows what to do. Finally, this website should provide all templates for implementing RRI in the company.

### *Further results and insights*

Overall the participants gave positive feedback to RRI as a concept and to the framework. Yet, for them the format and the general approach of it was not sufficient. The suggestion of a checklist shows their need for **concrete and practical indicators** that can be used in their everyday work.

Also in the light of competition among companies the implementation of RRI was seen critically. Even though it could become a way to make one's company stand out from other companies, the investments were considered to be a crucial point.

Some participants wondered if RRI was a new concept or not. Furthermore, they had the impression that responsible behaviour was a necessary condition for the long-term sustainability of any company.

There was general agreement that such a framework document and implementation plan was a good idea and needed. One participant said that in the past many products have been developed without full consideration of people's needs, which led to a huge waste of resources.

There are perceived problems with the use of **ethics committee** that are traditionally research-focussed: "If I think about asking the ethics committee as a company, this is a large step. The ethics committee I know are research driven. In their mind there is no core product [...]. So if you want to have a company looking more at ethics then the process has to be easier and less research-driven... Ethical issues are also important for companies and if you want them to engage voluntarily then it has to be more practical".

There was agreement that there should be some type of public **acknowledgment** for adopting RRI so that companies can use this to enhance their image. However, it should be undertaken on a voluntary basis. It was suggested that this acknowledgment, say, '**RRI Compliant**', could be similar to other seals of quality. Anyhow, obtaining this seal should be **free of charge**. For instance, many small companies do not get **ISO standards** just because it is a very expensive process and they cannot afford the costs, even though they would perfectly comply with the standard.

## 3.5 Italy

### *Metadata*

Project partner: AIRI

Method: Focus Groups

Dates: 19 January 2016, 16 April 2016, 12 January 2017

Participant: Large Italian company working in the telecommunication sector

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick.

### *Area/driver for research and innovation*

The host organization of the Focus Groups was a large Italian company operating in the telecommunications field, which offered in Italy and abroad fixed telephony, mobile telephony, public telephony, IP telephony, Internet and cable television.

The company followed two main trends in research and development: the first was related to the core-business technologies in the field of telecommunications. Research activities were generally performed through well-established methodologies having to meet the high standards related to systems and products already on the market. The second part of the innovation activities focused on services for the user and included activities in the domain of ICT for

an aging society, where there is room for less conventional research such as open innovation.

### *Current Practice in RRI*

There were some differences between the RRI procedures suggested by the *Responsible-Industry Framework* and those adopted by the telecommunications company. One employee stated that during the agenda setting phase in an early stage of a research project, there was no well-established procedure for the identification of **potential ethical and societal risks**. A checklist to identify and to address any ethical issues in the first phase of a project proposal may be encountered or not in the course of the project. It was reported that the analysis of potential risks, which may arise during research and development of an innovative product or service, was left to the sensibility and experience of the project manager. Moreover, the involvement of **end users** was not envisaged for that purpose.

Possible scenarios in the use of **new technologies** were currently developed at an early stage of the project only in case of extremely innovative experiments, as for example in the field of brain-computer interfaces. In those cases, the societal risks and ethical aspects were usually analysed by means of literature data studies to highlight specific problems and issues. However, only a desk analysis of various scenarios was performed, without direct consultation or involvement of potential users. However, there was considerable attention to the involvement of end users in the final stages of the R&D process.

Concerning participant's practise, it was stated that, first of all, their company strictly followed existing legislation. When a specific **regulation** was in place – as in the case of technologies for sensitive data management and for health monitoring–, well-structured and strict protocols and internal procedures were established in accordance with current regulations for all persons responsible for research, development and innovation activities. Based on current **legislation**, appropriate solutions were sought in each particular case to address critical issues. For example, privacy-sensitive services were organized following the chain-of-responsibility pattern, i.e. the tasks were clearly defined and divided between the various parties and only authorized personnel was allowed to have access to sensitive data and carried out specific actions to provide services.

In the absence of specific regulations, **risk analysis** has been carried out within the company and internal procedures to address issues raising from this analysis were accurately defined. Where appropriate, **legal and insurance aspects** were evaluated in order to avoid any possible disputes. The advice of consultants with expertise in legal and **ethical matters** were considered on specific issues.

As for the integration of RRI principles all along the **value chain**, it was reported that some measures had been already implemented. Such measures, although conceived in a predominantly business-oriented perspective, were in agreement with many of the RRI practices as defined by the *Responsible Industry Framework*.

In particular, at the level of Agenda Setting in an initial phase of research, questions related to sensitive issues (such as data protection and privacy) were addressed by referring to the relevant **regulations**, while other ethical

implications were taken into account through the analysis of possible scenarios. These scenario analyses, however, were mostly carried out through literature studies and not with the direct involvement of end users.

**Involvement of end users** was carried out in the following ways:

- Professional and private users were most frequently involved in the prototype testing in order to evaluate functional aspects as well as in the analysis of the product acceptability. A specific unit within the company was in charge of dealing with these issues. For example, a new instruction manual was tested with users in the presence of a psychologist, before it was revised on the basis of the users' feedback.
- Focus Groups with users were organized during the prototype phase either to discuss innovative solutions or for testing the products and services already on the market.
- Only in few cases the operators, i.e. professional users, were involved from the earliest stages of the project to ask for their opinion on the solutions, services or innovative ideas.

Regarding the **Governance Tools** for RRI implementation, the company adopted various CSR (Corporate Social Responsibility) tools, including the *Global Reporting Initiative* and an *Internal Code of Conduct* that sets out the general principles and rules of conduct that must be followed by all employees, including managers, both inside the company and in relations with third parties (suppliers and customers). These tools mainly focussed on issues related to business ethics, such as professional integrity and anti-corruption.

### *Problems and impediments*

Many of the measures proposed in the *Framework* were already adopted in the company, but there was a clear need for a **better relationship between the different business units** to address the issues that fall under the umbrella of RRI.

A more systematic and structured approach to the management of ethical and social risks would require the direct involvement of the **top management**, but this objective did not seem achievable in the short term. A significant barrier to embrace RRI was the additional **costs** associated with this approach. The adoption of RRI principles would require a major change of mentality, which could be fostered by the perception of competitive advantage on the market to compensate for the additional management costs. For example the presence of the company in the sustainability index was motivated by the importance of this presence for the global market, in particular in the U.S.A. An incentive for the up-take of RRI principles could come from the possibility of affixing an "**RRI mark**" on products to promote their market penetration.

### *Gaps in practice*

What seemed to be missing was therefore an organic and **structured approach** that would allow to plan all actions from the beginning that must be carried out at various stages of the R&I activities with the objective to improve the desirability and acceptability (from an ethical point of view) of the final products.

Video-phones were discussed as an example of innovative product that did not had a great success on the market. The acceptability of video-phones, also from an ethical point of view, could have been enhanced by a more systematic involvement of consumers in the early stages of R&I and vice versa, i.e. the early consultation of end users would have allowed to understand from the beginning that the product was bound to have an unsatisfactory impact on the market.

## Discussions

Another point for improvement, according to one participant, was the **limited interaction** on issues related to **societal and ethical risks** among the units involved in R&I activities and other departments of the same company, such as the marketing department. It might be useful, for example, to undertake market analyses to address the degree of interest and awareness of the consumers about the ethical aspects related to the use of some innovative ICT products. One example is the real-time control of users' life-style through sensors or the transmission of medical data monitored by sensors to a third party. A medium- and long-term feedback on these issues could be very useful for setting strategies of the R&I groups and innovation departments.

The main topic during the discussion was the proposal of the Framework for operationalization/integration of the RRI principles all along the **value chain** (Fig. 4 of the Executive Brief).

As widely discussed in the first Italian Focus Group, it was underlined that procedures for business-oriented risk analysis were already in place in the company and end users (i.e. operators and consumers) were involved in the final activities of the value chain like the prototype testing to evaluate and to improve quality, usability and acceptability of the final products. The discussion focused on the "gaps" and raised the following questions:

- Is it useful and suitable to **extend the risk analysis** procedures by including a more **systematic identification and evaluation of ethical risks and social implications** of the R&I undergone by the company?
- Is it useful and practical to **involve the end users** not only in the prototype testing but also in the **agenda setting/early phase** of research?

Concerning risk analysis procedures, the importance of ethical and social risk assessment was emphasized, in particular in case of **ground-breaking research** that could bring products on the market *before* a specific normative would be set to prevent harm deriving by the use of these products.

Moreover, it was pointed out that research activities on **drones** were initially carried out in the absence of normative rules, being a new research field, and moved forward rapidly. Later on, as a consequence of the growing social pressure, the stringent regulation made the development of some applications of interest to the company difficult. Therefore it was decided to go ahead freely with basic research and to consider the compliance with the rules in the stage of application of basic research (if successful) to products and services for the users.

Research on drones was considered to be a good example of highly innovative research that presents **risks of physical injury**, e.g. when drones crashed on people, as well as ethical risks of dual use, so that drones developed for civil applications could be used for military purposes or for spying on citizens. It was observed that consultation of ethics experts or ethical advisory boards had been suggested by the Framework with the aim to avoid and to limit ethical and social risks of innovative research outcomes. It could be prudent to carry out part of the research without disclosing the results to others with the aim to avoid any possible misuse.

However, according to another participant, the opposite behaviour was followed in the case of research on **Artificial Intelligence** where, in the absence of specific rules, there were self-regulation initiatives based on open sharing of the outcomes of research activities and related applications. All stakeholders were fully aware of what had been developed and how it was done and this should insure a positive steering of innovation.

The relevance of the opinion of **ethical advisors** was reiterated, as proposed in the Framework, to lay down internal guidelines aiming to avoid and to limit ethical risks and malicious use of innovative products by third parties.

It was reported that several **security mechanisms** were already in place in the company to prevent and avoid damages caused by the theft of (client-to-client or company-to-client) information and electronic data. Furthermore, compliance with the *Framework guidelines* for innovative, ground-breaking research – as in the case of the aforementioned research involving drones or artificial intelligence – could lead to a stop of the activities as a consequence of negative opinion issued by the consulted ethical committee. According to one employee, this would give a competitive advantage to less responsible companies that do not consult ethical boards. This disparity would be overcome only in case of binding rules for ethical evaluation of innovative research projects.

A participant confirmed his positive opinion about the integration of ethical and social issues into the risk analysis currently undergone by the project leaders (that is through “ethics self-assessment”), but reiterated his concern about a possible consequent slowing down of the research activities.

Regarding the **procedures for ethical assessment** (Fig. 5 of the Executive Brief), it was discussed how to deal with ethical issues in the absence of an internal advisory board. One person said that sometimes, in the course of collaborative projects, reference was made to the experience of the other partners or their ethics committees in dealing with ethical issues, while in other cases, the legal department of the company was involved. One remark was that consultation of an external **ethics committee** could be useful for specific ethical concerns, but appointing a permanent advisory board would represent an excessive cost for the company and a further bureaucratic burden.

The Focus Group suggested that a **preliminary ethics self-assessment** should be carried out inside the company at the agenda setting and early phase of new research activities, and only where significant and critical ethics issues arise, advice should be asked to an external ethical board or an ethics adviser to deal properly with these issues and put in place procedures to handle them. This solution would limit the bureaucratic burden and costs.

Concerning **end user involvement**, the discussion focused on public engagement practices. One employee said that the company used to take part in public consultations organized at high political level and public authorities on specific themes like telemedicine to assess the relevant normative.

Furthermore, there was some concern regarding the **involvement of stakeholders in the early phase of research** for the ethical and social risk assessment. It could slow down or even stop research activities before it was clear which kind of results could possibly be achieved and which products or services could derive from applying these results.

**“Lean development”** is one approach to avoid this risk. It suggests getting an early feedback from users only after putting into practice the basic ideas and after realizing some preliminary applications.

The conclusions drawn by this discussion led to two actions as possible refinements or alternatives to the Framework guidelines:

1. Wide and deep desk-analysis of ethical risks and social implications of R&I at the agenda setting and early phase of new projects, when positive outcomes of the planned research are not yet guaranteed.
2. End-user involvement as soon as the basic ideas have been transformed into concrete proposals for product development.

This proposed approach coincides partially with the *precautionary principle* suggesting not to stop but to go ahead with great care in case of uncertain scientific evaluation and unpredictable risks of research.

The FG participants agreed on the usefulness of this approach that would combine the risk evaluation phase and the prototype testing phase. In this way, end users would be involved at the same time in the functional analysis as well as in the ethical evaluation of the products, with the objective to increase their safety, quality and acceptability.

There was consensus on the opportunity to involve both types of end users, professional operators and consumers from the general public, as their opinions and points of view are often contrasting.

The next discussion point concerned the usefulness of getting a feedback from the **marketing department** on the possible increase of product acceptability and desirability as a consequence of end users (operators and consumers) involvement in the prototyping testing of the product.

It was observed that this effect could be more directly checked by a company specialized in providing services/products for health care. As the core business of the company was telecommunications, involvement in ICT for an ageing society was only one among many other areas. The typical approach followed by the company for getting feedback on ICT products and services was step-by-step by means of internal trials followed by trials with customary partners and, finally, with end users.

According to one participant, sometimes end users express very differing opinions with respect to the **social utility or desirability** of a product. For example, the results of a scenario analysis on autonomous cars had shown a very low desirability for this product even if it was considered socially useful in terms of safety and efficiency. Market analysis fully centred on the consumers could give results that could be not entirely indicative.

Regarding a possible **economic return** of the additional costs for the company after adopting RRI procedures, some FG participants believed that it would not be easy to quantify them, although adherence of a product to ethical standards was considered a plus for its marketing. Both, vendors and marketing department staff, usually collected the opinions of visitors of the public web sites. These comments were reportedly very general and usually did not allow for specific and punctual analysis.

In relation to the need for **transparency on research results** and products, the company had adopted an **open approach** to research results, at least between project partners, whenever strong ethical barriers to the research development (as in the case of Artificial Intelligence) were present. In most cases, for competitiveness reasons, research results remained confidential for internal use only, whereas transparency on the products should be guaranteed. This last point was considered very critical. It was observed that total transparency on the products could not be guaranteed, as in the case of hidden costs of products.

It was pointed out that some problems related to the use of new products and services may derive from the management's request to shorten the "time to market" before all the technical details are entirely fixed.

As for **governance tools** for RRI for implementing RRI in the company (Fig. 7 of the Executive Brief), the participants remarked that their company already had adopted **CSR tools** and a very exhaustive **CSR report** had been compiled with the contribution of all departments. According to the FG participants, despite being a long and complex document that was sometimes difficult to read, it represented an important reference point whenever a critical situation occurred. The adoption of **Codes of Conduct** was not considered as a measure of particular relevance for positive steering of the research activities. To this respect, an important steering effect was associated with the interaction with other partners inside a collaborative project. This interaction could show different opinions on critical issues of research, including ethical and social aspects. Furthermore, another benefit would be sharing of good practices, for example health organizations could make their internal ethics committees available to all the project participants.

It was pointed out that effective adoption of RRI practices inside the company would require strong and unambiguous support of the **Management**, as schematically indicated in Fig. 3 of the Executive Brief. It was observed that some RRI principles had already been taken into account by the company Management, as shown by its concrete commitment to adopt CSR practices. To this respect, the inclusion of RRI related activities and initiatives in the CSR performance report was suggested, even though it was already done. The scepticism of the general public concerning corporate policies due to "window dressing" was mentioned. One opinion was that this mistrust could be overcome if CSR activities were monitored by independent certifying bodies of proven experience, as it happens for the company budget and all aspects of quality control.

### *Further results and insights*

Discussions in the FGs addressed a number of issues and problems pertaining to the implementation of RRI in industry, with close but not exclusive reference to

the sector of ICT for an ageing society. Many of the proposed measures were already implemented by the company, in particular concerning strict adherence to current **legislation** throughout the R&D of innovative products, the involvement and **inclusion of end users** in several value chain activities, the ethical and societal analysis of new technologies (*“foresight”*), the adoption of **CSR tools** and the attention to **business ethics**.

The focus group participants identified some points for discussion related to the concept of “mutual learning”:

- on one hand side, a critical review of RRI practices and methodologies which could be implemented inside the company (e.g. a more systematic analysis of the ethical and societal risks),
- on the other hand, a careful examination of the feedback from the company about the usefulness, validity and completeness of the guidelines proposed by the Framework, in order to increase its attractiveness and interest for the industrial community.

It was concluded that real-life experience and practical suggestions are essential for integrating principles and methodologies of RRI into research and innovation processes.

## 3.6 Netherlands

### *Metadata*

Project partner: UT

Method: Focus Groups

Dates: 9 August 2016, 6 September 2016

Participants: 1 Large Research and Technology Organisation, 1 start-up company

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick.

### *Area/driver for research and innovation*

Focus groups were held at two different companies. The first institution was a leading **developer of ICT for healthy ageing** and a large Dutch scientific research centre for rehabilitation technology covering a wide range of topics related to rehabilitation technology and telemedicine. Examples include robotics for treatment and support of the upper extremity, three dimensional ambulant gait analyses, online services to identify and prevent frailty among older adults, and display technology for integrating home automation to support independent living. R&D is mainly funded through the granting network for care-related research, both at national and European levels.

The second company was a **small and recently created spin-off** from the University of Twente, specializing in home automation. In addition to the two founders, they employed 15 other people – many of which are former students from the same university. They had won several awards, among them “start-up of the year”. After having had their main product tested by early backers, at the

time of the focus group sessions, they were in the process of going from prototyping to commercial launch. This FG consisted of only one participant, the founder and leader of a University of Twente spin-off building a home automation device.

### *Conception of RRI*

The concept of RRI was considered from some FG participants as “really broad”. It was associated with “**Responsible Entrepreneurship**” which was believed to be more targeted “towards nature and stuff.”

One person tried to summarise the concept as “keep thinking about what you are doing [...] from multiple perspectives.” He believed that “a lot of the ethical stuff is just **common sense**.”

### *Current Practice in RRI*

Risk analysis was performed about business-risks and risks for the users. Regarding **data-security** and legal issues related with it, one employee said it was mostly about who owns the data and who may access certain kinds of data.

Products like **home automation** systems may obtain and store many personal data of the people living in their homes. One FG participant said that when monitoring the home of people, they should decide about what they accepted and what went too far. He stated that “the responsibility was shifted to the user”, which led to the question about the responsibility of the gun manufacturer if someone gets shot with a rifle from their production.

### *Practise of the sector*

**User-centred design** was associated with RRI. One FG participant reported about his perception of a common unawareness about ethical questions among technical staff. He stated that he was collaborating with many technical partners in projects, who had “no clue what they were developing and even though they are developing components of systems that are targeted for groups like the elderly, people with disabilities, among others, they develop components without knowing what they are doing.”

Another person tried to explain this **unawareness** as “typical for the **research context**, because you could do it for quite some time without being punished.” This “punishment” was in the sense of lack of negative consequences, which in contrast in the case of commercial product development would have rather soon a negative effect on the business.

It was testified that some companies were using the gaps “in the **European directive for medical devices** where the categories are stated, by applying for a specific category, instead of the higher and more administered category where the device or technology actually fit in.”

One participant had observed that in a project about an infrastructure for primary care mainly for chronic patients, a large company participated mainly to collect data for secondary analysis and **data mining** “without thinking of any privacy or legal consequence.”

Some employees of the SME agreed on potential ethical issues with **working conditions in suppliers**, in particular in international supply chains. They believed that small enterprises such as a start-up company hardly had the resources to investigate in these issues.

One person was pointing out a **misconception of user-centred design**, according which “everything should be designed *by* the user and everything should be done *with* the user, and basically if I asked the user to design something new they will come up with what is already there.” He believed that in these cases companies were not innovating, but wasting money by asking users to do everything professional designers would normally do. Therefore, the design should be made by experts who consult and engage with end users. He was of the opinion that end users cannot replace designers and if someone is designing something new, end users should not play the role as **co-designers** all the time during the whole design process.

### *Feedback on framework*

Regarding the Framework on RRI proposed by the Responsible-Industry consortium, concerns were raised over users of the Framework who would **cherry-pick** only the aspects that were easiest to apply, without considering more important activities.

The tool should be **target group-oriented**, e.g. leading the user of the tool if they are from a start-up company or a large business.

The question “What’s in it for me?” should be on top, which would imply the need for an **enticement** document.

Another requirement was that the document should be **useful** and perceived to be useful and moreover “**fun to use**.”

One participant disagreed that **videos** were a good medium for dissemination in this case, because in a professional context, he or she preferred to skim a text, e.g. a PDF file or a webpage, to evaluate instantly its relevance. The text should be short and to the point, and contain many bullet-lists to avoid “long stories”. Moreover, the use of **flow-charts** was suggested, which could be especially suitable for programmers.

## **3.7 Spain**

### *Metadata*

Project partner: TECNALIA

Method: Semi-structured interviews and workshops in the context of two case studies

Date: 10 November 2015, 23 November 2015, 24 November 2015, 23 May 2016, 6 October 2016, 19 January 2017 and 23 January 2017

Organisations: Multi-national large ICT company with headquarter in Spain, Spanish small company working on hospital equipment, among other products

Analysis: Semi-structured interviews were transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by A. Garzo and M. Obach.

### *Area/driver for research and innovation*

The large multinational company with headquarters in Spain is one of the main service companies in the field of Information Technology on the Spanish market focusing in IT consultancy, infrastructure services, integration of information systems, outsourcing and the implantation of integrated solutions for business management. It was created more than 40 years ago and has nowadays more than 3,100 employees.

The Spanish SME is an international manufacturer specialized in designing developing and manufacturing innovative and modern communication systems and software for the healthcare and security sectors. The company has more than 20 years of experience in providing reliable and customized solutions to hospitals, clinics, nursing homes and private companies.

### *Conception of RRI*

None of the employees who participated in the case studies with the two Spanish companies was familiar with the term Responsible Research and Innovation or **RRI**. However, they were **aware** of most of the defining concepts (pillars), especially on ethics and gender equality. However, some misconceptions regarding **open access and governance** were observed, which were corrected during the case study.

Both companies had few and only **indirect contact with end users** of their products related to health and ageing, because their clients were mostly other companies (B2B). Most end user contact occurred in public R&D projects.

Dissemination material and websites of both companies demonstrated their explicit "**social connection**" and commitment with society.

RRI was regarded as an **internal value** of the company and the employees.

There was no awareness of **legislation** directly related to RRI.

RRI was thought to be a useful concept for being a **complete and holistic approach**, in this sense it is unique in its aim to provide a comprehensive view of research and innovation processes.

RRI may countervail negative effects of **globalization** and may mean that products and services could take national or cultural aspects of end-users further into account.

Part of this can be to create a **better image** towards clients and providers and add value to a company's products and services.

Interviewees were not aware of **legislation** directly related to RRI. Regulation was supposed to be very important for the successful and effective application of RRI.

### *Current Practice in RRI*

Many ICT companies are aware of **market barriers**, and accessibility and application of products is often difficult. Therefore, the large multinational

company (MNC) has been collaborating with CSOs, NGOs, end users, and other stakeholder groups in the design and development of their products and services.

**Open access** for disseminating results of public EU and national projects were accepted. **Governance** seemed to be a political issue and of interest for big companies, not so much for SMEs.

While the MNC had explicit internal policies regarding **gender equality**, the small enterprise affirmed that they did not apply any gender-specific advantages or disadvantages for people of any gender.

The MNC used to organise internal activities to **engage with employees** by means of training programmes, fostering entrepreneurship, and talent groups. Employees of the SME used to participate in new technological developments, but there were no internal procedures in the company to apply RRI in projects.

**Risk management** strategies were implemented and used in the MNC, even though mainly for technical issues. FG participants believed that contact with project partners could help to detect risks and to find mitigation strategies.

Concerning **risk management** in the SME, its CEO had the opinion that everybody in the company should be informed about ethical and social risks associated to their projects. However, there was no internal procedure for that.

When the case studies started in 2015, there were no measures of the **impact of RRI principles** in the MNC defined. Moreover no procedures in operational practises related to RRI were implemented.

**Anticipatory design** was applied only to a lesser extent, even though there was engagement with users and clients.

Given the business model of the SME, **end-user contact** was sporadic and problems identification was indirect through distributors and installers.

Even though the SME had less **internal procedures** than the MNC, there was awareness of their responsibility for the well-being of end users such as elderly people and hospital patients.

**Privacy protection** was an important feature of tele-assistance applications.

**Internships** of students in the SME were given as an example of engaging with society and third parties.

**Technology assessment** was partly done, but without following specific procedures or using any tools. They did not promote it, and they did not know any tool to do technology assessment.

Customers (installers, distributors) of the SME provided **feedback from end users**, namely patients, medical and nursing staff.

### *Problems and impediments*

**Protection of intellectual property** was important to both companies, but often interfered with any attempt to publish their knowledge, except in public financed projects such as EU projects. Much information about their projects was provided on their websites, except where explicit clauses existed with clients for confidentiality reasons.

The decision makers of the SME believed that there was a strong **need to work with end users** in order to place and sell “good products on a good market.”

### *Gaps in practice and discussion*

Some discussion was about the differences between small and large companies with regards to the barriers and opportunities to implement RRI in their research and innovation processes.

An important point for the discussion was that **SMEs make up a large part of this sector** along with their specific structure and ways of working.

A main challenge, especially for SMEs, was that RRI may require structured steps which **increase the time of development** and therefore the **costs**. Furthermore, the financial risk for developing new products is often higher in SMEs, as their portfolio normally is smaller than in large enterprises and every development has a higher proportional value and means a higher proportional investment.

In SMEs there is often no specific department that is explicitly responsible for RRI or ethical considerations, therefore it is difficult to elaborate on specific procedures.

Some interviewees believed that SMEs tended to be more short-lived than typical large enterprises. They assumed that decision makers in SMEs therefore often take **higher risks** and do not care so much about sustainability and “disregard responsibility issues in order to make quick money instead of being accountable for their actions.” However, it was stated that it also makes a difference who owns the company and that in the case of family-owned SMEs the identification with the company was supposed to be much higher and therefore the potential to take responsibility into consideration in development processes would be also higher compared to SMEs led by purely profit-oriented business people.

An advantage of SMEs is their **flexibility and adaptation** enabling them to react faster than large companies.

It was stressed that SMEs often relied on the **experience of few individual developers** who had a deep know-how in how to work with end users about various issues and how to obtain feedback. This would make it more difficult to disseminate information on how to engage with end users because it was specific knowledge within individuals or a company.

Some interviewees claimed that smaller companies have the possibility to be much **closer to the end user**, which is why they are especially important in the ‘social care’ sector. They can be more careful regarding how to put a product on the market also regarding ethical aspects such as privacy.

Here it was suggested contacting **associations and networks** that coordinate and even regulate (Codes of Conduct) a sector because they are more able to initiate changes towards RRI than a single company.

Within the SME there were many projects with various partners, such as universities, end users, other companies, policy makers. This means that during the collaboration different partners might bring up ethical issues and reflections. Therefore these projects were considered to be important for the SME because they allowed for exchange of experiences and issues and hence problems could be identified early on.

One problematic issue mentioned here was the **communication with policy makers** and the increasing speed of development: for companies developments are often much faster than the reactions of policy makers, especially in the area of ICT. An opportunity of RRI is to overcome this issue by including policy makers early on and therefore opening up the discussion during the development process.

### *Discussions*

The large company planned to use **key performance indicators (KPI)** related to RRI in forthcoming R&I projects. A list of KPI has been defined in the context of this project and is supposed to help assess the maturity of RRI. However, this list was complex to be used and needed a user manual and an objective scale to measure projects. The use of the selected **KPI** was successful, even though maybe rather local and on a pilot basis.

A procedure to assess new and ongoing projects regarding their **societal and environmental impact** through a list of indicators developed in the context of this project was tested and partially established. This active participation created high **awareness** among the participants.

The **Marketing Department** of the large enterprise has been closely involved in this whole process together with Administration and the R&D department.

### *Feedback on framework*

It was postulated that **incentives** for R&I performing companies for implementing RRI must be made clear.

**Success cases as examples of good practise** for faster and better market entry through RRI would be very useful to convince decision makers to implement this concept in their companies.

In order to guarantee the success of an attempt to implement RRI into a company, the **executive management level** of the company has to be engaged. The **corporate management** has to “buy into it” and promote RRI within the company and outside as a crucial part of the company’s mission.

It is important to **estimate the costs** and investments of implementing RRI, because this could require many changes in a company

An important aspect in order to implement RRI successfully in **all levels and departments** is to involve the employees and to train them.

The question about **the added value of applying RRI** in an organisation is very important, especially in terms of business, sustainability and well-being of the employees.

The **standardization and regulation of RRI**, at least in Europe, would be useful. This may lead to a certification or “label” for processes and products based on RRI. In this regard, a tight collaboration with existing certification bodies would be helpful

Partnerships are needed, using already established forums and develop reward schemes to integrate RRI in existing structures. In particular **partnerships of companies with CSOs and end users** were considered helpful to add various

perspectives. CSOs and end user organisations can represent the interests and rights of end users, because they are aware of wider needs. However, engaging with them can be difficult for smaller companies

One aspect pointed out by representatives of CSOs was that **maintenance of products and services** is also an important, but often disregarded, factor. Therefore, there was a perceived lack of clarity regarding maintenance costs.

**Key performance indicators** (KPIs) of companies could be an important tool to measure the degree of implementation in a company and the success of RRI, e.g. related to environmental issues, stakeholder engagement or integration of ethical standards

#### *Dissemination: how can the framework be realised?*

It was stated that **public funding programmes** had changed over time and in recent years more attention was paid to ethical aspects than before. Companies needed to take this new situation into account when applying for public funding. Therefore, funders of public calls have an opportunity to influence in the adoption of RRI in R&I projects.

A useful strategy for RRI experts for **communicating RRI to companies** and to engage them is to approach first personal contacts in companies to promote RRI and then to train employees, preferably starting with representatives from departments that are open to innovative changes, such as the R&I department or the marketing team in order to create success stories to then further promote, using public funds (e.g. Horizon 2020) to support new and innovative initiatives that otherwise may not be sufficiently aspirational for companies.

## **3.8 UK**

### *Metadata*

Project partners: DMU (2 FG), Euclid Network (1 FG)

Method: Focus Groups

Dates: 30 October 2015, 12 May 2016, 22 August 2016

Organisation: Non-profit organisation developing and selling apps for health self-management of patients; SME in health technologies, including telehealth

Analysis: Focus group was transcribed in full; Analysis was done using NVivo 10; analysis was undertaken by C. Flick and B. Stahl who also held the focus group and M. Brown, who did the transcription.

### *Area/driver for research and innovation*

The members of the first Focus Group (FG) worked at a **non-profit organisation** that centred on a set of apps that patients could use to help with self-management of arthritis conditions by inputting data from blood test results to gain information about their condition. This information is not provided by the health care provider in a way that is accessible to patients, or in a way that could potentially concern patients, so this acts as a driver for the innovation that the

non-profit organisation has been involved in. Another driver is that often patients know more than their General Practitioners (GPs) about the condition, so self-management is highly sought-after. It was obvious from the discussion that the lack of funding is a significant driver for innovation. They have to compete with similar environments for attention and funding because arthritis did not get the attention it deserved.

The participants of the second Focus Group were from an **SME** based in a major city developing products for mobility. The company has invented devices that seek to reduce the risk of falling for people with mobility issues caused by injury, ageing and serious diseases such as diabetes, multiple sclerosis and Parkinson's disease. When the Focus Group took place the devices were in the prototyping phase.

### *Conception of RRI*

The idea of RRI was strongly linked with **Corporate Social Responsibility** (CSR) in the minds of the participants of the SME. There was much discussion about how most of the CSR funding went to bigger organisations, but that there was a charity that was involved in providing the organisation with access to accountants and solicitors (which they considered to be part of CSR).

There was also a significant link in the participants' minds with **policy** – they felt that it was up to policy makers to regulate and to drive responsible innovation, “they give the direction and the drive and then everybody else [follows].”

However, they were aware of their **own responsibility** for the app they were developing and any issues that arose from that, particularly with regard to privacy and data protection.

The members of the FG were not aware of the term RRI prior to this project but they believed they had been applying RRI aspects since the beginning, classifying many aspects of RRI as **common sense**.

The participants claimed that they **engaged with end users** in the earliest phases of their research activities “from problem definition, before there was any product, any technology at all.” Furthermore, there was some collaboration with universities and non-governmental organisations (NGOs).

They considered **irresponsible R&D** to ignore risks, e.g. when engaging with fragile people and asking them to test their products, it must be guaranteed that the testers are safe and do not fall during the tests.

### *Current Practice in RRI*

Activities in the participating SME included stakeholder engagement with **participatory design**, **informal ethical assessment** through thinking about potential stakeholder impact of aspects like display and access to data, **privacy and data protection-related design**. The organisation also carried out **science education** through educating patients in technology and how to use the apps they develop to understand blood test results and the science behind and management of their condition. **Participatory design** methods comprised a multidisciplinary co-designer group where different stakeholders and their needs were analysed. These methods fed into user-centred design methods

which allowed the designer to take into consideration the user needs during the technology development.

### *Problems and impediments*

Most of the problems identified by this organisation were external, for example, lack of **open access** to data from the NHS funding. Another concern was **access to participants** – many of their users had movement difficulties which made it difficult for them to come to workshops.

In the sector, they identified **profit motives** as potential reasons for other organisations not innovating responsibly. They also suggested that because bigger organisations used to have more dedicated CSR tools they would have more chance of innovating responsibly than smaller companies.

On one hand side, from a corporate perspective, it was appreciated being able to get products to market with relatively little regulatory framework and little hassle. Therefore, it was argued that, from a commercial, corporate, and financial perspective, when it comes to developing new products, the regulatory environment would not make the development of products any better, and all it would do was adding expense and not add huge value.

One concern was that willingly opting to have a regulatory framework like the MHRA for medical devices or ICT developments could mushroom into a huge and expensive bureaucracy, which would be a barrier for any development that could exclude mainly small companies from “bringing some really useful stuff to the market.”

One participant reported that they had come across some **irresponsible communication of the outputs** of research, such as active non-communication of bad results.

Another example were products that would not really have a significant advantage in real terms for patients but which extend the patent life of products, therefore benefiting the **commercial interests** of the company.

### *Gaps in practice*

One identified gap that had arisen from the data was that the company was lacking in **expertise in responsible innovation**. They asked explicitly for help from the consortium member in thinking about some of the issues that had arisen from their discussion, and some of the issues (e.g. privacy) seemed to be relatively new to them.

They would like to get data directly from the National Health Service (NHS) England, but seemed to be **unaware** that this could be potentially problematic in terms of data protection and privacy.

The following aspect would be of interest to the organisation:

- Business model for app distribution;
- advice on privacy and data protection;
- advice on general ethical issues to do with e-health applications.

They would like to get data directly from the NHS but seem unaware that this could be potentially problematic due to problems regarding data protection and privacy.

The participants insisted on the difficulties they faced to:

- understand EU marking (legal);
- understand and access EU funding;
- connect with similar organisations facing similar issues, and potential partners.

Companies need some guidance in **regulations**, such as CE marking and self-certifications. One approach could be to team up with peers building **networks** with people with similar problems. A network would be very useful but also being able to connect in person with the European Commission as well, which could help to get EU funding.

### *Feedback on framework*

There was general agreement that the framework was a **great idea** and could really **help companies** with their development to make better and more user-centred products. The participants were enthusiastic about the idea and came up with some good ideas for dissemination and implementation as well as what was missing.

Overall they thought the format was too **complex** for a starting document. They thought it should be simplified to motivate people to read it, then keep the detailed information for the person at the company who might be involved in policy implementation. One suggestion was that there could be an **interactive PDF** for use on iPads, with cross-correlated links etc. that could be useful for reference material.

Another suggestion was a **poster format** for basic information for people to have hanging in break room with direction for more information and general guidance that could then refer to the larger document. An adult colouring book was suggested jokingly, but the emphasis was that the document needed to be much simpler to get people hooked in.

Then there could be, it was suggested, a **hierarchy of information** so that there is multiple standards and detail information.

Animation **videos** were mentioned as good practice in general, so that it can be assumed that the video produced by the Responsible-Industry project is a good approach.

Looking at diagram 'Users and **stakeholder engagement**', the FG members believed that all steps are relevant to them: *"To be honest I think we quite follow the steps that you have laid out here: we have had user engagement from problem definition, before there was any product, any technology at all!"*

Regarding the diagram *Stakeholders involvement in the different phases of risk/impact assessment*, the FG participants said it was relevant to them and that they were used to risk assessment as they had learnt it at university. But they also thought that the diagrams would not, for example totally apply to them, that it would have to be tailored to the situation, the context of the company and the target group.

Some people were expecting more details on how to perform stakeholder involvement and other activities related to RRI. They suggested having methodologies, templates and examples, especially for SMEs (see section: Format).

*“In e-Health, you need to go deeper in the question “how do we test?”, “are we testing with usual people or we are testing at university?”. We need to know what kind of test it has to be. For example, stakeholders’ engagement: keep evidence of the results of these activities.”*

They also insisted on getting help on EU regulation and compliance (*see above*).

A criticism of another FG was that the Framework was quite **generic**, even more in the Executive Brief that summarised the framework. The participants proposed to have some examples of implementation, what the framework would actually look like, so those particular principles to be adopted.

How much it’s going to cost me to do it? And actually companies talk about the potential benefits of doing some of this stuff, which is why to an extent I have an issue around some of it being quite negative. Because arguably doing some of it is quite positive and there’s a positive impact from doing it, I know it’s difficult to measure the net of the impact of risk, but something around what people got from doing it that way would be really useful.

They suggested including a **glossary**, which is already available in the main document (the FG participants had only received the executive summary of the framework rather than the whole plan).

Another suggestion was that it would be useful to have further information on where to get more detailed information e.g. on **standards**.

The Framework has to appeal to different people in different ways, following a **neuro-linguistic programming** approach. Furthermore, it should be something which carries on trying to catch the target readers’ attention also when they do not have something to do about it, i.e. sending case studies and the practical examples on a regular basis in some format that is engaging.

The CEO of the SME believed firmly that an RRI Framework was relevant for all the functions of a company: *“No, I don’t think this is only relevant to engineering. For example, in terms of engaging users, no matter what role you have in a company the users are your end-clients so if you are designing the marketing campaign you also need to know the user.”*

**Infographics** were much appreciated, being more appealing to the reader than text only, catching the attention, and being a quick way to know what the section is about. However, it was suggested that there could be added more text around them.

Advice from this FG is that it should be completed by something more interactive like **courses, webinars** and an **on-line networking interface**.

The Executive Brief of the RRI Implementation Plan was regarded as being a bit “too dry” on certain aspects but a good introduction that should link to other resources (preferably online) with more details on each concept, method, etc. It was stated that it looked like a summary and needed more details and examples, in particular about concepts like human-centred designed.

They insisted on the integration of **templates** in the guide. For instance beginners to risk assessment might wonder how to perform risk assessment in practise.

A website was considered a good option, especially if it includes:

- Templates;
- Access to detailed information on each notion;
- Access to a networking interface;
- Help on EU funding.

One new suggestion was to build a **networking portal** on the project website where people could create a short profile and connect with each other, connect with stakeholders. This would require a database, a simple user interface that would allow searching other users and finding partners.

A recurring concern during the FG was **funding** for SMEs and how to find secured funding, and create a network to connect SMEs together and to know how to engage with EU funding.

When looking at the diagram 'Key responsibilities for RRI within the organization', members of the FG identified with all components of RRI that are named. They also believed that the team was 'ethically aware'. One participant said: *"I think generally yes we cover all aspects. Although I think that will change as we move through the different stages, right now the R&D is the key thing for us. The legal resources are more here to support the other things that have to take place. CSR is probably something we are not very focused on at this point in time. Marketing will come a bit later, we are not putting too much effort on that as we do not need to reach our users for sales right now."*

### *Dissemination: how can the framework be realised?*

There was a suggestion for it to be integrated with **NESTA or InnovateUK** as a toolkit. This branding could allow for further dissemination and integration with policy initiatives.

There was a strong suggestion for a **"toolkit" of approaches** to guide the developers. Flowcharts and tick charts were suggested to help making it easy to implement. As one participant said, it would "be great if there were some frameworks where you just literally got rid of all the noise and just followed it."

A tax rebate was suggested as an **incentive** to implement responsible innovation via this framework, perhaps in conjunction with InnovateUK/NESTA or other organisations.

Something like a **"Responsible Innovation Champion"** like "Brand Champions" within bigger companies could allow for implementation push throughout a bigger company.

One person said that she often read case studies and reports that came through as a link on **LinkedIn**. Furthermore, information should be sent in a different way, over a number of times, before I might actually see that it's worth doing, because everybody that is on the LinkedIn profiles will be in businesses, so if you try and get a profile up there and get people to follow you that are in the industry, then you can keep putting out messages through that format and they'll get in touch with you, download the report or whatever.

The Framework should be online, e.g. on a **website**, even though some participants expressed their disagreement on this suggestion.

The “*How-to bits*” could be little **modules** that could be accessed by those who were particularly interested in that specific section. In any case, it should be **regularly reviewed and updated**.

### *Further insights and surprising findings*

A surprising finding was that one of the impediments to RRI specifically in health was that it was often difficult for participants to travel and participate in health innovation participatory design methods. This applies for instance to patients and users that have difficulty attending, who are bedridden, or those who cannot access the internet.

## **3.9 China, Japan, the U.S.A.**

### *Metadata*

Project partner(s): KIT, Euclid

Method: Workshop

Date: 22 May 2016

### *Conception of RRI*

Experts from the U.S.A., China and Japan presented their main understandings and current discussions of RRI during a workshop organised by the project consortium. In the **U.S.A.**, discussions on responsibility are often challenged by demands for increased innovation regulated by the market. At the same time there are claims for RRI to become a way to smoothen the development of predetermined technologies. Therefore, it seems that for RRI to actually be adopted in the U.S.A., it will have to move away from the top-down idea of implementation and align with innovators and drivers of economic growth to potentially reach a mutual advantage. For this, collaborations between academia, government, business and civil society are needed in order to reflect on experiences from other countries and adapt to the specific culture of innovation in the U.S.A.

**China** however does not have an influential discussion in the context of policy making and public debate on RRI yet. The Chinese innovation policy discourses are focused on innovation-driven development strategy, mass entrepreneurship and supply-side reform. These stem from characteristics of traditional science and technology management, which revolve around “*developmentalism*”, scientism and top-down management. Therefore, RRI would need to be translated into the policy making area. A main challenge in China is the ageing society, which is a large scale and high speed process, with problems of low levels of health and large regional differences. It seems that this particular societal challenge may have the potential to introduce RRI to some degree in China.

Ageing society is also a huge issue in **Japan**, which has been termed a “super-aged society”.<sup>3</sup> This has led to large changes in the structure of the population and has impacted the economy as well as society as a whole. There are many initiatives towards finding ICT solutions for this situation, which is expected to increase in the future. RRI is not known in Japan or discussed at policy or academic levels. Yet, the term “responsibility” has been increasingly discussed in the context of science and technology and there are substantial similarities between the debates in Europe, the U.S. and Japan regarding research and innovation policies and debates.

More facts and insights from the three countries are reported in the project deliverable D4.4.

---

<sup>3</sup> Naoko Muramatsu, Hiroko Akiyama: “Japan: Super-Aging Society Preparing for the Future”. *Gerontologist* 2011; 51 (4): 425-432. doi: 10.1093/geront/gnr067

## 4 Conclusions

The 15 focus groups and five case studies in Cyprus, Denmark, Finland, Germany, Italy, Spain, the Netherlands and the UK, as well as the input from experts from Japan, China and the U.S.A. provided numerous facts and insights from employees of small, medium and large enterprises that offered products and services in the field of ICT applied to health and demographic change about their conception of Responsible Research and Innovation (RRI), current practice in RRI in their company and the sector, problems and impediments, feedback on the results of this project and inspiration how they could be disseminated.

This document reports about relevant and interesting outcomes of the activities in each one of the countries listed above. It must be noted however that this study does not aim at comparing the conceptions and practises of companies concerning RRI among different countries or types of companies. Neither can these samples be generalized for each one of the countries.

Nonetheless, some conclusions can be drawn that describe general observations and trends:

- Even though the term RRI was practically unknown to all employees of companies that participated in the case studies and focus groups, they were aware of most of its underlying concepts and related topics, such as stakeholder involvement, risk analysis, and personal data protection.
- All knew about subjects that were regulated by laws like those related to personal data protection.
- In general, the employees of all enterprises that took part in the study considered stakeholder engagement and in particular end-user engagement as very important for their designs and developments, and their later success on the markets.
- Among the problems of the companies active in the intersection of the sectors ICT, health and ageing that most frequently were observed by the participants of the study were insufficient communication among members of the supply chains, the end users, and other stakeholders, high investment costs in terms of time and money, a prioritisation of economic aspects in research and innovation activities, and issues related to the application of the legislation and regulations regarding personal data protection that were considered too strict by some people.

Furthermore, the numerous opinions and valuable feedback on disseminating the project results obtained through the focus groups, the case studies and the workshops, led to significant modifications and additional project outcomes.

One frequently expressed request was to publish in addition to the many existing text documents a short, engaging multimedia presentation on RRI for ICT and the Responsible-Industry project, so that the project consortium contracted and directed the production of a video that is now available on *YouTube*, see Figure 2.



Figure 2: Video created by the Responsible-Industry project published on YouTube (<https://www.youtube.com/watch?v=Z0GnZr6Ki1g>).

Moreover, in order to meet the requirements of a more target group oriented presentation of the results, the two booklets about the Framework on how to implement RRI in companies in the sector of ICT for ageing and that covered in the first published version a summarized overview and a more detailed handbook, were rewritten and redesigned for three target groups of readers: firstly, “Benefits of RRI in ICT for an ageing society”, mainly aimed for decision makers like CEOs and other members of the top-level management, secondly, a “Guide for the implementation of RRI in the industrial context”, that has R&I practitioners as target group, and thirdly, “EU Policy recommendations for RRI in Health and Ageing” for policy makers (see Figure 3).

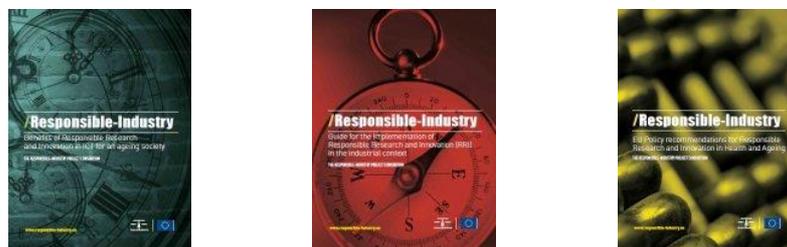


Figure 3: The three final volumes of the Framework for Implementing RRI in ICT for an Ageing Society: Benefits of RRI in ICT for an ageing society (left), Guide for the implementation of RRI in the industrial context (centre), EU Policy recommendations for RRI in Health and Ageing (right).

A summary of selected results obtained in the context of this study is shown in

Table 2.

**Table 2: Selection of results from the Focus Groups and Case Studies in eight countries.**

	Cyprus	Denmark	Finland	Germany	Italy
Conception of RRI	<ul style="list-style-type: none"> <li>○ Unaware of RRI concept</li> <li>○ Ethics and responsibility related to data protection</li> <li>○ Government could play a role as driver for RRI</li> </ul>	<ul style="list-style-type: none"> <li>○ R&amp;D projects co-development</li> </ul>	<ul style="list-style-type: none"> <li>○ Unaware of RRI concept</li> <li>○ Familiarity with governance, innovation, compliance, customer-centred design</li> <li>○ Belief in contributing to a better future and society</li> </ul>	<ul style="list-style-type: none"> <li>○ High awareness of issues related to RRI</li> <li>○ Top management of a company (e.g. CEO) as driver for RRI</li> <li>○ Awareness about data protection</li> </ul>	<ul style="list-style-type: none"> <li>○ Following legislation</li> </ul>
Current practice in RRI	<ul style="list-style-type: none"> <li>○ Stakeholder involvement process</li> <li>○ Employees did risk analysis</li> <li>○ Application in design, prototyping and pilot testing</li> </ul>	<ul style="list-style-type: none"> <li>○ Close collaboration with customers</li> <li>○ Products tested internally and externally with users</li> <li>○ User-centred design tools applied</li> <li>○ Involvement of suppliers in design</li> <li>○ Risk assessment</li> </ul>	<ul style="list-style-type: none"> <li>○ End-user involvement methodologies considered as useful</li> <li>○ Programmes implemented for employees' engagement</li> </ul>	<ul style="list-style-type: none"> <li>○ User involvement methodologies</li> </ul>	<ul style="list-style-type: none"> <li>○ Risk analysis carried out</li> <li>○ Legal, insurance and ethical aspects evaluated</li> <li>○ User involvement methodologies implemented</li> <li>○ CSR tools adopted</li> </ul>
Problems and impediments	<ul style="list-style-type: none"> <li>○ Limited infrastructure and resources to apply RRI</li> <li>○ Economic interest often prevailed over other motivations</li> </ul>	<ul style="list-style-type: none"> <li>○ Communication problems among customers and workers</li> <li>○ Personal data protection</li> </ul>		<ul style="list-style-type: none"> <li>○ Product focus different from user demand</li> </ul>	<ul style="list-style-type: none"> <li>○ Need for better relationship among internal groups</li> <li>○ Lack of systematic and structured approach for management of ethical and social risks</li> </ul>
Feedback on framework			<ul style="list-style-type: none"> <li>○ Risk identification and management related to regulation</li> </ul>	<ul style="list-style-type: none"> <li>○ Use less abbreviations</li> <li>○ Add diagrams and checklists</li> </ul>	
Framework dissemination	<ul style="list-style-type: none"> <li>○ Website for dissemination</li> </ul>		<ul style="list-style-type: none"> <li>○ Five-minutes video</li> <li>○ Combine audio-visual contents and traditional communication</li> </ul>	<ul style="list-style-type: none"> <li>○ Website considered useful</li> <li>○ Guidelines or short documents</li> </ul>	

	Spain	Netherlands	UK
<b>Conception of RRI</b>	<ul style="list-style-type: none"> <li>○ No familiarity with RRI concept, but awareness about pillars</li> <li>○ Social connection and commitment with society</li> </ul>	<ul style="list-style-type: none"> <li>○ Board concept</li> <li>○ User-centred design associated with RRI</li> </ul>	<ul style="list-style-type: none"> <li>○ Linked to CSR and policy</li> <li>○ Awareness about own responsibility</li> </ul>
<b>Current practice in RRI</b>	<ul style="list-style-type: none"> <li>○ Open access for dissemination</li> <li>○ Policies for gender equality in large company</li> <li>○ Employees engaged, participating in some activities</li> <li>○ Risk management strategies</li> <li>○ User-centred design methodologies</li> <li>○ Personal data protection measures applied</li> </ul>	<ul style="list-style-type: none"> <li>○ Risk analysis performed</li> </ul>	<ul style="list-style-type: none"> <li>○ Engaged with end users</li> <li>○ Apply participatory design methodologies</li> <li>○ Informal ethical assessment</li> <li>○ Privacy and data protection-related design</li> </ul>
<b>Problems and impediments</b>	<ul style="list-style-type: none"> <li>○ Protection of intellectual property</li> <li>○ Need to work closer with end users</li> <li>○ Communication with policy makers</li> </ul>	<ul style="list-style-type: none"> <li>○ Misconception of user-centred design</li> </ul>	<ul style="list-style-type: none"> <li>○ Lack of open access data</li> <li>○ Difficulties for accessing participants</li> <li>○ Irresponsible communication of the outputs</li> <li>○ Companies need guidance on regulations</li> </ul>
<b>Feedback on framework</b>	<ul style="list-style-type: none"> <li>○ Incentives for using RRI practices</li> <li>○ Engagement with executive management</li> <li>○ Estimate cost of implementing RRI</li> <li>○ Standardisation of RRI</li> </ul>	<ul style="list-style-type: none"> <li>○ Tool should be target group-oriented</li> <li>○ It should be “fun to use”</li> </ul>	<ul style="list-style-type: none"> <li>○ Framework is a good idea and helpful for building user-centred products</li> <li>○ Complex format: better interactive PDF or poster format</li> <li>○ Too generic information</li> <li>○ More information on standards needed</li> <li>○ Cost estimation for applying RRI</li> </ul>
<b>Framework dissemination</b>	<ul style="list-style-type: none"> <li>○ Through public funding programmes</li> <li>○ Experts for communication</li> </ul>	<ul style="list-style-type: none"> <li>○ Not using videos</li> <li>○ Use flow-charts</li> </ul>	<ul style="list-style-type: none"> <li>○ Animation videos</li> <li>○ Infographics</li> <li>○ Courses, webinars, on-line networking interface</li> <li>○ Design of a toolkit</li> <li>○ Social networks such as LinkedIn and website</li> </ul>

## 5 Acknowledgements

We would like to thank all contributors who participated in the 30 in-depth interviews and many other conversations, a large-scale Delphi study, two international workshops, five case studies, 15 focus groups, valuable feedback through the website, and comments on Twitter.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 609817.

## 6 List of Abbreviations

CEO	Chief Executive Officer
CSO	Civil society organisation
CSR	Corporate social responsibility
FG	Focus group
ICT	Information and communication technologies
MNC	Multi-national company
R&D	Research and development
R&I	Research and innovation
RRI	Responsible research and innovation
SME	Small and medium enterprise
UClanCY	University of Central Lancashire-Cyprus
UT	University of Twente
VTT	VTT Technical Research Centre of Finland