



**Deliverable 5.4.**  
**Final evaluation report  
on co-creation experiences**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 741527 and runs from May 2017 to September 2021.

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| Project Acronym                                                                                                                                                                                                                                                                                                                                                                            | ORION                                                                     |     |
| Project Title                                                                                                                                                                                                                                                                                                                                                                              | Open Responsible research and Innovation to further Outstanding kNowledge |     |
| Grant Agreement no.                                                                                                                                                                                                                                                                                                                                                                        | 741527                                                                    |     |
| Start date of the project                                                                                                                                                                                                                                                                                                                                                                  | 01/05/2017                                                                |     |
| End date of the project                                                                                                                                                                                                                                                                                                                                                                    | 30/09/2021                                                                |     |
| Work Package number                                                                                                                                                                                                                                                                                                                                                                        | WP5                                                                       |     |
| Deliverable Number                                                                                                                                                                                                                                                                                                                                                                         | D5.4                                                                      |     |
| Deliverable title                                                                                                                                                                                                                                                                                                                                                                          | Final evaluation report on co-creation experiences                        |     |
| Lead Beneficiary                                                                                                                                                                                                                                                                                                                                                                           | UAB (CRECIM)                                                              |     |
| Due date                                                                                                                                                                                                                                                                                                                                                                                   | M51 (July 2021)                                                           |     |
| Date of delivery                                                                                                                                                                                                                                                                                                                                                                           | 30 <sup>th</sup> July 2021                                                |     |
| Nature                                                                                                                                                                                                                                                                                                                                                                                     | R (Report)                                                                |     |
| Dissemination level                                                                                                                                                                                                                                                                                                                                                                        | PU (Public)                                                               |     |
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| VersionContributorsComments                                                                                                                                                                                                                                                                                                                                                                |                                                                           |     |
| 1.0                                                                                                                                                                                                                                                                                                                                                                                        | CRECIM-UAB                                                                | CRG |
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## Executive summary

This report is part of the ORION (Open Responsible research and Innovation to further Outstanding kNowledge), a European project funded under the Science with and for Society (SwafS) work programme within Horizon 2020. As part of Work Package 5 (Evaluation), this document presents the results of the evaluation of co-creation activities organised within Work Package 3 (Open-Experiments), mainly:

- Public Dialogues (i) to identify risks and opportunities presented by Genome Editing and (ii) to inform CRG research strategy.
- Funding Calls to promote Open Science.
- Citizen Science projects and Novel co-creation initiatives to promote multistakeholder collaboration in fundamental research in biomedicine.

Considering the diverse nature of all these actions, results are presented separately and preceded by a brief description of the context and sample of each initiative. Qualitative and quantitative methods have been used to assess the impact on participants, particularly on key actors involved from ORION Research Funding and Performing Organisations (i.e., call organisers, researchers, science communication professionals, etc.) in terms of satisfaction and perception of own change of views and learning.

The main findings of the evaluation of these initiatives are the following:

Public Dialogues (PDs) are events that attract participants from the general public with positive views regarding Open Science, which include democratic reasons of fairness and ethics, opening mostly to other scientists and specially concerned groups and signalling that all aspects of research should be open to citizens, with a clear focus on research results and outcomes. Citizens participating in ORION PDs show very high levels of satisfaction and perceive they learnt about the scientific topics of the dialogues. In all PDs organisers raised concerns regarding the need to involve senior researchers and slow the pace of the event. Public engagement experts organising PDs, despite highlighting the importance of these events in allowing a necessary bidirectional exchange of views and information between scientists and the public and increasing their network, recognise these are expensive and time-consuming initiatives. The most valued characteristic of PDs for all participants relates to their dialogic nature: the direct interaction that is established between scientists and other members of society.

The ORION Open Science (OS) funding calls were novel experiences for the involved organisations which included OS principles both in the preparation of the call and in its evaluation criteria. Examples of the introduced novel strategies were: improving communication aspects, open peer-review procedures and attempting public involvement in evaluation. Co-creation processes developed for the definition of the OS funding calls were perceived as positive experiences which, despite requiring extra funding and considerable OS knowledge, showed to be feasible and impactful in their institutions. According to their organisers, the ORION OS calls had also impact in the applicant-researchers, helping them to include OS principles in their work that would be useful along their research career.

The elaboration and launching of a call for promoting multiple stakeholders' engagement in science, either as Citizen Science projects or Novel Co-creation initiatives, is a demanding process. A crucial aspect is ensuring coherence between the level of co-creation and multi-stakeholder engagement expected in the applicant projects and the way the calls are developed and evaluated. The participation in such science projects that involve active multiple stakeholders' engagement showed to be very demanding for researchers, particularly at initial stages of the project. The role of Public Engagement experts in these projects is recognised by all involved actors as crucial. According to the views of those participating in active, multiple stakeholders' engagement projects in science, these have benefits both at personal and professional level for those involved in the team. Some researchers leading the active, multiple stakeholders' engagement projects that were launched and evaluated at ORION show a certain preoccupation regarding the quality of the science being used or produced in these projects. Scientific projects that involve demanding co-creation processes are described as more time and resource-consuming than more standard scientific projects.

## 1. Introduction

The ORION project aims to trigger evidence-based institutional, cultural, and behavioural changes in Research Funding and Performing Organizations (RFPOs), targeting researchers, management staff and high-level leadership. The project long term vision is to “embed” Open Science (OS) and Responsible Research and Innovation (RRI) principles in RFPOs, in their policies, practices and processes to organise, do and communicate research. To do so, the project carried out diverse open experiments and training actions involving multiple stakeholders.

Within ORION, **the aim of Work Package 5 (WP5) is to evaluate the project** to evidence to what extent and how the implementation of the project has achieved its expected impact. **The present document provides the final version of the ORION evaluation report on the open experiments organised within Work Package 3 (WP3).** This evaluation represents one of the main portions of the project evaluation, with the objective to provide evidence of the contribution of WP3 actions and strategy to the project overall objective of enriching and improving quality of existing co-creation experiments on RRI and Open Science. The evaluation reported here is part of an ensemble of three different evaluation efforts: evaluation of the impact of ORION trainings, evaluation of the impact of ORION open experiments, and evaluation of the changes produced in the ORION RFPOs along the project. The overview of this ensemble of efforts was detailed in an interim report (Deliverable D5.1 "Evaluation and Quality Plan: Instruments, strategies and indicators"), that has been updated along the project to describe contextual adaptations and changes along the project.

### 1.1. Objectives of the evaluation

The evaluation of co-creation activities under WP3 aims to assess three specific aspects, which are the following:

1. To monitor the scope and sustainability of the ORION co-creation activities.
2. To assess the overall impact of the different co-creation actions on participants, both in terms of satisfaction and of changes in views, knowledges and attitudes or beliefs about OS topics.
3. To provide data that will help to improve and to enrich the general quality of the ORION co-creation activities and, more specifically of each type of activity assessed.

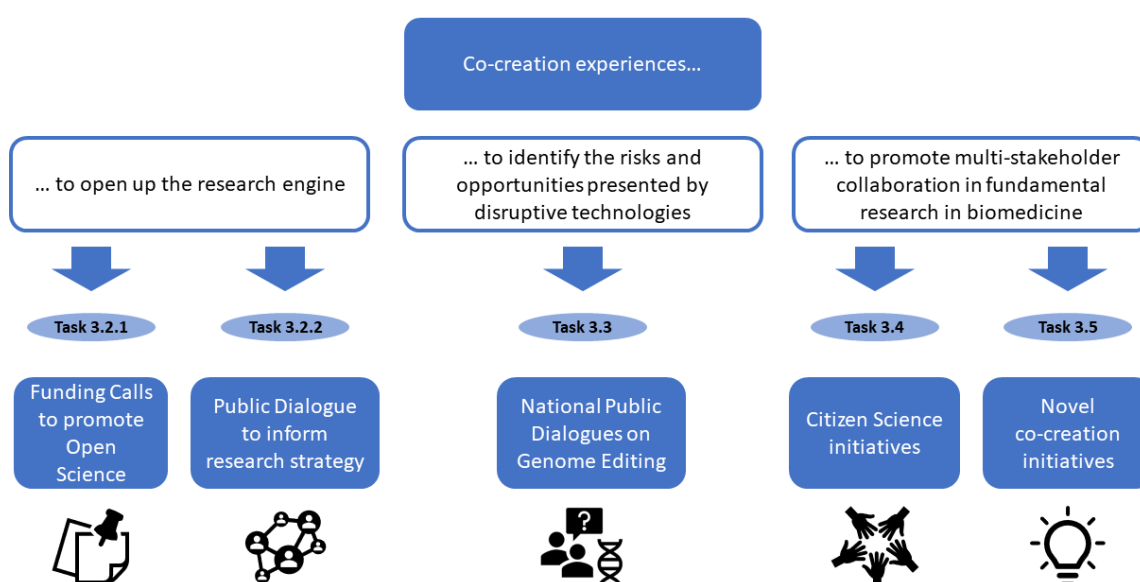


## 2. Methodology

### 2.1. Overview of ORION co-creation experiments

To achieve the goals presented in the previous section regarding the evaluation of ORION co-creation experiments, five different types of actions were undertaken, each of them including a series of specific activities, as shown in Figure 1:

- Co-creation experiments to open-up the research engine (Task 3.2)
  - Funding calls to promote OS designed by the two RFOs
  - Public Dialogue to inform research strategy (CRG/Spain)
- Co-creation experiments to identify the risks and opportunities presented to the public by disruptive technologies (Task 3.3)
  - National Public Dialogue on genome editing UK
  - National Public Dialogue on genome editing Germany
  - National Public Dialogue on genome editing Sweden
  - National Public Dialogue on genome editing Czech Republic
- Citizen Science initiatives in fundamental research in biomedicine (Task 3.4)
  - SMOVE project
  - GENIGMA project
- Novel co-creation initiatives (Task 3.5)
  - MELTIC project
  - VACCINE project



**Figure 1.** Scheme of co-creation actions developed within WP3.

The context in which data has been gathered for this evaluation effort is very diverse, as five different types of initiatives, taking place in the different countries of the RFPOs and partner institutions of ORION, have been evaluated. Specific details on the context of each of these initiatives can be found in the corresponding Deliverables (see Table 1)

| ORION action<br>(Task)                                                      | Deliverables with detailed description                                                                    |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Pilot calls to promote OS<br>(T3.2.1)                                       | D3.5 Specification of new pilot funding calls<br>D3.9 Implementation of New Funding Calls                 |
| Public Dialogue to inform<br>CRG's research strategy<br>(T3.2.2)            | D3.7 Implementation of the Public Dialogue to inform CRG's<br>research strategy                           |
| National Public Dialogues<br>on Genome Editing (T3.3)                       | D3.8 Implementation of Public Dialogues on Disruptive<br>Tehnologies                                      |
| Citizen Science initiatives<br>on fundamental biomedical<br>research (T3.4) | D3.10 Multi-stakeholders Citizen Science projects                                                         |
| Novel co-creation initiatives<br>(T3.5)                                     | D3.6 Selected New co-creation initiatives<br>D3.11 Report on novel co-creation initiatives implementation |

**Table 1.** Relation of ORION co-creation actions and the public Deliverables which describe them.

In the present report, and to avoid repetition with these previously mentioned documents, we will only provide a very brief description of each of these initiatives and include the specific number of informers that contributed to the evaluation. This will be described separately together with the results of each type of co-creation action.

## 2.2. Instruments and data gathering

Different evaluation instruments and methodologies have been used to assess the mentioned actions. The following table provides a summary of these instruments (which can be found in Annexes I to XIV)

### Instruments used to evaluate the National Public Dialogues on Genome Editing

| Informers                                             | Instrument and methodology | Type of study | Indicators                                                                                                                                                      |
|-------------------------------------------------------|----------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All Public Dialogue participants (citizens)           | Questionnaire (pre-post)   | Quantitative  | Satisfaction with Public Dialogue<br>Improvement in knowledge about OS/about Genome editing<br>Changes in behaviours and opinions about OS                      |
| Public Dialogue organisers                            | Interview                  | Qualitative   | Successful and limiting design principles<br>Perceived impact at project institutions                                                                           |
| Public Dialogue co-organisers (subcontracted company) | Interview                  | Qualitative   | Successful and limiting design principles<br>Perceived impact at project institutions                                                                           |
| Selection of Public Dialogue participants (experts)   | Interview                  | Qualitative   | Satisfaction with Public Dialogue<br>Improvement in knowledge about OS<br>Successful and limiting design principles<br>Perceived impact at project institutions |

### Instruments used to evaluate the Public Dialogue to inform CRG's research strategy

| Informers                                                            | Instrument and methodology  | Type of study | Indicators                                                                                        |
|----------------------------------------------------------------------|-----------------------------|---------------|---------------------------------------------------------------------------------------------------|
| All participant public to the Public Dialogue                        | Questionnaire (pre)         | Quantitative  | Scope and diversity of participants<br>Opinions and understanding about Open Science              |
| Participant public to the Public Dialogue (citizens and researchers) | Questionnaire (post)        | Quantitative  | Perception of changes in opinions and understanding about OS<br>Satisfaction with Public Dialogue |
| Sample of participating researchers                                  | Interview                   | Qualitative   | Perception of changes in knowledge/opinions about OS<br>Satisfaction with Public Dialogue         |
| Public Dialogue organisers (internal-CRG)                            | Interview                   | Qualitative   | Successful and limiting design principles<br>Perceived impact at project institution              |
| All participant public to the Public Dialogue                        | Observations <i>in situ</i> | Qualitative   | Level and types of interactions/engagement between participants and organisers                    |

### Instruments used to evaluate the Pilot Calls to promote OS designed by the two RFOs

| Informers                         | Instrument and methodology | Type of study | Indicators                                                                            |
|-----------------------------------|----------------------------|---------------|---------------------------------------------------------------------------------------|
| Call organisers (JCMM and ISCIII) | Interview                  | Qualitative   | Scope and diversity of participants<br>Analysis of call criteria (degree of openness) |
| Call documents (JCMM and ISCIII)  | Documentation analysis     | Qualitative   | Analysis of call criteria                                                             |

### Instruments used to evaluate the Citizen Science initiatives on fundamental biomedical research

| Informers                                                            | Instrument and methodology | Type of study | Indicators                                                                                                                                                           |
|----------------------------------------------------------------------|----------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Citizen Science call organisers                                      | Focus group                | Qualitative   | Scope and visibility of the call<br>Successful and limiting design principles                                                                                        |
| Participant researchers                                              | Interview (pre-post)       | Qualitative   | Successful and limiting design principles<br>Improvement in knowledge about Citizen Science and OS<br>Changes in behaviours and opinion about Citizen Science and OS |
| Participant citizens                                                 | Questionnaire (post)       | Quantitative  | Satisfaction with CS projects<br>Views, knowledge and opinions of participant public                                                                                 |
| Citizen Science / Science communication experts                      | Interview (pre-post)       | Qualitative   | Successful and limiting design principles                                                                                                                            |
| Citizen Science call organisers (Official documentation of the call) | Documentation analysis     | Qualitative   | Scope and diversity of participants<br>Analysis of call criteria<br>Analysis of call evaluation criteria                                                             |

## Instruments used to evaluate the Novel Co-creation initiatives

| Informers                                                                          | Instrument and methodology | Type of study | Indicators                                                                                             |
|------------------------------------------------------------------------------------|----------------------------|---------------|--------------------------------------------------------------------------------------------------------|
| Novel Co-creation initiatives call organisers                                      | Interview (post)           | Qualitative   | Scope and diversity of participants<br>Successful and limiting design principles                       |
| Participant researchers                                                            | Interview (post)           | Qualitative   | Satisfaction with co-creation initiatives<br>Changes in behaviours and opinions about co-creation / OS |
| Participant managers                                                               | Interview (post)           | Qualitative   | Satisfaction with co-creation initiatives<br>Changes in behaviours and opinions about co-creation / OS |
| Novel Co-creation initiatives call organisers (Official documentation of the call) | Documentation analysis     | Qualitative   | Scope and diversity of participants<br>Analysis of call criteria                                       |

## The questionnaires' design

**The pre and post questionnaires on ORION co-creation experiments mainly addressed changes in behaviours and opinions about Open Science.** For this reason, they were designed using some of the questions included in the quantitative analysis undertaken in D2.2 “Analysis and Benchmarking: Self-assessment”, which assessed views and practices of Open Science at ORION institutions.

The questionnaire included Likert Scale Questions, Multiple-choice questions, Multiple-Choice grid questions and open questions. In the case of the Public Dialogues (PDs) on Genome Editing, the questionnaire was distributed before the first workshop of each PD and after the second workshop. To maximise the number of respondents, the questionnaires were submitted in paper form. The Public Dialogue to inform CRG research strategy took place online, and so the questionnaires were sent by email to participants before and after the event. All questionnaires were translated into the national language of the organizing countries.

Answers to open questions to these questionnaires were translated by ORION partners responsible of the public dialogues and sent back to WP5 leaders.

**The post questionnaires also included** a set of “extra questions”, a mix of multiple-choice grid questions, open questions and Likert grid questions mainly assessing participants' satisfaction (in relation to several aspects of the Public Dialogue including both content and organisational aspects) after attendance.

The English version of these questionnaires can be found from Annexes I to III.

## The interview protocols

Different interview protocols have been designed in order to get information from the different informers of the ORION co-creation experiments. We designed specific protocols for:

- The organisers of the RFOs pilot calls to promote OS interview.
- The Public Dialogue on Genome Editing experts' interview.
- The Public Dialogue on Genome Editing internal (ORION) and external (contracted) organisers interview.
- The citizens' science focus group.
- The citizens' science researchers' interview (pre and post).
- The citizens' science PI interview.
- The citizens' science communicator/CS expert interview (pre and post).
- The Novel co-creation initiatives call organiser interview.
- The Novel co-creation initiatives call participant managers.
- The Novel co-creation initiatives call participant researchers.
- The Public Dialogue to inform research strategy researchers' interview.
- The Public Dialogue to inform research strategy organisers' interview.

All these interview protocols aimed at gathering the informers' role, knowledge, perceptions and opinions on all the aspects related with the open experiments in which they were involved, from the design to the implementation. The interview protocols have always followed a semi-structured approach with open questions grouped in three different blocks, each one focused on a different aspect to evaluate. The questions in each block, while similar, have been adapted to the activity that was being assessed each time and to the type of stakeholder that was being interviewed.

- **Block on Monitoring**, including questions about the design of each action, as well as methodology used to carry out the action, relevance, accessibility, participation, materials used and sustainability.
- **Block on Views and Opinions about Open Science**, including questions about meaning given, empowerment, benefits and drawbacks of OS (and its comparison), barriers of OS, etc.
- **Block on Impact of Action**. This could be focused on the impact on **(1) stakeholders** (including questions about the stakeholder's interest, reaction, knowledge, and disposition) or **(2) ORION institutions** (including questions mostly about Institution culture, next steps on Open Science, etc.)

If necessary, to ease the flow of the interview, questions of different blocks were merged into one.

The complete protocols for the interviews can be found at Annexes from IV to XIV.



### 2.3. Data analysis strategy

The analysis of the gathered data followed standard procedures of data preparation (such as digitalising data and entering data on an analysis programme), data validation (removing incomplete data) and data edit (correcting mistakes in data). An important effort was done regarding the matching of same participants pre and post questionnaires when needed.

For the quantitative analysis of quantitative data, including the analysis of likert scale, multiple-choice and multiple-choice grid questions, the analysis consisted in a simple descriptive statistics based on calculating percentages and frequencies of the different options selected by the participants. The analysis included comparison of results pre and post for the Public Dialogues on Genome Editing and to inform CRG's research strategy.

For the qualitative analysis of qualitative data, both regarding open questions in the questionnaires and mostly answers to the interviews done to the different stakeholders participating in the ORION co-creation initiatives (citizens, researchers, public engagement experts and other stakeholders), discourse analysis methods have been used. In particular, qualitative open data has been analysed using the constant comparative method (Miles and Huberman, 1994), by identifying similar and different key ideas, connections among ideas and possible regularities between ideas.

In order to assist the interpretation and provide reliability and validity to the analysis done, different researchers (partners responsible of WP5) and knowledgeable participants (ORION leaders, ORION co-creation initiatives organisers and partners) have participated in the analysis, either at coding and/or at the final interpretation level. Triangulation has included data coding and interpretation from two different researchers and triangulation among different instruments, mostly questionnaires and interviews.

Due to the nature and time-frame of the activities under evaluation, which in many cases involve few participants and/or are still on-going, some of the evaluation results reported here has been referred to as insights interpreted from the evaluation team with the data available at the moment. As such, limitations in the interpretative capacity and need of more or different data has been made explicit along the document.

### 2.4. Ethical concerns

The different evaluation and quality assurance practices and methodologies presented in this document ensure consistency with the strategies stated in other closely related important deliverables (D5.1 "Evaluation and Quality plan" and D2.2. "Analysis and Benchmarking: Self-assessment") as well as with the strategy for data management stated in the Deliverable D1.4 "Data Management Plan" and the views and practices regarding Ethics, according to Deliverables D7.1 "H-Requirement No.1" and D7.2 "POPD-Requirement No.2".

Specific actions that have been done to ensure the above mentioned are the following:

- Low or high compromising data (different data with low identifiable informers, but easy identifiable profiles or with easy identifiable informers) has only been obtained from informers alongside a signed consent letter (templates are available in Annex XV). Both the data and consent letters have been stored in the ORION data management system.
- Non-compromising data, which is different data with no identifiable informers, and collected in an anonymized way has been used to collect datasets. Only ORION partners in WP3 and WP5 have access to these datasets and it has been stored in the ORION management system.

Any public document derived from low compromising data analysis will assure the confidentiality, in such a way that identifying information will not be made available to anyone who is not directly involved in the study.

## 3. Final Evaluation of National Public Dialogues on Genome Editing

### 3.1. Context and Sample

Four national Public Dialogues were organised within ORION to explore public views on genome editing. As stated in Deliverable D3.8 “Implementation of Public Dialogues on Disruptive Technologies”, a public dialogue “is a process during which members of the public interact with scientists, stakeholders and policy makers to deliberate on issues relevant to future policy decisions”.<sup>1</sup>

ORION Public Dialogues on Genome Editing (PDs-GE, from now on) had two parts-structure consisting in two events that were held in each country with members of the public to discuss genome editing technology. Both events, one Thursday/Friday evening session and a full-day Saturday session the following week, took place at the same venue in each country with over thirty members of the public.

The four ORION PDs-GE were organised by ORION partners with the help of the professional company subcontracted by ORION, Ipsos MORI. In all of them, multiple stakeholders were involved, from the public to expert scientists in the field of genome editing, policy-making and engagement professionals.

The four national ORION PDs-GE took place in different venues, dates and countries:

- UK: 24th October & 2nd November 2019; Michaelhouse Centre, Trinity St, Cambridge
- Germany: 6th & 16th November 2019; MDC's offices, Robert-Rössle-Straße 10, Berlin
- Czech Republic: 21st & 30th November 2019; Ipsos Offices, Slovansky dum, Na Prikope 22, Prague
- Sweden: 23rd of January & 8th February 2020; National Museum of Science and Technology, Museivägen 7, Stockholm

The total number of attendees to the ORION PDs-GE were 167 people, and the distribution is shown in the table below:

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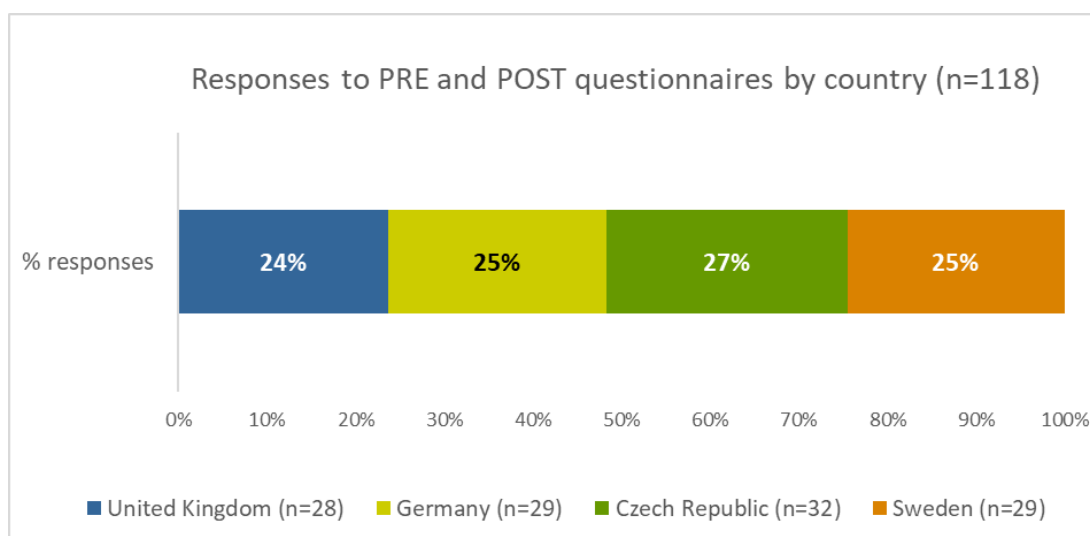
<sup>1</sup> Sciencewise, Sciencewise Guiding Principles, 2018 (accessed 12th July 2021):  
<http://sciencewise.org.uk/wp-content/uploads/2018/09/Sciencewise-Guiding-Principles-August-2018.pdf>

| Public Dialogue                         | Number of attendees per profile                                                                                                                                             | Total number of attendees |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| UK Public Dialogue (BI)                 | <ul style="list-style-type: none"> <li>Invited general public 31</li> <li>Invited experts /panellists 6</li> <li>Organising team 7</li> <li>External evaluator 1</li> </ul> | <b>45</b>                 |
| Germany Public Dialogue (MDC)           | <ul style="list-style-type: none"> <li>Invited general public 29</li> <li>Invited experts /panellists 5</li> <li>Organising team 2</li> </ul>                               | <b>36</b>                 |
| Czech Republic Public Dialogue (CEITEC) | <ul style="list-style-type: none"> <li>Invited general public 32</li> <li>Invited experts /panellists 3</li> <li>Organising team 6</li> </ul>                               | <b>41</b>                 |
| Sweden Public Dialogue                  | <ul style="list-style-type: none"> <li>Invited general public 31</li> <li>Invited experts /panellists 4</li> <li>Organising team 10</li> </ul>                              | <b>45</b>                 |

Attendees from the general public to each of the ORION PDs-GE were requested to answer the PRE and the POST questionnaires to evaluate the general public views on Open Science and also the events themselves. The following table shows the number of respondents who answered both the PRE and the POST questionnaires per PD-GE.

| Activity   | ORION institution | Number of responses (PRE-questionnaire) | Number of responses (POST-questionnaire) | Date       |
|------------|-------------------|-----------------------------------------|------------------------------------------|------------|
| Workshop 1 | BI                | 28                                      |                                          | 24/10/2019 |
| Workshop 2 | BI                |                                         | 28                                       | 02/11/2019 |
| Workshop 1 | MDC               | 29                                      |                                          | 06/11/2019 |
| Workshop 2 | MDC               |                                         | 29                                       | 16/11/2019 |
| Workshop 1 | CEITEC            | 32                                      |                                          | 21/11/2019 |
| Workshop 2 | CEITEC            |                                         | 32                                       | 30/11/2019 |
| Workshop 1 | VA                | 29                                      |                                          | 23/01/2020 |
| Workshop 2 | VA                |                                         | 29                                       | 08/02/2020 |

In Graph 1 we compare the number of respondents to both PRE and POST questionnaires per country, in order to show that comparison among countries in terms of representativeness is possible.



**Graph 1.** Distribution of total number of responses of PRE-POST questionnaires.

In addition to these questionnaires, a series of personal interviews were done to both ORION and Ipsos MORI organisers of the PDs-GE, and to invited experts. The table below describes in an anonymous form the number of interviews done per type of stakeholder and public dialogue, including the affiliation to ORION RFPOs.

| Country / Institution          | Interviewee                               | Date       |
|--------------------------------|-------------------------------------------|------------|
| UK Public Dialogue             | Ipsos Mori (UK team/Overall coordination) | 15/11/2019 |
| UK Public Dialogue             | Organizer BI                              | 04/06/2020 |
| Germany Public Dialogue        | Organizer MDC                             | 12/06/2020 |
| Czech Republic Public Dialogue | Organizer CEITEC                          | 24/04/2019 |
| Sweden Public Dialogue         | Organizer VA                              | 29/05/2020 |
| UK Public Dialogue             | Expert                                    | 12/12/2019 |
| Germany Public Dialogue        | Expert                                    | 11/12/2019 |
| Sweden Public Dialogue         | Expert                                    | 10/03/2020 |

These evaluation instruments were accompanied by extra evaluation instruments in the case of the original public dialogue in UK, which undertook a second evaluation by the external consultant Gene Evaluations. This external evaluation was commissioned via an Invitation to Tender with the UK Research and Innovation (UKRI) funds secured by the Babraham Institute (see more information in Deliverable D3.8). Such an evaluation focused on the implementation of the PD-GE in the UK and was commissioned to determine the

robustness of this methodology. CRECIM and Gene Evaluations collaborated actively to use compatible instruments that could provide complimentary information without producing respondents' fatigue.

In addition to the present evaluation report, individual reports for each of the PDs-GE as well as a country synthesis report have been published<sup>2</sup> by Ipsos MORI to contribute insights on public attitudes on genome editing in life sciences research.

### 3.2. Starting point of the National Public Dialogues on Genome Editing

- Participating citizens of PDs-GE state the most important reasons for organising Public Dialogues are those related with democratic views, that is, issues of Fairness and Ethics. The public consider that aspects related with increasing quality, such as Impact and Rigour, are also very important reasons. New economic possibilities are the reason more often selected as “not a reason for” organising PDs.
- Results show that participants from the general public think that all aspects of the scientific process should be open to citizens like themselves, particularly research results and research outcomes (4.5 over 5). The aspect they give the least importance to is the research process (3.9)
- Participating citizens of PDs-GE consider science should be open to all stakeholders, particularly to scientists working on the same field and especially concerned groups. The stakeholders they consider the last ones in their preferences regarding OS are civil and social organisations and industries and companies.

#### 3.2.1. Why should Public Dialogues be organised?

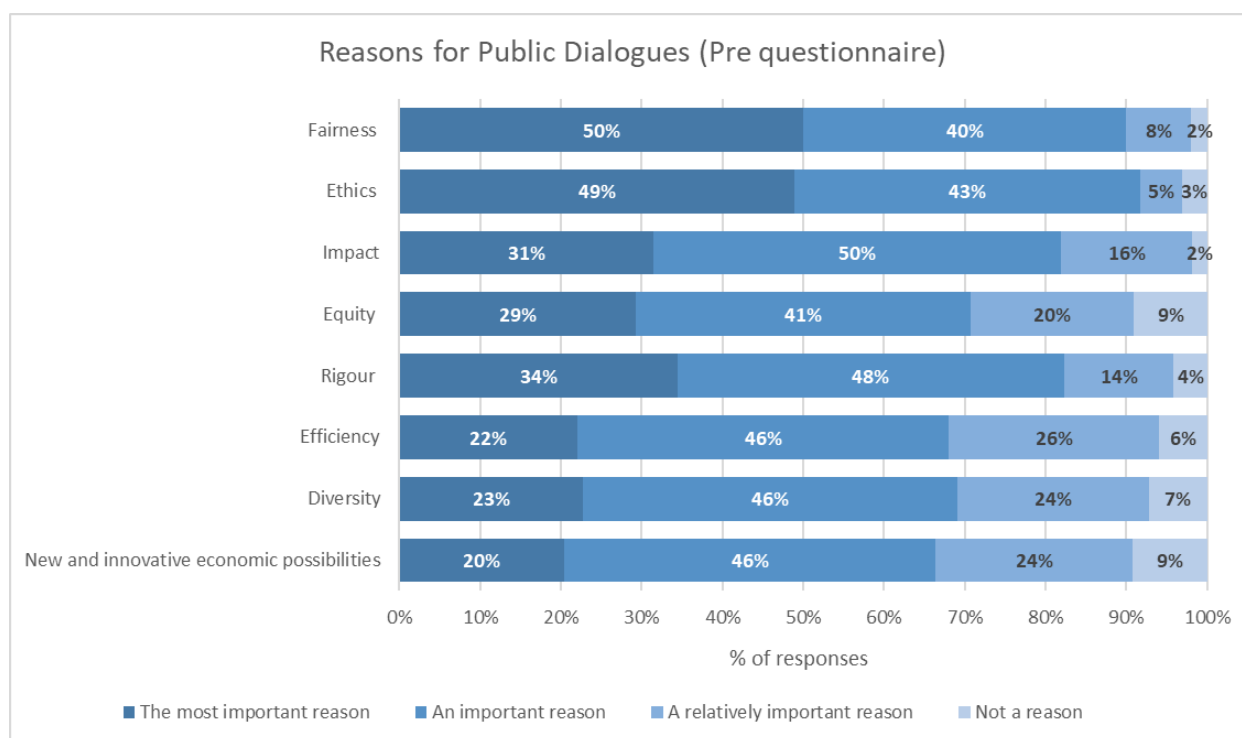
Participants of the ORION PDs-GE were asked to respond to the question, “In your opinion, which are the main reasons to organize a Public Dialogue?”. A series of different items were presented randomly, to avoid the order of the items to potentially imply a hierarchical order of priorities. The items were those already used when discussing OS at ORION previous evaluations: Diversity; Economy; Efficiency; Equity; Ethics; Fairness; Impact and Rigour. Through a multiple-choice grid, participants had to select for each item of the previous list whether it was not a reason to organise a Public Dialogue, a relative important reason, an important reason or the most important reason. Participants had also the option of not giving

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<sup>2</sup> The five reports can be found in this [link](#)

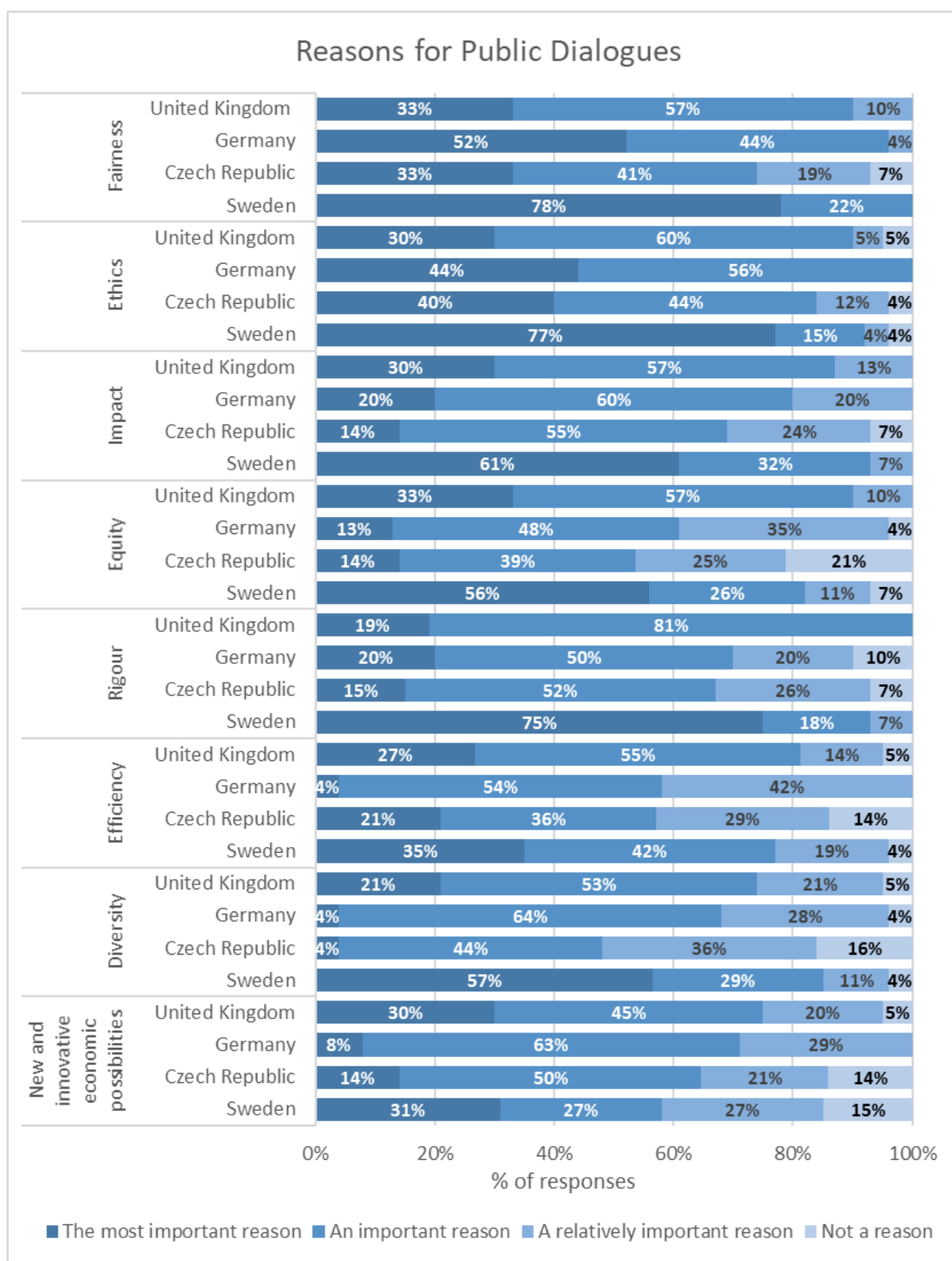


their opinion by selecting DK/NI. With the obtained answers, DK/NI answers were excluded and then the percentage of participants which have considered each option was calculated.



**Graph 2.** Reasons to organise a Public Dialogue according to participants responses in the pre-questionnaire of the ORION Public Dialogues on Genome Editing.

Aggregated results of Graph 2 show that, after participating in the PD-GE, most participants think that all the reasons proposed are important to organise an event like a Public Dialogue, since in all cases, more than 90% of participants think these are either the most important reason, an important reason or a relatively important reason. However, when comparing what are considered the most important reasons for organising a PD, the general public give issues related with democracy, such as Fairness and Ethics, the utmost importance, with 50% and 49% of respondents respectively stating that they are the most important reasons to open science via PDs. Participants also give a lot of importance to aspects related with increasing the quality of research, such as Rigour or Impact, with 34% and 31% of people respectively selecting them as very important reasons. On the contrary, despite all reasons for Open Science had high percentages (more than 60%) of consideration as good reasons for PDs, those ideas that were more often considered as “not a reason” for participating in a PD were issues of Equity and New economic possibilities.



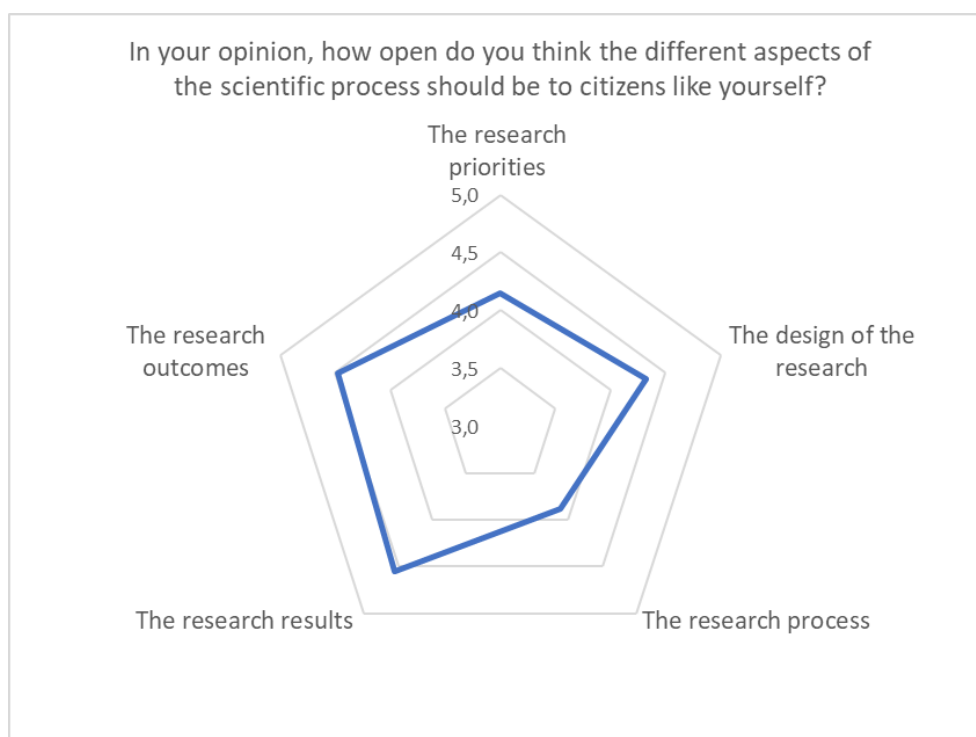
**Graph 3.** Reasons to organise a Public Dialogue according to participants responses in the pre-questionnaire of the ORION Public Dialogues on Genome Editing (per country).

When looking at the results by country, however, we can observe some differences between them that could be related with the different existing cultures (Graph 3). For most countries the democratic reasons of Fairness and Ethics are seen as those more often considered the most important reasons for PDs (especially in the case of Sweden). Germany is the country

where this selection is more clearly differentiated, that is, where there is a bigger difference between the % of people choosing these two reasons as those of utmost importance in comparison to doing the same with the other reasons.

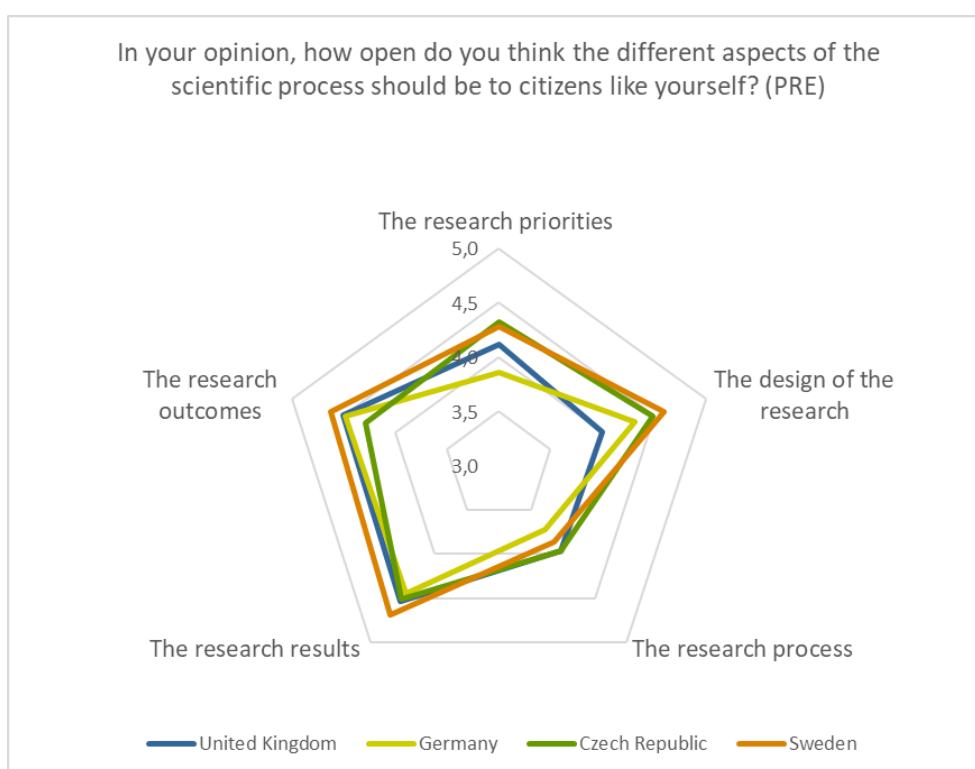
Regarding which are not reasons for organising a PD, in Czech Republic and Sweden, Equity and New economic possibilities are those with the higher percentage of selection as “not a reason”, whereas for Germany it is Rigour. In the case of UK, Ethics, Diversity and New economic possibilities have the same percentage of people stating as “not a reason”.

In addition to being open “as a whole”, Science can be understood as a combination of quite different phases or processes. Under this idea, participants were asked about which aspects of the scientific process should be open. Five key aspects were presented: the research priorities (what topics, how much funding); the design of the research (methodologies, ethical considerations); the research process (data gathering, data management, replicability); the research results (knowledge, publications, patents) and the research outcomes (design of final products for end users). Participants were asked about how open these five different aspects of the scientific process should be to citizens like themselves and had to rank from 1 to 5 each of the items above, where 1 corresponded to “should not be open” and 5 “should be very open”. Based on the obtained answers, the means have been calculated.



**Graph 4.** Views on the aspects of the scientific process that should be open responded by all the participants on ORION PD-GE.

Results in Graph 4 show that the participants of the PDs-GE think that all aspects of the scientific process should quite open to citizens. Those aspects related with the direct impact of research, that is research Results and Outcomes, were those selected to be more open, with 4.5 both. The research process was considered to be less open to citizens' input (3.9). Interestingly, the design of the research and the research priorities ranked quite highly (4.3 and 4.1, respectively), which agrees with the democratic view on citizens' participation deduced from citizens' previous reasons to participate in PDs.



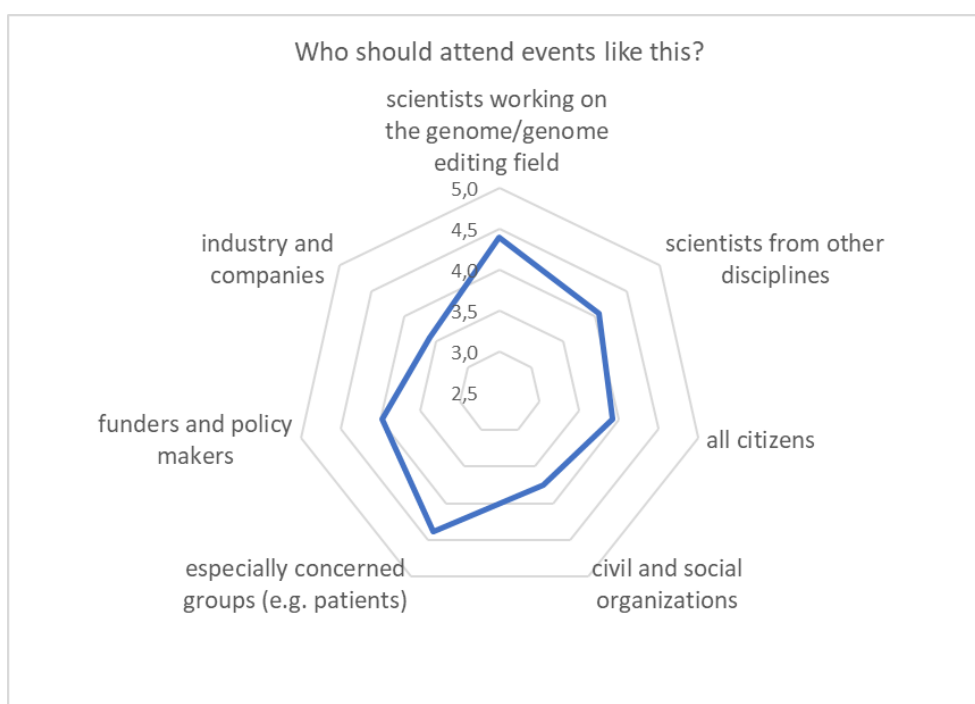
**Graph 5.** Views on the aspects of the scientific process that should be open responded by all the participants on ORION PD-GE (per country).

When looking at the results by country, we can observe a similar profile between the countries, despite with interesting small shifts from the global tendency (See Graph 5). All countries hold very positive views regarding the research results and outputs. Germany respondents are those ranking less the research process and priorities, while the design of the research is considered to be the less open aspect for UK participants.

### 3.2.2. Who should participate in a Public Dialogue?

The idea of Open Science can be understood as something that concerns different stakeholders, such as scientists, citizens, industry, etc. For this reason, the Public Dialogue participants were asked the question “In your opinion, who should attend events like this Public Dialogue?” in which they had to answer from 1 to 5 for each of the following stakeholders: scientists from the same area, scientists from other disciplines, all citizens, civil and social organizations, especially concerned groups funders and policy makers, industry, and companies. Number 1 corresponded to “should not attend” and 5 to “it is very important that it attends”.

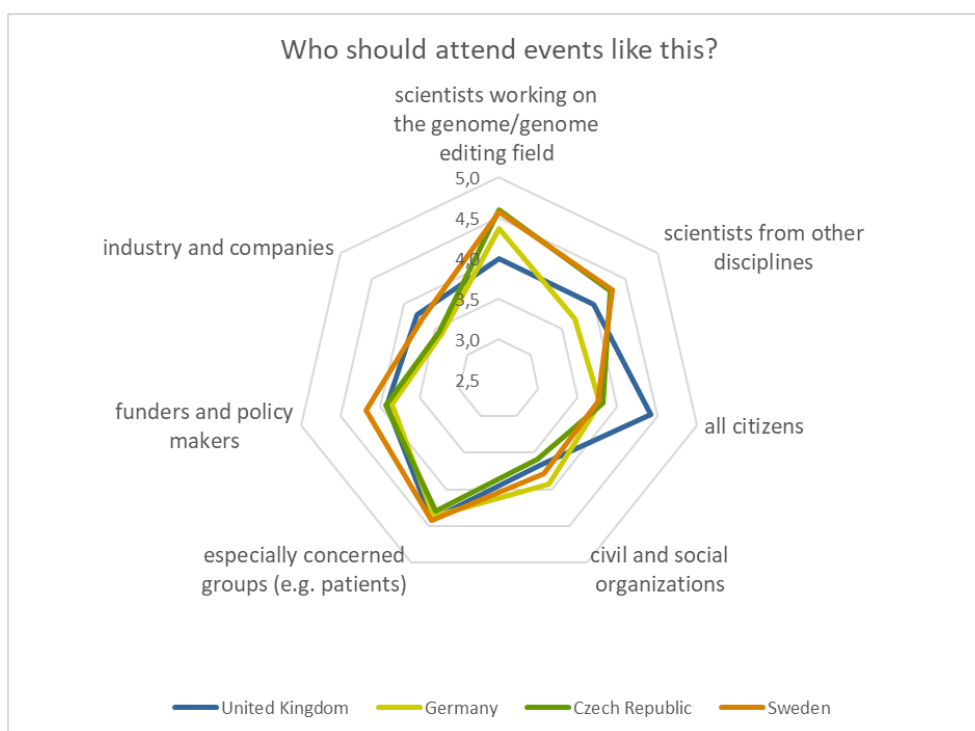
Participants’ views on this issue show a very open view of PDs as interesting to be open to all stakeholders (See Graph 6). More specifically, the highest value corresponds to those more involved in the topic, both from within and out of science: scientists working on the same field (genome/genome editing field) (4.4) and especially concerned groups (4.4). On a second level, we can find scientists from other disciplines (4.1), funders (4.0) and all citizens (3.9) and on a third level, civil and social organizations (3.7) and industry and companies (3.6).



**Graph 6.** Views on who should attend events like the ORION PD-GE.

When looking at the results by country in Graph 7, the main differences in relation with the aggregated data are found in respondents from the UK who give a higher importance to all citizens attendance to events like the PD (4.4) compared to the rest of the countries’

responses (3.8). According to respondents from Germany, the Czech Republic and Sweden, scientists working on the genome/genome editing field are the target group considered more important to attend PDs (4.4, 4.6 and 4.6, respectively) while industry and companies get the lower score (3.4, 3.4 and 3.7, respectively).



**Graph 7.** Views on who should attend events like the ORION PD-GE (per country).

As it has been shown through the quantitative results, PDs-GE participants are quite concerned about including industry and companies in PDs or other science communication activities. Even in UK, where participants ranked the highest the participation of companies, this concern was raised by one of the attending experts.

*“Of course, if you are working for example in a big pharma company that you have another motivation that is very biased, what you do, to participate in these things, I think that can be very dangerous (...) If they are only kind of representing I think in a very biased way (...) some people that are involved in companies” (Expert UK)*



### 3.3. Impact of the National Public Dialogues on Genome Editing

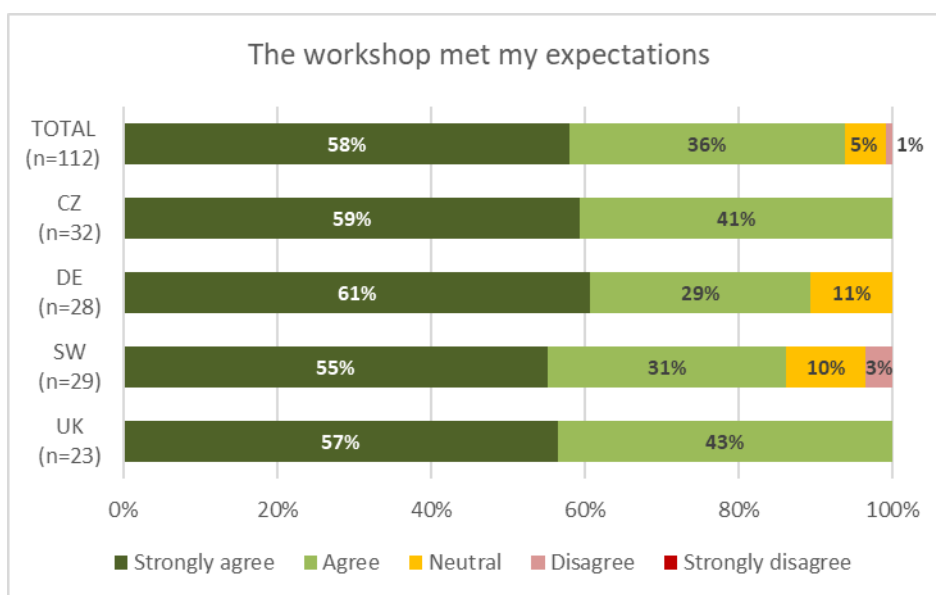
- Satisfaction among citizens participating in the ORION PDs-GE is very high, as 93.7% of them agreed or strongly agreed that the workshop met their expectations.
- PD participants are also very much satisfied both with the structure and length of the event (93.8% of them agreed or strongly agreed that it was appropriate) and with the information and materials used (which are relevant and useful for 95.5%).
- Public dialogue organisers are more critical regarding aspects of calendar, structure and content of the PDs. In particular, they raised concerns regarding: who should also be involved in PDs (experts in ethics and top/senior managers); calendar between stakeholders' workshop and public workshop (too disconnected); when and where to do PDs (problematic attendance of experts on a Saturday or far from home); rhythm (too quick); scientific content/language (not properly adapted) and role/interaction with scientists (too limited / regulated). The concerns more shared by the different PD organisers were in relation to the pace of the PDs and the use of non-adapted content/language, which are aspects closely related.

#### 3.3.1. How do participants value the Public Dialogues on Genome Editing?

##### General assessment in terms of satisfaction

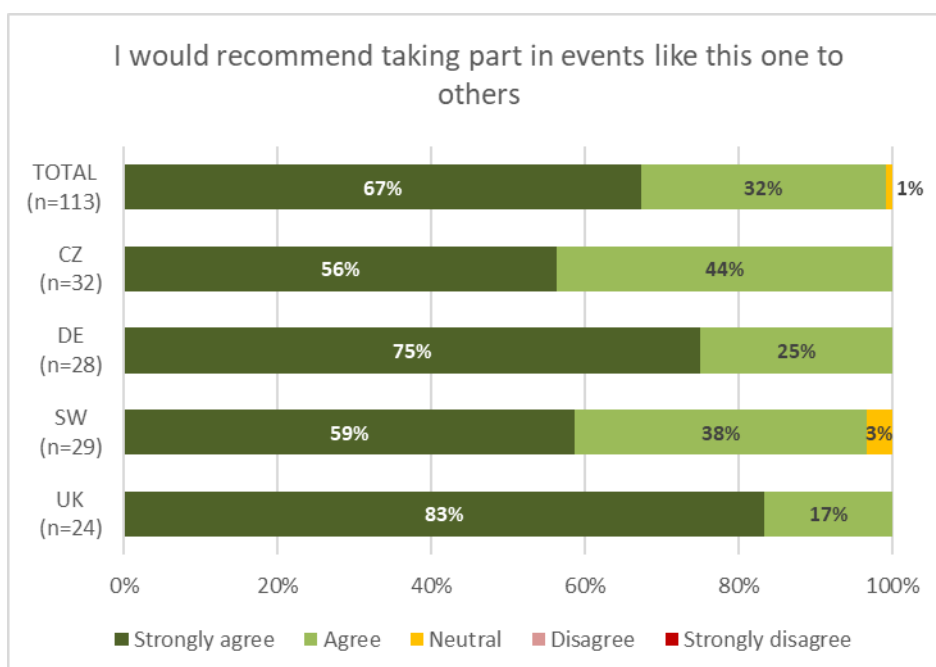
Considering the aggregated data from all PDs-GE shown in Graph 8, a majority (93.7%) of Public Dialogue participants agreed (35.7%) or strongly agreed (58%) that the workshop met their expectations. The number of respondents who held a non-positive opinion about the PDs was very low (less than 5% of respondents).

While no major differences can be found between countries, data does show how, in some countries, attendees have experienced the participation in the PD-GE as more positive (such as in the Czech Republic and UK, where 100% of participants agreed or strongly agreed the above-mentioned statement). More critical participants can be found in Sweden, as the participants with non-positive views come from this country.



**Graph 8.** Degree of fulfilment of expectations according to participants to the ORION PD-GE.

In addition, most participants strongly agreed (67.3%) or agreed (31.9%) in recommending others to take part in events like the Public Dialogue (Graph 9). Results from Sweden and the Czech Republic seem to be slightly less enthusiastic, since only 58.6% and 56.3% of participants, respectively, strongly agreed (compared to 75% in Germany and 83.3% in the UK).



**Graph 9.** Degree of recommendation of the ORION PD-GE according to its participants.

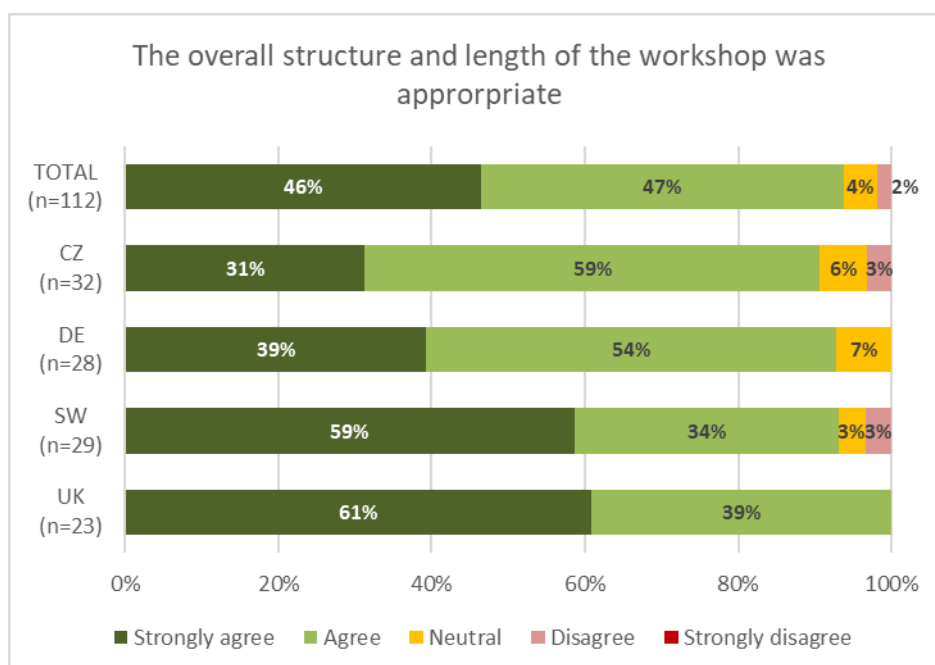
### 3.3.2. How do participants assess the structure and content of the Public Dialogues on Genome Editing?

The structure of the ORION PDs-GE was quite complex, as it tried to replicate in very different contexts the same type of open experiment. In each country, PDs-GE were organised as two consecutive public workshops, with a set number of citizens and experts in attendance. The PDs-GE took place on a weekday evening, generally Thursday or Friday evening, followed by a Saturday, with a span of 1 week in between. An external expert company, Ipsos MORI, oversaw the moderation and helped with the organisation of all the PDs. These workshops were always preceded by a stakeholder's workshop. While all the stakeholders' workshops were organised in September 2019, the public workshops were organised at different dates between October of 2019 and February 2020. More details can be found in Deliverable D3.8.

This particular structure was also evaluated through both a quantitative and a qualitative analysis of views from different participant stakeholders.

#### The views from the participating citizens

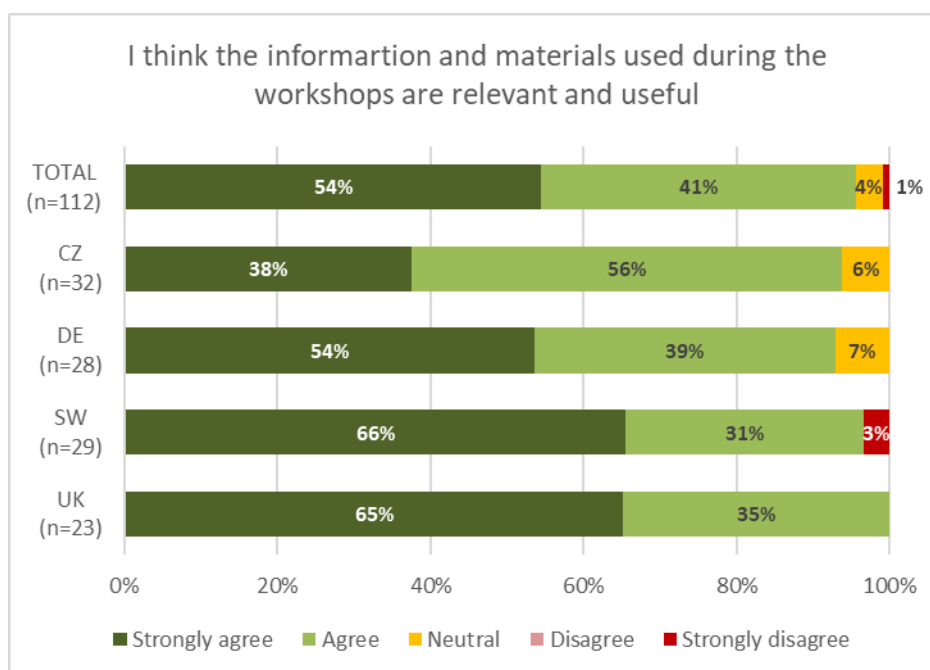
Most PD attendees think the overall structure and length of the workshops was appropriate, since 93.8% of them strongly agreed or agreed with that statement (See Graph 10).



**Graph 10.** Degree of participating citizens' satisfaction with the overall structure and length of the ORION PD-GE.

The most positive results are found in UK and Sweden, where 61% and 59% of participants respectively strongly agreed with that statement. In the case of Germany and Czech Republic, despite the overall view is also positive, there are more people that agreed than those that strongly agreed, signalling a more moderated opinion. There is only a very minor number of participants, from Sweden and the Czech Republic, who disagreed with the appropriateness of the structure and length.

Regarding its content, participants to the PDs-GE believe the information and materials used during the workshop were relevant and useful, since 95.5% of them either agreed or strongly agreed with that statement (Graph 11). Again, participants from Sweden and UK are the ones who valued these more positively, with 65.5% and 65.2% of them, respectively, strongly agreeing with the statement, compared to 53.6% in Germany and 37.5% in the Czech Republic. Only one participant (from Sweden) strongly disagreed with the statement.



**Graph 11.** Participants' views regarding relevance and usefulness of the information and materials provided in the ORION PD-GE.

## The views from the organisers

When ORION organisers were asked to assess the structure of the Public Dialogues, several issues came up. For a start, organisers in the United Kingdom and Czech Republic found that **scheduling the PD workshops on a weekday evening and especially on a Saturday, while being accessible for citizens, had presented problems for attracting attendance of scientists and experts.**

*“We picked these kind of dates because in Ipsos’s experience it was most easily accessible by the public (...) **I’m not sure that it particularly fitted well, as much, with the scientists timetables**, I think a whole day on a Saturday is hard to get people to commit to it. And on a Friday night, as well, I think it’s different asking people to do something slightly different (...) **asking scientists to do basically more work on a Friday event and a Saturday, I don’t think ... I think we might have had more volunteers if we would have done it on a week day but then we wouldn’t have gotten the public so...**” (Organiser United Kingdom)*

*“**I found a bit problematic that it was a Saturday. I don’t know how it was for the participants. (...) It was more difficult for the experts. (...) they have a lot of things to do (...) it was difficult for us to convince people to come on a Saturday. (...) this was really challenging.**” (Organiser Czech Republic)*

The organiser in the Czech Republic also had some criticism regarding the two-separate structure, considering that this could affect the knowledge and confidence of participating citizens. This aspect could be further explored in future interventions.

*“Because I think maybe having it in one day it would be more convenient. (...) the information for some people it was new, its maybe better to have it on the same date because the few days in between you might forget and because you forget you feel again less confident and knowing, and then less likely to participant. I think it would be maybe better to have it in one day.” (Organiser Czech Republic)*

The location was also an issue of concern for organisers that changed location from the ORION partner institute to another one. This was the case in the Czech Republic, where many of the experts working at the host research centre were based in Brno and not in Prague, where the Public Dialogue took place.

*“For us it was also the location. As you know we are located in Brno, and the workshop took place in Prague, (...) **at the end I think we only managed to get experts who were based in Prague because our Brno experts, they didn’t want to travel on a Saturday, to another city.**” (Organiser Czech Republic)*

In addition, and in relation to the organisation of all the workshops, organisers in Sweden thought it would have been nice **to include a follow-up stakeholder’s workshop and considered the span of time between the initial stakeholders’ workshop and the public dialogue workshops to be too long.**

*“I think it was very good although **I think we should have had a follow up workshop with the experts.**” (Organiser Sweden)*

*“**The stakeholder workshop was in September and we had the dialogue in January and February. So, it was a very long time elapsing**, so maybe we didn’t have that much feedback from Ipsos, from the stakeholder dialogue and how that fed into the development of the public dialogue.” (Organiser Sweden)*

When organisers commented on the atmosphere and pace of the public workshops, they also were more critical than participants. Some PD organisers remarked negatively on the speed and the tempo of the sessions, which was considered too fast and in some aspects even pressing the participants.

*“And then I think they had **a lot of things that they wanted to get done in one day in a certain amount of time, so there was a certain feeling of pressure, pressure, pressure** (...) It had a certain hectic heated, you have to make decisions, and less of a science communication was in there. So we had this four different examples of scientific research... it was really really fast... at least half of the people on the table were kind of lost ... Something they hadn’t had time to look into.”* (Organiser MDC)

*“And I think (...) **it was very high tempo all the time**. And I think also the participants felt that ... it was relevant but the language was so condensed.”* (Organiser VA)

Another critical aspect that the organisers of PDs-GE would like to see improved was related with the difficulty of the information given to citizens. PD organisers from Czech Republic felt that the presentation of the science was perhaps not that adapted to the general public as it should have been.

*“It was explained quite clearly, I didn’t find it too difficult. Maybe for me it is not difficult but maybe if we speak for general population, maybe for them it could have been done a little bit explained more easier, or maybe using various fonts (maybe using a very simple video) maybe ... because we cannot assume that every person has the same capacity to understand the situation. Maybe really considering that they would be someone’s grandmother (...)”* (Organiser JCMM)

In addition, PD organiser also challenged the role chosen in the PDs-GE for the researchers, which it was considered not so adequate by the PD organisers in German who would have preferred a more direct communication between scientist and people, instead of scientists being in the PD as a resource that could help to solve questions.

*“I think definitely in the part of how are they presenting the science, but also the experts were sitting at the table and they had kind of the rule that they are there kind of like the joker. So if there is a question that someone doesn’t understand at all then they can be used... you could see that the moderator was kind of fighting to have that and you could see that the participants, some of the groups were kind of bossy and loud.... People wanna talk to the scientists. But in this day they were supposed to be the joker.”* (Organiser MDC)



### 3.3.3. What are the most positive aspects of the Public Dialogues on Genome Editing?

- Public Dialogue organisers commented positively on the PD giving experts and citizens an opportunity to have in-depth conversations between them, where the information would go on both directions.
- The PD-GE is perceived by organisers as a good learning opportunity that should be replicated at wider, local level for informing management and policy making.
- Organisers of the PD-GE did not agree in the degree of innovation of the topic chosen. While in most contexts the PD-GE organisers considered Genome Editing needed to be discussed, in others the PD-GE organisers perceived it was not really an innovative topic to discuss with the public.
- Scientists and organisers see as benefit of the PD-GE the possibility for scientists to share with citizens direct, non-biased scientific information.
- The international dimension of the ORION PD-GE was also highlighted as a positive outcome since this would allow data comparison between different countries.
- Organisers from Sweden and the Czech Republic mentioned how organising the Public Dialogue helped them establish connections with other relevant stakeholders.

Public Dialogue organisers from Sweden, Germany and the UK as well as an expert from Sweden commented positively on the Public Dialogue giving experts and citizens an opportunity to have in-depth conversations between them, where the information would go both ways and both benefit from it.

*“And it goes not just to take advice from the public but to know what the public **it’s both getting information and also giving information, so it goes two ways.** So the public get aware of hard topics as well as we get information from the public.”*  
(Expert Sweden)

*“**They enjoyed talking to each other** and he could understand the other persons distrust in science and the lack of interest in science and he could also see the change in this person when they had discussed the change in attitudes and behaviours, **I think that was also a gain in this interaction between science and participants... the meeting between them.**”* (Organiser Sweden)

*“**It allows you to spend a long time with the public, to really dig deep in some of some of these really difficult issues,** you know, ethical issues. You could never do this in a survey, you could never do this in a 1 to 3 hours focus group, you need two sessions at least to actually you know give them some information, get them to*

*a point at which you can take the conversation to a place which is harder, more abstract sometimes” (Ipsos UK)*

***“I think the scientists, our MDC scientists, I think they really enjoyed having the communication with the public. I think they were really inspired to see how the public actually really thinks they are doing a good job and they are really interested so, the side of the scientist was beneficial. So that format makes sense. I think also the 1 on 1 from the society side, were really really keen on talking to the scientists.”***  
(Organiser Germany)

The exercise of co-organising a PD is perceived as a learning experience by organisers, both in terms of the views they gained (learning about citizens views on certain scientific topics) but also in terms of the methodology in itself. For them, both aspects make the PD a good methodology that should be replicated widely and at local scale in the future, in particular for informing managing and policy making.

***“I was very curious about the participation (...) there was a lot to learn I guess”***  
(Expert UK)

***“We have a snapshot or an idea of current attitudes in our society or country towards this subject and it can help us as a starting point to know from where to start with the communication or education of this subject.”*** (Organiser Czech Republic)

***“And also, working in this way was a bit new ... we have never done things like this, it was very interesting for us and also like a competence gain. (...) Now when you have this method you should go out and do it in other parts of the country and then you could probably write a very good policy recommendation to the commission or to your institution”*** (Organiser Sweden)

In terms of the topic chosen, organisers in Sweden and in the Czech Republic referred to the attraction and interest raised in connection with the controversial nature of the topic of Genome Editing, as a current social challenge. However, the organiser in Germany commented on the fact that the topic chosen for this Public Dialogue is not innovative enough in their own context, which could hinder interest.

***“I think it’s a very good thing if you have big questions, if you have societal challenges that you want the public opinion on I think that’s a very good way (...) and getting the thoughts and inputs from society at large but they might be other methods and easy methods to do like this or you could combine it with an online survey...”*** (Organiser Sweden)

*“I think it is very easy just the content needs to be adjusted and the pool of experts. But the content can be basically replicated. But if it would be done **I would only do it for topics that are, let’s say, extremely controversial**. That are so new that we have no idea what the opinion of the public is. Basically, to have a starting point to have a smooth” (Organiser Czech Republic)*

*“One more thing was also the topic of genome editing. **There’s been a lot of Public Dialogues done on Genome Editing**. That was more of an internal ORION question of you know, what was the topic. But I think there would have been maybe more support for it if we have done something new and innovative because it’s kind of like were doing something that has already been done.” (Organiser MDC)*

Interestingly, for some experts and organisers of PDs-GE in the UK and the Czech Republic one of the main benefits of the PD was that it allowed scientists to give citizens non-biased scientific information, that is, information that it is more objective and less influenced by other interests than the one the public generally received by other channels.

*“**Lots of the people also give the feedback that they learned a lot and I always found that very satisfying and also important as a scientist, you have to, if you get the chance, to tell them, as a scientist I think you are always trying to be very objective and telling the truth** so I think this is our purpose also to do that as much as possible and we hardly ever get the chance to do that, basically, we tell family and friends but not the general public and I think the scientists are a great voice for objective knowledge because politicians and other people of the general public are always or very often biased, I would say” (Expert UK)*

*“So, this would indicate that those people without information they are not deciding, **so there is a lot of work to be done to give them the information and to basically to give them the tools to consciously decide after they have been provided with the information**” (Organiser Czech Republic)*

*“**It’s important that we don’t take our biases into the public workshop but it’s also important that the information we gave to the public enables them to way up to the possible benefits but also the negative consequences. And that’s what they discuss. They trade off these things.**” (Ipsos UK)*

In addition, the international dimension of the ORION PDs-GE, which were taking place in the same format in very different national contexts, was also highlighted by experts in Germany, the UK and Sweden as a positive outcome, since this would allow data comparison between different countries

*“[Participate in a similar activity in the future] yes, of course if I would have the opportunity, yeah. It was also a very nice concept **and specially comparing the different countries as I'm curious of what will come out of it**” (Expert Germany)*

*“It's going to be interesting to get the final report **to see if we find differences between the countries in Europe**” (Expert Sweden)*

Finally, organisers from Sweden and the Czech Republic mentioned how organising the PD helped them establish connections with other relevant stakeholders and improve their communication and dissemination strategy.

*“So here I found that very beneficial was the actual fact that **we had experts from different institutes. And that we could basically meet and we could basically find out how they feel about the topic, what problems they are facing, how is science communication going on in their institutes (...)** what was very beneficial was that Ipsos invited the science (...) superstar, (...) we invited him to a workshop, and that workshop, **helped so much our scientists to open up and be more interested in communicating research** because he was saying things like “It is a duty of modern scientist”, to communicate things (...) **it was extremely motivating and this happened basically for us thanks to this workshop.**” (Organiser Czech Republic)*

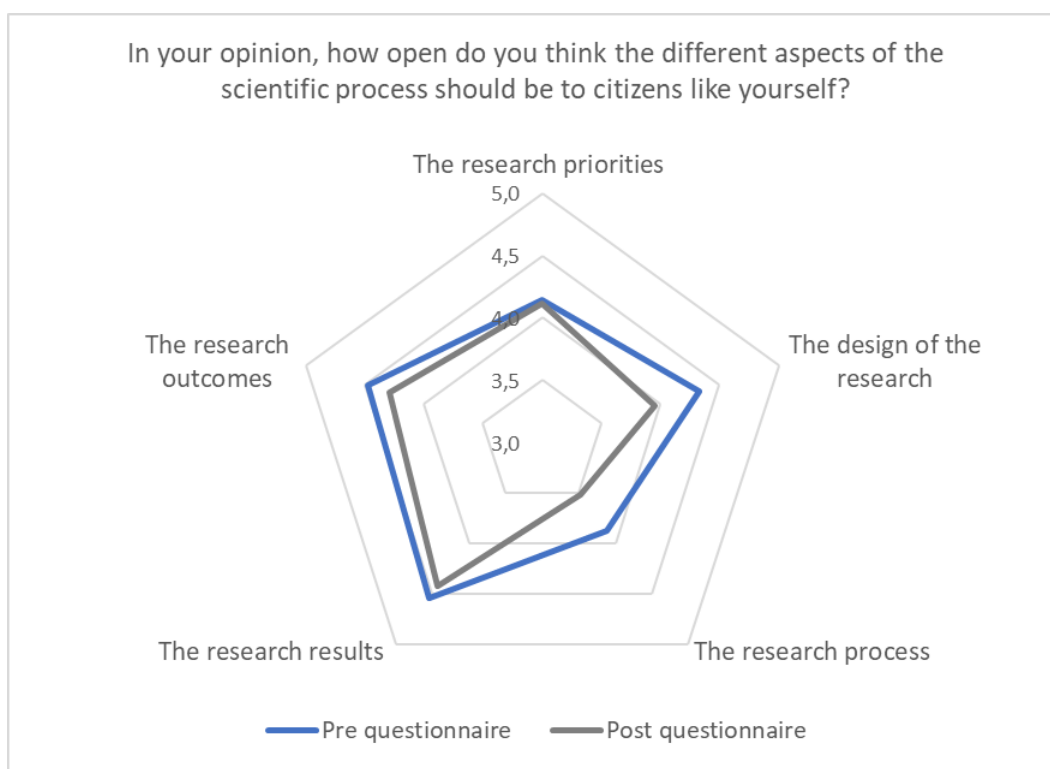
*“**We have kind of broadened our stakeholders. We have more stakeholders now, we have a bigger reference group in the field of health**” (Organizer Sweden)*

*“[Due to the PD] **We managed to have 4 times more press releases, publications**” (Organiser Czech Republic)*

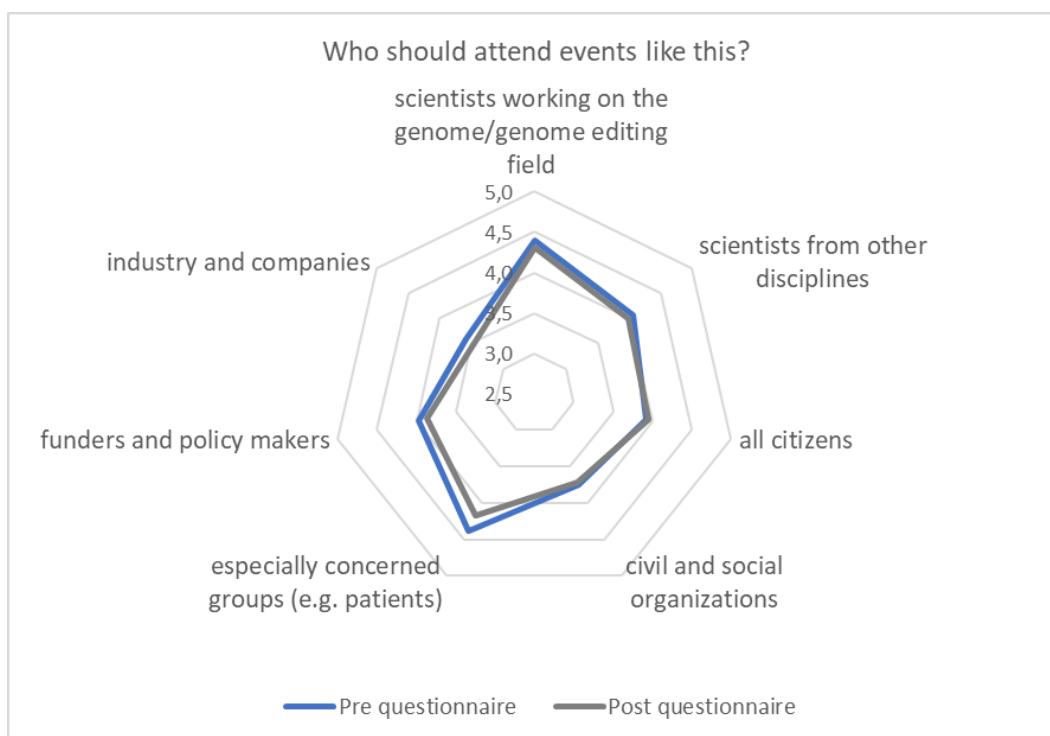
### 3.3.4. What are the views of participants about Open Science after the Public Dialogues on Genome Editing?

Participants' views regarding how open the different aspects of the scientific process should be to citizens were explored after the PD-GE and compared with those before the event (Graph 12). No relevant changes can be observed comparing initial and final views, which we attribute to the already existing very open views on OS of those who accepted to participate in the PD.

The question about who should attend events like the PD-GE was also asked again after the event, and comparison with the results of the pre-questionnaire (Graph 13) show again almost no change in participants' views, which were already very open to all stakeholders.



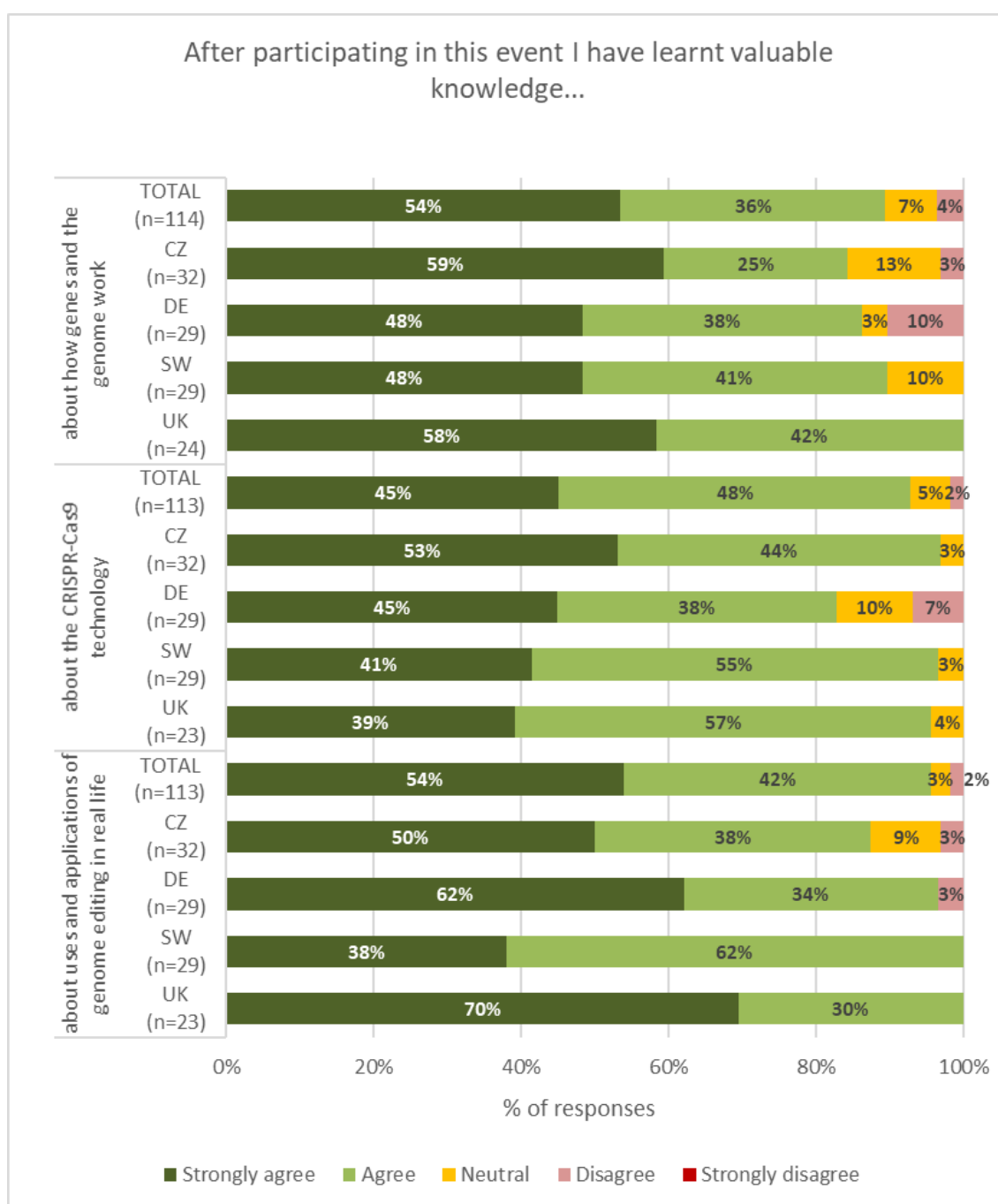
**Graph 12.** Views on the aspects of the scientific process that should be open responded by all the participants on ORION PD-GE before (pre) and after (post) the event.



**Graph 13.** Views on who should attend events like the ORION PD-GE before (pre) and after (post) the event.

### 3.3.5. What do participants perceive about their learning regarding Open Science and Genome Editing?

After participating in the PD-GE, attendees were asked to what extent they considered that they had learnt valuable knowledge about different topics related to genome editing. Results displayed in Graph 14 show that, indeed, a vast majority of participants either agreed or strongly agreed with knowing more about uses and applications of genome editing in real life (95.6%), about the CRISPR-Cas9 technology (92.9%) and about how genes and the genome work (89.5%).

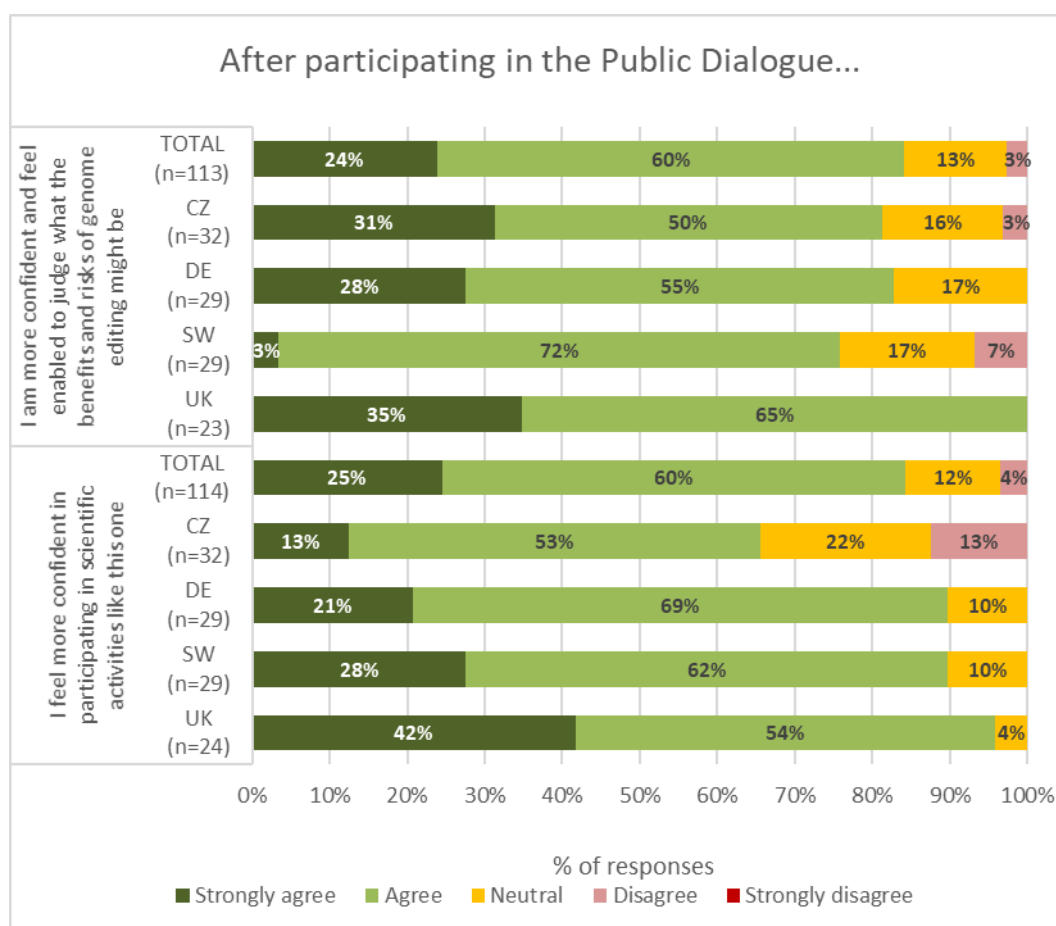


**Graph 14.** Perception of learning according to the statements of attendees to the PDs-GE.

However, it is still worth mentioning how there are some significative percentages of non-positive answers regarding perception of learning, particularly on basic knowledge and less about practical one, specifically in some countries. For example, German participants did not consider having learnt valuable knowledge about how genes and the genome work (13% of respondents) and about the CRISPR technology (17%), and 12% of respondents from the Czech Republic did not consider having learnt valuable knowledge about uses and applications of genome editing in real life.

The Public Dialogue in the UK presents slightly more positive results than the rest, since no participants disagreed with any of the statements.

In addition, attendees were also asked if, after their participation in the PD-GE, they felt more confident to judge about genome editing and to participate in scientific research activities like this one (see Graph 15).



**Graph 15.** Perception of gained self-confidence (to judge about genome editing and to participate in scientific activities) according to the statements of attendees to the PDs-GE.



Most participants agreed (60.2%) or strongly agreed (23.9%) with being more confident and enabled to judge about benefits and risks of genome editing. In this sense, the perception of mastery of critical competence in the field of genome editing is less than the perception of having learnt knowledge, but still very high considering the complexity of the topic. However, 13.3% of participants nor agreed nor disagreed with that statement. No strong differences were found between countries with the exception of the UK having only positive perceptions of acquisition of critical competence and a more dispersed view of participants from Sweden. On the other hand, 84.2% of respondents attending the ORION PDs-GE agreed or strongly agreed with the statement “I feel more confident in participating in scientific activities like this one” after their participation in the event. This gaining in confidence is especially relevant in the case of UK (with a total of 95.8% agreeing or strongly agreeing) and in Sweden and Germany (with a total of 89.7% agreeing or strongly agreeing in both cases). The least positive results are found in the Czech Public Dialogue, where only 65.6% of participants agreed or strongly agreed with the statement, 21.9% had a neutral opinion and 12.5% directly disagreed with the statement.

### 3.3.6. What are the main limitations of organising a Public Dialogue, according to scientists and organisers?

- All organisers of the ORION PDs-GE agreed on the fact that the Public Dialogues have been a very expensive and time-consuming open experiment that need investing important resources to have success. Issues regarding its suitability in terms of cost-effectiveness were raised and remain unclear.
- Organisers of the PDs-GE struggle between realising the benefits of a centralised, easily-comparable, international PD exercise and the need for the PDs to fit the priorities of each institution and make sense locally so that the data outcomes are relevant for their work. Both the PDs-GE organisers at ORION and at local level agreed that more local-based initiatives would have worked better.
- The PDs-GE organisers, despite recognising success of the PD external organisers in terms of ensuring representativity of the PD attendees, consider it is very difficult to extrapolate information from these small samples.
- The active involvement of both senior management and actual scientists from each ORION institution was a challenge that ORION PDs-GE organisers consider very important to tackle.

All organisers agreed that the main limitation of the PD-GE is the fact that they are very intensive events that cost a lot of resources. They agreed that PDs are very expensive and time consuming in terms of their organisation, which makes them difficultly replicable if there is not an *ad hoc* source of funding such as in ORION.

***“The Public Dialogue takes up a huge amount of time and effort and resources and I think (...) people who haven't done it before are quite shocked of how intense the whole thing is. (...) You need a lot of time (...) there's so much process involved in these things. And project management is crazy. You need a lot of time particularly to work up your materials and discussion guides.”*** (Ipsos UK)

***“The drawback is always that it costs money and if you invest into something and then you always start to think other benefits, are they imbalanced with the costs but otherwise I don't see any drawback because it doesn't do any negative impact, of course”*** (Expert Germany)

***“I think it would be hard to replicate, in terms of If you're creating almost guidelines or a handbook or whatever for other institutes to follow without that specific kind large amount of funding from the ORION project, like **BI wouldn't have been able to do it so I don't think other institutes would have been able to do it without you know, if they really wanted to I guess they would have to find the funding somewhere** but you know institutes aren't going to be able to fund that stuff themselves”*** (Organiser UK)

***“It's very time consuming and very costly”*** (Organiser Sweden)

This fact makes that for some ORION PD organisers a nation-wide, externally run and expertly moderated PD such as the one done at ORION is not actually the methodology they would follow for connecting with the public and having impact on OS in their own institution. In short, despite the benefits they found regarding the ORION PD, they consider it to be exclusive. In this sense, they wonder if it could have been substituted by least costly but equally effective smaller-scale versions.

***“And I think there are other ways how one can get information and maybe even from more people and basically it was not either effort from our part (...) I think it was really demanding for Ipsos (...) and I know it was for sure very expensive. And I think this money could have been invested into something else, for example, organizing something similar here, directly at the institute”*** (Organiser Czech Republic)

***“I don't think that this is the format. It's a very expensive format. It's very exclusive and I'm not sure what it really brought the participants that were there besides the fact of being in awe about the science and feeling that they had the privilege of asking the questions that they wanted to ask.”*** (Organizer Germany)

In relation with these issues of cost-effectiveness, organisers from the UK and Germany also considered that, despite the international dimension of the ORION PDs-GE have been signalled as providing interesting insights for country comparison regarding the PD methodology, the objectives of a PD should be carefully developed to fit the organising institute's priorities so the effort is worthy and the data outcomes are relevant for their work.

*“I do a lot of these things and in a way it’s only useful to spend this kind of money, cos they are very expensive projects to run **if the findings are actually gonna be useful to scientists that are working at their bench but also you know the people that run the science institutes.**” (Ipsos UK)*

*“**And I think that the aims would need to be more clear:** Are we trying to get people’s opinions? Are we trying to do an education event? Science attainment? What are we trying to do? And at the end maybe it doesn’t matter because all the things happen at the same time to a certain extent, **but I think that then the aims need to be better aligned between those two parties** [local and international PD organisers].” (Organiser Germany)*

Another important limitation perceived by the PD organisers, which could have also impact in the way the cost/benefit of PDs are perceived, is how much credit to give to the data gathered through Public Dialogues. This fact is in relation with how representative they consider the attendants to be so that their views could be considered representative enough of the citizens/society in their country.

In this sense, PD organisers acknowledge that, in spite of being reduced groups of attendants, there were strong efforts to have diverse people that were representative enough of the general public in their country.

*“Basically, it was 30 people from the German public, **they were chosen by the gender balance, we had different ages (...) and also different professions and different incomes and different levels of education so of course it was not representative for the full German society but at least it was a segment that was diverse.**” (Expert Germany)*

*“**From I could tell, it seemed like quite a good diverse good,** there was older people, younger people, they were like... we discussed with them quotas like ethnicity and social status and things like that (...) **to me it did produce quite a diverse range of opinions and I thought it was kind a good group specially for Cambridge which is usually quite one sided**” (Organiser UK)*

However, PD-GE organisers also raised concerns about the representativity of such a small number of participants and the fact that there were economic incentives for PD participants, which could affect the outcomes.

*“The question was if it was representative enough because there were only 30 participants and to my knowledge there were paid to be there (...) **So, this would be my only concern, whether we can really consider what the results that came out that they are really representative and it reflects really what the society thinks.**” (Organiser Czech Republic)*

*“**Some of the downsides,** it’s expensive, it takes a long time and **you’re only speaking to a (...) relatively small group of people.** But you know, as I said, it’s*

*not designed to be big scale. (...) dialogue is very much for exploring in detail.” (Ipsos UK)*

*“Because they felt like this is such a small sample of information that you gathered and data. So, you could probably not make a big European recommendation, but they thought it was very interesting.” (Organiser Sweden)*

An organisation limitation of the PDs-GE is in relation with how to actively involve the scientific institutes in this PD exercise. This includes involvement of both senior management and actual scientists.

Regarding the involvement of management, both ORION PD-GE organisers in the UK and Ipsos MORI experts raised concerns about the challenge associated with involving senior management in each ORION institution in the development of the PDs-GE. Despite the high cost of these events and the potential visibility they give to the ORION research centres, involvement of management did not happen easily and as expected during the organization of ORION PDs.

***“For [the PD] to be impactful you need the senior decision makers in these organizations to be really involved in it and I don’t think that’s been particularly good in this project. It’s kind of this advisory group that’s supposed to sit above (organizer UK). I’ve never met them in person, one or two commented on a very early draft of the discussion draft that we’ve done.” (Ipsos UK)***

***“It might have been nice to have someone in higher management from the scientist part to talk to the other scientists about the project... rather than it coming from the ORION person, that might have had more way in and got more people interested ... I think more awareness and generally from my experience in an institute, you get more awareness if you get group leaders talking about it, basically” (Organiser UK)***

Regarding the involvement of scientists, both participant experts and organisers from the different participating ORION institutions agreed that researchers are usually scared to participate in activities such as a Public Dialogue, since they fear they will publicly get negative feedback.

***“Of course there’s always the fear that you would have people that might not be happy also with what kind of research is done or specially like since many examples we discussed also involved animal experience” (Expert Germany)***

***“The subject itself was a bit controversial of course and I mean of course as a scientist you are in the worst case always associated with the bad science” (Expert UK)***

***“I would say that before there was a bit of, the scientists were a bit afraid of communicating those controversial topics because they didn’t know how they would react. They were afraid or (...) they saw it worked fine we didn’t receive any***

*hateful emails after the interviews (...) so it didn't happen so they feel less fearful in communicating such noble subjects which is positive.” (Organiser Czech Republic)*

*“I do sympathise with scientists quite a lot because I do think they've just been told that they need to do this Open Science stuff and reach out to the public **but they haven't really been given the support to do it or the resources to do it so I totally understand this nervousness or this reticence to get involved**” (Ipsos UK)*

*“Then I would maybe ask if anybody would like to be specifically trained for this (we have specifically open science workshops) (...) **people tend to not engage in activities** (...) so sometimes a little bit of training, a little bit of information ahead of time helps” (Organiser Czech Republic)*

For this reason, organisers from the UK and the Czech Republic agreed that one way of improving the participation of scientists is to do better internal dissemination and promotion within the institutes. For this, getting support from management of each institute is considered to be very important.

*“**Try to do better is try to communicate, prepare the people early enough.** Basically, first I would publish article in our internal newsletter, we send those every month, explaining the importance of engaging in public dialogues, what would be the added value for scientists and for the science institute to do this, I would perhaps do a little survey, who would be interested to know” (Organiser Czech Republic)*

*“**try to constantly motivate people to engage in some activities, maybe not getting money or a bonus for that time but maybe say giving certain bonuses or rewards once per year for someone who was very very active in activities like this.** It would not be like money wise but it would be something like you did something nice so it would give you prestige, and everybody know you are now the...” (Organiser Czech Republic)*

*“Getting management not just to agree with you but also to start talking to people about it. That would be a really positive step. I think it's a bit of a general thing at BI that kind of public engagement and admin staff are kind of separated from researchers so there is a bit of a gap there that isn't just to do with public engagement it's kind of a quirk of the system and **I think it would help specifically at Babraham it would help for people to get involved if there was a closer relationship in the kind of admin people included in public engagement and the researchers...**” (Organiser UK)*

An interesting characteristic of the set of ORION PDs-GE is the international dimension that was pursued. At ORION, WP3 leaders from UK were not only the organisers of the first PD-GE at UK but in charge of the overall coordination of the four National Public Dialogues. As such, they recognised to have struggled between ensuring enough similarity between the different PDs-GE and leaving enough room for context and local-adaptation.



*“One of the other reasons why we wanted to centralize the organisation, some people felt that we had to make sure that it was exactly the same things that were happening in each place which wasn’t what happened, partly because we wanted to make each one specific to each country partly because for example with the art piece it couldn’t be physically be the same at each place. **Ipsos always said that it wasn’t a science experiment, it was a social science experiment so it didn’t had to be exactly the same but some people felt very strongly that it should be. Those two things kind of got crossed sometimes.** So, the idea was kind of to centralize it kind of to make it exactly the same but it didn’t end up being exactly the same in the end anyways, so the benefit of centralizing it was lost” (Organiser UK)*

Moreover, while according to the contracted organisers many efforts were put in coordinating the PDs-GE specifications in the different countries, local ORION organisers felt that there were important time and language constraints, and that they would have needed more support and perhaps even some piloting to organise the PD better.

*“The team I’ve got are really organised, **they give very thorough briefings and guidance, (...) we know people haven’ done this before so we’ve given them guidance** on what the layout of the room should look like, guidance of what the role of experts are for, guidance on what the role of observer is for, of experts, guidelines on how to inform stakeholders experts to inform workshops, we’ve written all of the materials for them.” (Ipsos UK)*

*“Everything was done in English, and we had to translate it into Swedish. **It didn’t give us that much time because we had the last versions very late** and also if we had a round through it, a pre-test of the PD would have probably discovered all of us that there were too many questions, they were too detailed questions. And I think there should have been a moderator trainer” (Organiser Sweden)*

All in all, and considering that in the end the different PDs-GE had to accommodate locally, ORION organisers from UK consider that the PDs would have benefited from more autonomy for each national organiser to coordinate their own Public Dialogue.

*“Personally think it would have been easier if each country would have stood more alone but things just kept running around in circles and **there was miscommunications going on (...)** certainly at times it felt like the other countries were like this isn’t my part of the project (...) I understood because people were massively overworked and under resourced and you know but splitting up that money and resources and time to be able to give everyone else more independence to do their own thing but perhaps...” (Organiser UK)*

## 4. Final Evaluation of Public Dialogue to inform CRG's research strategy

### 4.1. Context and Sample

The Centre for Genomic Regulation (CRG) conducted a Public Dialogue (CRG-PD from now on) to gather opinions from civil society and strategic stakeholders and explore how to take them in to account in the development of the next CRG strategy for the period 2021-2024. The aim of this exercise was twofold. On the one hand, to align the CRG plans with society's views, values and expectations. On the other, to promote a cultural change in the perception of open science throughout the CRG community. Ipsos MORI, a global market research organisation, was commissioned to implement the full dialogue project which, as described in Deliverable D3.7 "Implementation of the public dialogue to inform CRG's research strategy", was developed in three main steps:

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stage 1 | <p><b>Online community</b></p> <p>Asynchronous event where <b>recruited participants from the general public</b> were able to analyse the materials designed and answer the questions put to them using the Ipsos-owned platform Live. During the 11-days community, three online synchronous sessions took place, each of them consisting in a set of semi-structured meetings moderated by a representative from Ipsos in which groups of 5-6 people from the general public could discuss with a CRG researcher around a particular case study (i.e., research projects that had been developed by, or went born at, the CRG). These sessions were organised in such a way that all groups of participants could talk alternatively with two different CRG researchers during a total of 3 hours.</p> <p>Participants: 30 citizens and 6 CRG scientists</p> <p>Duration and dates: 11 days (from 28<sup>th</sup> September to 13<sup>th</sup> October 2020)</p> |
| Stage 2 | <p><b>Stakeholders' workshop</b></p> <p>Online session which consisted in a set of debate groups where <b>selected stakeholders</b> and CRG researchers could discuss about four main topics (basic vs applied research, funding, ethical debates and science communication).</p> <p>Participants: 21 stakeholders and 10 CRG scientists</p> <p>Duration and date: 3 hours (20<sup>th</sup> October 2020)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Stage 3 | <p><b>Final workshop</b></p> <p>Online session with <b>representatives from the three different groups</b> (citizens, stakeholders and CRG scientists) aimed at obtaining feedback from the analysis of the information collected in the two previous stages and gathering all ideas to be incorporated into the CRG's strategy.</p> <p>Participants: 13 citizens (involved in stage 1), 9 stakeholders (involved in stage 2) and 5 CRG scientists.</p> <p>Duration and date: 2.5 hours (4<sup>th</sup> November 2020)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |



In terms of selection and recruitment of participants to the whole CRG-PD (i.e., the 3 stages), there were:

- 31 participants from the general public (the sample reflected the Spanish population in terms of gender, age, work situation, etc., although was not statistically representative).
- 22 stakeholders with very different profiles (4 journalists and science communicators, 4 representatives from private companies, 2 funders, 3 bioethics' experts, 3 clinicians, 1 representative from a patients' association, 3 researchers from different disciplines to biomedicine and 2 experts in formal and informal science education).
- 15 CRG researchers took part in the 3 stages (3 PhD students, 2 Postdocs, 3 staff scientists, 1 Group Leader, 3 Programme Coordinators, 2 Heads of Unit / Department, 1 Director).

However, not all attendees participated in all the stages of the CRG-PD. For instance, some of them were involved both in the online community and in the final online workshop, while some others participated only in the community, or in the stakeholders' and/or the final workshop. Thus, it is important to bear in mind that, when assessing their participation in the Public Dialogue, some of the informers were just evaluating one of the stages.

A summary of the number of participants of each group and their involvement in the different phases of the evaluation (questionnaires and interviews) is shown in Table 2.

| Type of population               | General public | CRG researchers | Stakeholders |
|----------------------------------|----------------|-----------------|--------------|
| Participants in the CRG-PD       | 31             | 15              | 22           |
| Respondents (PRE-questionnaire)  | 32 (100%) (*)  | 5 (33%)         | 9 (41%)      |
| Respondents (POST-questionnaire) | 22 (71%)       | 4 (27%)         | n/a          |

**Table 2.** Summary of the population and sample analysed in the evaluation of the CRG-PD. (\*) Although 32 people from the general public were recruited to participate in the CRG-PD (and all of them filled in the PRE-questionnaire), a total of 31 finally participated in it.

Regarding the evaluation, quantitative results have been only analysed for participants from the general public, since the sample of informers from the CRG researchers' and the stakeholders' groups is too small to allow for quantitative analysis. However, the analysis of impact on CRG researchers has been carried out from a qualitative point of view from their answers to open questions and the interviews conducted, as well as through *in-situ*

observations. Table 3 describes in anonymous form the number of interviews done to participating researchers and to the organisers of the event:

| Interviewee   | Participation in the CRG-PD                  | Date                       |
|---------------|----------------------------------------------|----------------------------|
| Researcher 1  | Online community (Stage 1)                   | 21 <sup>st</sup> Dec. 2020 |
| Researcher 2  | Stakeholders' workshop (Stage 2)             | 22 <sup>nd</sup> Dec. 2020 |
| Researcher 3  | Stakeholders' & final workshops (Stages 2&3) | 23 <sup>rd</sup> Dec. 2020 |
| CRG organiser | Design and execution of the whole event      | 31 <sup>st</sup> May 2021  |

**Table 3.** Relation of dates of the interviews carried out to CRG staff involved in the development and organisation of the CRG-PD.

## 4.2. Starting point of the Public Dialogue to inform CRG's research strategy

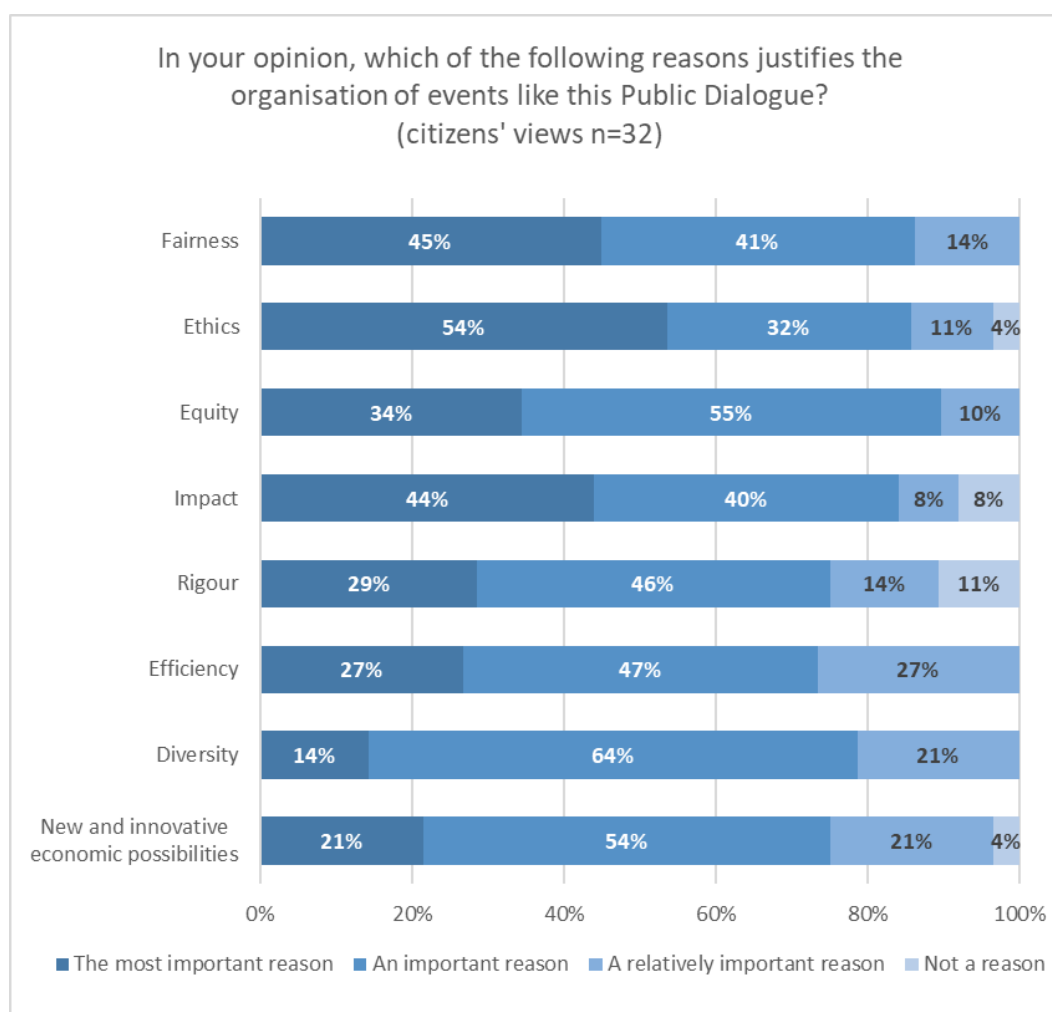
- Citizens consider that the most important reasons for PDs are related with ethics, fairness and impact. Less important ones involve efficiency, rigour and new economic possibilities.
- Researchers hold a more diverse and narrower view of which parts of science should be open than citizens. According to them, research results and outcomes are those aspects of scientific research they agree more to become open to society.
- There is a common expectation from the different participants regarding the public dialogue to inform research strategy related with the dialogic nature of this action. All participants emphasise the importance of realising diversity of views regarding research issues, with researchers more focused on citizens' views on particularly controversial topics and other participants in the dialogue itself. Most citizens (39%) refer to general learning as their main expectation when participating in the Public Dialogue, even if the PD is about the research enterprise.

### 4.2.1. Why should events like the CRG-PD be organised?

Before taking part in the CRG-PD, participants were asked to respond to the question "In your opinion, which of the following reasons justifies the organisation of events like this Public Dialogue?". A series of items were presented randomly, to avoid the order of the items to potentially imply a hierarchical order of priorities. The items were those already used when discussed Open Science at ORION previous evaluations: Diversity; Economy; Efficiency; Equity; Ethics; Fairness; Impact and Rigour. Through a multiple-choice grid,

participants had to select for each item of the previous list whether it was not a reason to organise the event, a relative reason, an important reason or the most important reason. They had also the option of not giving their opinion by selecting DK/NI. With the obtained answers, DK/NI answers were excluded and then the percentage of participants which have considered each option was calculated.

Results of Graph 16 show that most participating citizens think, prior to the event, that all the reasons proposed are important to organise an event like the Public Dialogue, since in all cases, more than 75% of participants think these are either the most important reason or an important reason.

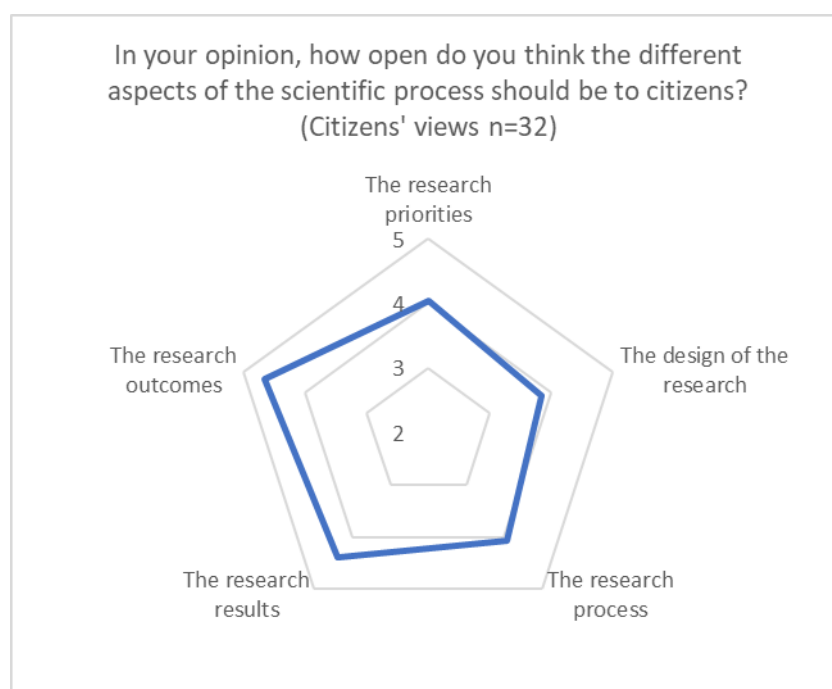


**Graph 16.** Reasons to organise a Public Dialogue according to participants from the general public who responded the pre questionnaire of the CRG-PD.

When comparing what are considered the most important reasons for organising a PD, the general public give **Ethics**, **Fairness** and **Impact** the utmost relevance, with 54%, 45% and 44% of respondents respectively stating that these are the most importance reasons to open science via PDs. Despite all reasons for Open Science had high percentages (more than

70%) of consideration as good reasons to organise a PD, those ideas that were considered as less important for participating in a PD were issues of **Efficiency**, **Rigour** and **New and innovative economic possibilities** (with 27%, 25% and 25% of respondents respectively stating that these are not reasons or relatively important reasons in favour of PDs).

In addition to being open “as a whole”, Science can be understood as a combination of quite different phases or processes. Under this idea, participants were asked about which aspects of the scientific process should be open. Five key aspects were presented: the research priorities (what topics, how much funding); the design of the research (methodologies, ethical considerations); the research process (data gathering, data management, replicability); the research results (knowledge, publications, patents) and the research outcomes (design of final products for end users). Participants were asked about how open these five different aspects of the scientific process should be to citizens like themselves, and they had to rank from 1 to 5 each of the items above, where 1 corresponded to “should not be open” and 5 to “should be very open”. Based on the obtained answers, the means have been calculated.

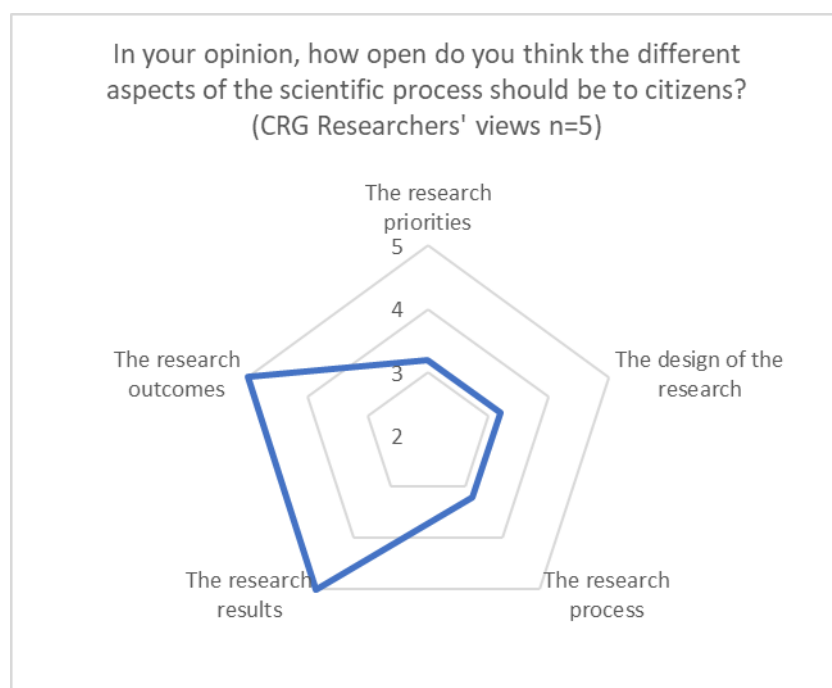


**Graph 17.** Views on the aspects of the scientific process that should be open according to responses of the participants from the general public prior to the CRG-PD.

Results in Graph 17 show that participating citizens of the CRG-PD think that all aspects of the scientific process should be quite open to citizens. Those aspects related with the direct impact of research, that is **research Results** and **Outcomes**, were those selected to be more open, with 4.4 and 4.7, respectively. However, the research **Priorities**, the research

**Process** and the **Design** of the research were also quite highly ranked, with 4, 4, and 3.8, respectively.

Interestingly, the views expressed by the CRG researchers who responded the questionnaire (Graph 18) show a less open pattern towards those aspects which are not related to research outcomes and results. When looking at the data in detail we find that the opinions regarding openness of the research results and outcomes are very homogeneous, with 100% of researchers considering these aspects should be very open. However, a high dispersion is observed regarding the views about openness of both the research priorities and the other aspects related with the actual organisation of research (design and process). For instance, some researchers gave the research process a score of 1 (which means they consider it should not be open) and some others gave it a score of 5 (considering that it should be completely open).



**Graph 18** Views on the aspects of the scientific process that should be open according to responses of the CRG researchers prior to the CRG-PD.

#### 4.2.2. What do participants expect from the CRG-PD?

Participants of the CRG-PD were also asked through an open question which were their expectations about the event. Responses from the general public were grouped according to the following categories, and the results of the qualitative analysis are shown in Table 4:

- **General knowledge:** learning concepts and ideas.
- **Diversity of opinions:** realising and recognising diversity of views, acknowledging debatable and controversial topics.
- **Networking and/or interpersonal skills:** interacting with others and improving communicative skills.
- **Knowledge about science:** learning about scientific research, research centres, etc.

| Citizens' expectations about the CRG-PD |                                                                                                                                                                                                                                                              |                    |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Category                                | Examples of answers                                                                                                                                                                                                                                          | % responses (n=43) |
| General knowledge                       | <i>"learning more about science"</i><br><i>"I find it very interesting, I think it will give me more knowledge and new concepts"</i>                                                                                                                         | 39%                |
| Diversity of opinions                   | <i>"knowing what people think and intuit the interest on what topic they want to talk about"</i><br><i>"observe other perspectives and ideas"</i><br><i>"a different vision"</i>                                                                             | 35%                |
| Networking and/or interpersonal skills  | <i>"socialize with new people"</i><br><i>"the possibility of reflecting with other people on current issues"</i><br><i>"participating (...) can give me more (...) language in terms of communication and to be able to express myself better in public"</i> | 14%                |
| Knowledge about science                 | <i>"more information about (...) the activity of research centres"</i><br><i>"experience on the current reality of scientific research and development"</i>                                                                                                  | 12%                |

**Table 4.** Results of the qualitative analysis of the answers from citizens to the question "*Which are your expectations about this Public Dialogue?*" There were 32 respondents, some of them mentioned more than one aspect and there were three non-valid answers, so the final number of items analysed was 43.

Concerning the stakeholders who were invited to the CRG-PD and responded the pre-questionnaire (n=9), their expectations can be summarised as follows:

- **People's views:** understanding people's expectations, concerns, misconceptions and fears about scientific research.
- **Awareness:** contributing to increase CRG's awareness about societal impact of its research and to promote better understanding of CRG activities.
- **Science communication:** learning about communication processes (to society, between researchers and general public, to policy makers...)
- **Diversity of opinions:** sharing different points of view.

The main expectations about the CRG-PD that were stated in the pre-questionnaire by CRG researchers (n=5) before participating in the event (see Table 5) were also focused on the **opportunity to know diverse opinions** (as already stated by citizens and stakeholders), as well as on **improving interaction between scientists and society**, **promoting debate about the impact of own research**, and **influencing strategic research**.

| CRG researchers' expectations about the CRG-PD |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category                                       | Answer                                                                                                                                                                                                                                                                                                                                                                                                           |
| Interaction with society                       | <i>"To improve interaction between scientists and society"</i><br>(Postdoctoral researcher)                                                                                                                                                                                                                                                                                                                      |
| Diversity of opinions                          | <i>"Hopefully it will be an interesting experience to see how people react to potentially controversial issues about data handling"</i><br>(PhD student)                                                                                                                                                                                                                                                         |
| Diversity of opinions                          | <i>"I am looking forward to hear what the general public thinks about my project. I am sure there will be someone asking questions from a point of view I didn't think about as well as a big ethical debate. I expect to be able to listen and understand the general public point of view as well as to transmit my point of view and scientific questions around my project"</i><br>(Postdoctoral researcher) |
| Explore impact of own research                 | <i>"I expect to have an open debate about the impact our research has on the society, and if it is what general public and stakeholders expect from us"</i> (Staff Scientist)                                                                                                                                                                                                                                    |
| Influence on strategic research                | <i>"I hope all this exercise can be considered while preparing scientific strategic plans for research centers and can influence political decisions"</i> (Staff scientist)                                                                                                                                                                                                                                      |

**Table 5.** Answers from CRG researchers to the question *"Which are your expectations about this Public Dialogue?"*

Interestingly, diversity of opinions is commonly shared among expectations stated by all participating groups. However, while citizens show quite a broad view (e.g., they want to know others' opinions, in general, and regardless of their profile), researchers seem to be particularly interested in getting to know citizen's views about specific topics related to ethical aspects or controversial issues.

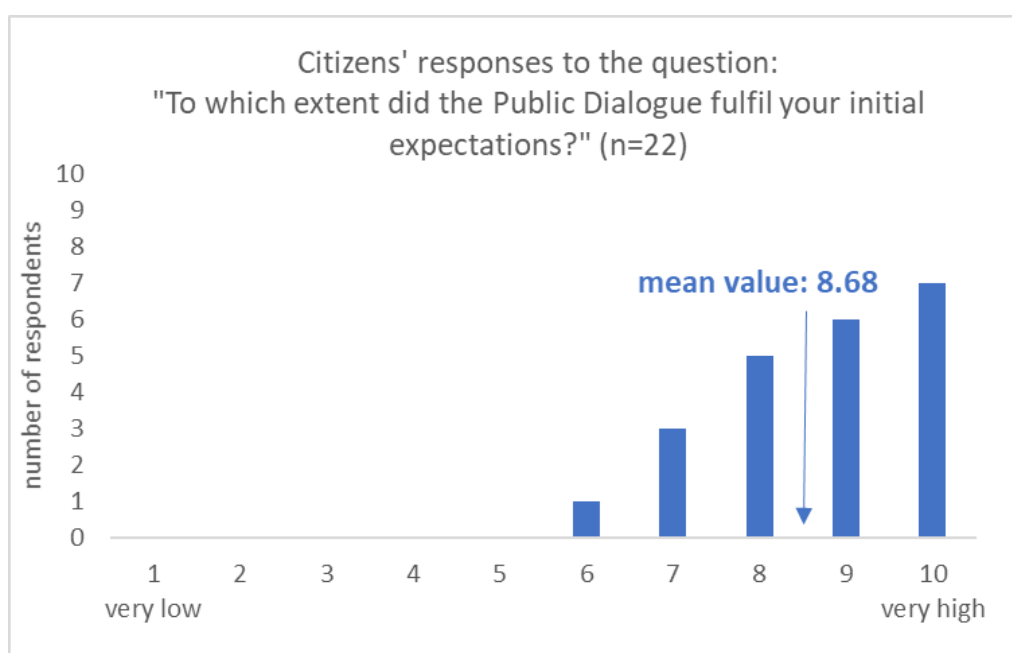


### 4.3. Impact of the Public Dialogue to inform CRG's research strategy

- All participating citizens and researchers attending the PD on research strategy highly value this event. Most citizens consider it has largely fulfilled their initial expectations and interviewed researchers consider they will attend similar events in the future.
- Organisers consider the PD on research strategy has had a tangible impact in the research strategy of their institution, mostly through the experience of leading management actors and researchers.
- Direct interaction with scientists is the most valued characteristic of the PD for citizens attending the event. Researchers were also positively surprised by the genuine interest of participating citizens.
- In line with the focus of the event, the main learning impact citizens recognised is the learning about scientific research, with more than 91% of citizens recognising that they could explain to another person the kind of scientific research that is carried out at CRG. This shows a shift from expectations linked to the products of science (scientific knowledge) to recognition of learning about the processes of Science.
- Dialogue between researchers and stakeholders was more bi-directional than between researchers and the public, mostly due to the existing knowledge gap. This could explain the mixed views of citizens regarding the actual need of their inputs in science.
- Citizens participating in the PD have an initial positive view regarding Open Science which increases after their participation.
- Researchers participating in the PD have a positive view of this experience, which actually contributed to them at different levels such as increasing their communication skills or opening their views regarding private funding.
- Challenges to be faced by PDs are about time constraints, how to ensure equity in participation and how to involve more stakeholders and particularly senior PIs.
- The online format of this event due to the Covid pandemic limited but did not avoid its positive impact on all participants.

#### 4.3.1. How do citizens and researchers value the CRG-PD in terms of satisfaction?

After the CRG-PD participating citizens and researchers were asked to which extent the event had fulfilled their initial expectations (rating from 1 to 10, 1 being “very low” and 10 being “very high”). Most respondents from the general public scored above 8 (see Graph 19) and all of them positively rated the statement “*I would recommend taking part in events like this Public Dialogue to others*” (14% agreed and 86% strongly agreed, being n=22).



**Graph 19.** Degree of fulfilment of expectations according to participating citizens in the CRG-PD.

The post-questionnaire circulated among attendees to the CRG-PD also included an open question for them to state **which aspects of the CRG-PD they would highlight as less positive**. Most participants from the general public (41%) did not mention any, and some of the aspects that came out were the following: **reiterative questions** in some parts, **time restrictions for the debates**, participants' low scientific knowledge, and some **participants not being very active** (and some **others being too active**).

Related to public's participation, during the *in-situ* observations it was possible to see the role of the moderator both in trying to balance the discussion when some participants were being too active, and in rekindling it if it was slowing down (something that usually happened at the end of the sessions, when participants may already be tired after more than 2 hours of meeting).

Regarding the answers from the CRG researchers to the post-questionnaire, the results show a high level of satisfaction after participating in the CRG-PD. The four of them who responded to the post-questionnaire strongly agreed with the statement "*I would recommend taking part in events like this Public Dialogue to others*" and rated above 8 (mean value 8.75) the question about to which extent the event had fulfilled their expectations. Moreover, those researchers who were interviewed assessed the experience very positively:

*"I had a great time, it was a lot of fun being able to talk to people and see things that they, that is, what I maybe thought they would ask me didn't interest them at all, and they were much more interested in something else, which was curious"* (Interviewed CRG Researcher 1)

*“when it finished (...) what I thought was: everyone should have been here, and not just me! (...) I felt: well, and why did I get the chance and someone else didn’t? Because in the end, these are questions that everyone needs to ask. Am I communicating well? Am I really doing everything I can? Am I asking myself the right questions?” (Interviewed CRG Researcher 2)*

When asked about the least positive aspects of the CRG-PD, the CRG researchers who responded the post-questionnaire signalled issues related to the **duration of the sessions**, the **online format** and the **aim of the event** (see Table 6).

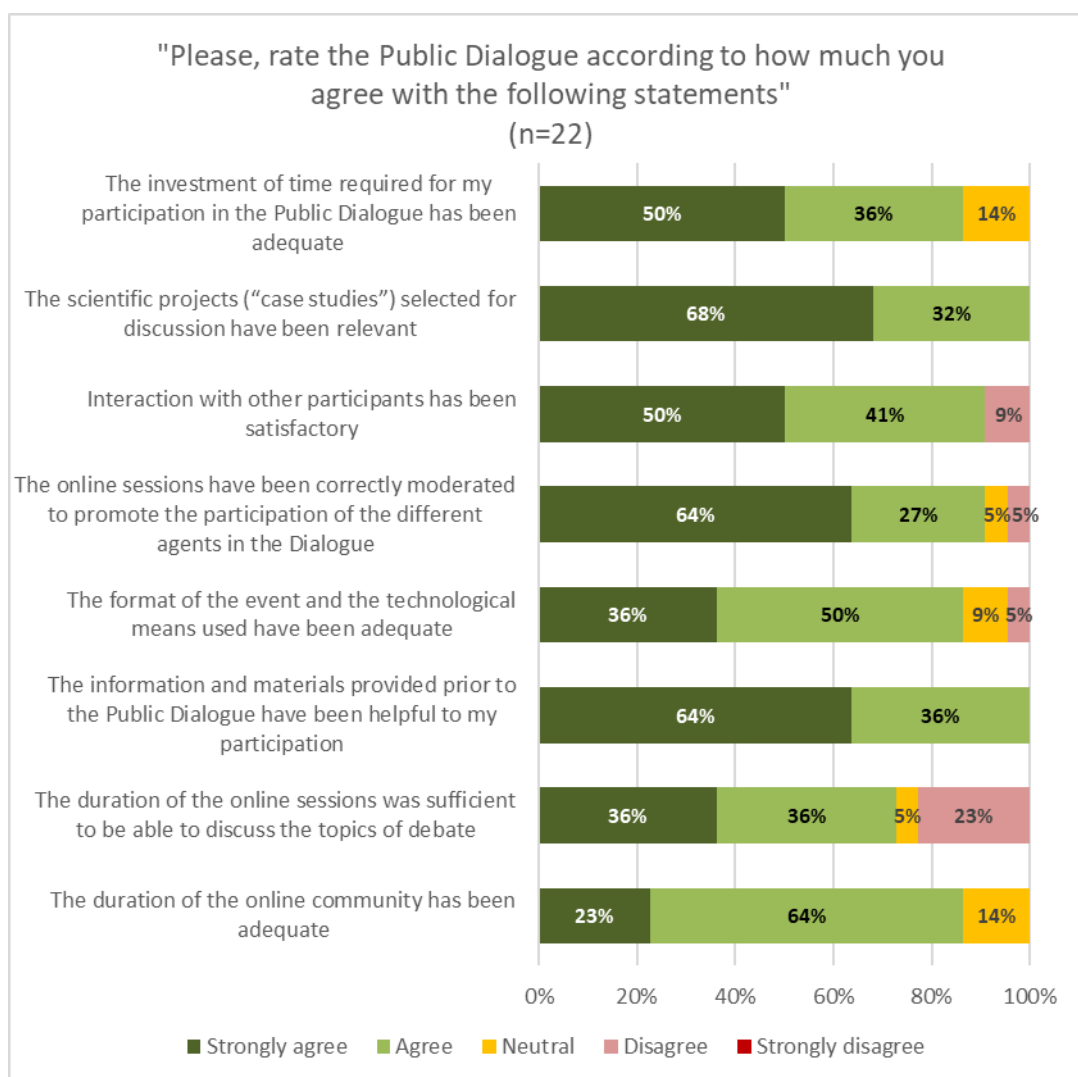
| Less positive aspects of the CRG-PD (according to researchers) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category                                                       | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Duration of the sessions                                       | <i>“For the researchers, the time slots are a bit too long. If the dialogues for a particular researcher could be broken down into two days it would be better: both people and the researcher get tired towards the end and it’s difficult to maintain the same level of enthusiasm from either side” (PhD student)</i>                                                                                                                                                                                                                                                              |
| Online format                                                  | <i>“I have the feeling that the “in person” dialogue would have been even more productive. In the “online” version, many issues cannot be deeply discussed, in part, because of the lack of time.” (Senior researcher)</i>                                                                                                                                                                                                                                                                                                                                                            |
| Online format                                                  | <i>“Communicative platform (Teams) did not work very well.” (Senior researcher)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Aim of the event                                               | <i>“I understand the importance of explaining the scientific projects to the public, but from my point of view, in this specific event the point was to help the CRG to decide how to orient basic research, how ethics should be taken into account or how to find new financing sources or improve science communication to the public. Maybe it would have been more interesting to brief the general public on how the scientific system works for this specific event, rather than explaining or discussing the scientific projects specifically.” (Postdoctoral researcher)</i> |

**Table 6.** Answers from CRG researchers to the question “Which aspects of the Public Dialogue would you point as less positive? Please, describe them”.

It is worth mentioning that the comment at the end of Table 6 regarding the aim of the event corresponds to a postdoctoral researcher who was only involved in one of the online sessions within the community (Stage 1). Not having participated in the workshops (Stages 2 and 3), where it was possible to debate with a broader audience around topics related to the CRG’s research strategy, may have given this researcher a partial view of the objectives and potential impact of the CRG-PD.

Participants’ responses regarding their satisfaction with the structure and content of the CRG-PD also show positive results (see Graph 20). Particularly all respondents from the general public found that:

- The scientific projects (“case studies”) selected for discussion were relevant (32% agreed and 68% strongly agreed).
- The information and materials provided prior to the CRG-PD had been helpful to their participation (36% agreed and 64% strongly agreed).



**Graph 20.** Participating citizens' responses to the post-questionnaire regarding several aspects of the CRG-PD.

Moreover, a high proportion of participants found that **the sessions had been correctly moderated to promote the participation of the different groups in the Dialogue** (91%), and that **the interaction with other participants had been satisfactory** (41% agreed and 50% strongly agreed). It is worth mentioning that 23% of respondents did not find that the duration of the online sessions was sufficient to be able to discuss the topics of debate. This fact was already detected through the *in-situ* observations, since in some of the sessions

the debate and discussion were so active and lively that the moderators had to end them abruptly so as not to exceed the established time.

The satisfaction was also high from the organisers' perspective, who stated during the interview that the CRG-PD was an impactful exercise which resulted not only in new actions to be included in the CRG strategy but also to raise awareness among CRG researchers. Despite considering that it was a highly valued exercise which set a seed for change towards a more open research, organisers also recognise the difficulty on influencing the views from management regarding public involvement in the scientific debate:

*“the final impact of the result of this project has been tangible and there have really been new actions in the CRG strategy that were incorporated thanks to doing this exercise (...) there are different impacts, the impact in the more junior researcher (...) the impact in the director who obviously is more difficult to convince [on the idea] that people have a say (...) I think that as an exercise it has been valued very well in the CRG (...) I think we have put an important grain of sand, a turn towards this more open way of doing and that will set a precedent” (CRG organiser)*

#### 4.3.2. What are the most positive aspects of the CRG-PD?

Attendees were also asked, through an open question, **which aspects of the Public Dialogue they would highlight as more positive.**

Citizens' statements regarding this question were grouped under four categories, three of which (General knowledge, Diversity of opinions and Knowledge about science) had already been identified when analysing their initial expectations, and the fourth one being the following:

- **Direct interaction with scientists:** Exchanging views with and learning from the experience of scientists.

Table 7 shows the results of the qualitative analysis of answers about the more positive aspects, and when comparing them with the analysis results of citizens' initial expectations (previously shown in Table 4), we can see that, although **before their participation in the CRG-PD citizens mainly expected to obtain learning (in general) and diversity of opinions, after the event they highlighted learning about scientific research and direct interaction with scientists as more positive aspects** (see Table 8).

| Positive aspects of the CRG-PD highlighted by citizens |                                                                                                                                                                                              |                    |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Category                                               | Examples of answers                                                                                                                                                                          | % responses (n=24) |
| General knowledge                                      | <i>"the information we were given"</i><br><i>"the knowledge of subjects that I thought I knew but that surprised me for good to be able to know better"</i>                                  | 21%                |
| Diversity of opinions                                  | <i>"different points of view especially in ethics"</i><br><i>"the debate"</i>                                                                                                                | 21%                |
| Knowledge about science                                | <i>"the explanation of the investigations"</i><br><i>"knowing about ongoing research and realizing that there is basic research underway, something that we are not aware of in general"</i> | 29%                |
| Direct interaction with scientists                     | <i>"being able to exchange thoughts with scientific researchers"</i><br><i>"the direct contact with members who participate in the research that is carried out"</i>                         | 29%                |

**Table 7** Results of the qualitative analysis of the answers from citizens to the question *"Which aspects of the Public Dialogue would you highlight as more positive? Please, describe them"* There were 22 respondents, some of them mentioned more than one aspect and there was one non-valid answer, so the final number of items analysed was 24.

| Categories identified from participants' answers | Expectations (before the event) % responses (n=43) | Main positive aspects (after the event) % responses (n=24) |
|--------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|
| General knowledge                                | 39%                                                | 21%                                                        |
| Diversity of opinions                            | 35%                                                | 21%                                                        |
| Networking and/or interpersonal skills           | 14%                                                | -                                                          |
| Knowledge about science                          | 12%                                                | 29%                                                        |
| Direct interaction with scientists               | -                                                  | 29%                                                        |

**Table 8.** Comparison of results of the qualitative analysis of the answers from citizens to the questions about expectations (before the CRG-PD) and about main positive aspects (after the event).

In line with these results, through the *in-situ* observations of the online sessions within the community (Stage 1 of the CRG-PD) where participants from the general public discussed with CRG researchers about the case studies, we could see that the former showed a high level of engagement in the debate (the number of total interventions ranging between 10



and 25 in a 30 minutes-meeting) and a genuine interest in learning about science and about scientific research. The following statement from a participant in one of these sessions exemplifies the demand of information from the public, who may not have felt knowledgeable enough to answer some of the questions that the moderators posed to explore their ideas:

*“you are asking us a lot about situations that we do not know about (...) I would like you to give me a vision of how research is in Spain, how official organisations coexist (...) how they coexist with university research, with pharmaceutical laboratories, because you ask us many things and I do not know the real situation”* (participant in session 1<sup>st</sup> Oct. 2020).

Regarding the CRG researchers who answered the post-questionnaire, they signalled two main positive aspects, which are closely dependent on the stage of the event they had been involved in. For instance, those who had participated in the online sessions within the community but not in the stakeholders’ workshop or the final workshop highlighted the **engaging and active attitude of participants from the general public and their genuine interest in science**:

*“The sessions were interesting, people were engaging more than I expected they would. I think it's good that they have beforehand access to the material like they did in this occasion because then we can have a more meaningful discussion”* (PhD student)

This aspect was also highlighted by two of the researchers (who had participated either in the online community or in the final workshop) and by the organisers during the respective interviews:

*“It was a very good experience especially because of the questions that people asked (...) for me it was very cool, especially for that, for the questions that were asked and to be able to explain how science really works, at the end (...) they only see the final part and don't know how it was to reach that point”* (Interviewed CRG Researcher 1)

*“Being able to talk to them directly and see their view of science and their interest, it is awesome, to see the interest they feel and that, of course, we are used to working in science, then it is like our daily life, but for them it is curiosity (...) this impressive interest is great, and of course they make you want to interact and explain more”* (Interviewed CRG Researcher 3)

*“I was surprised by the involvement of the people and the motivation they had in having a say when they were given this space for interaction (...) it is true that it is a very specific format (...) we must not forget that they were paid to do this and I think this is a factor that should be taken into account because it would have been very different if people had come of their own free will as it normally happens in our outreach activities”* (CRG organiser)



In fact, during the *in-situ* observations of the online sessions that took place between CRG researchers and participants from the general public within the online community (Stage 1 of the CRG-PD) it was possible to see a very positive attitude and good disposition on the part of researchers to interact with the public. In all cases it was clear that they enjoyed explaining their research projects and when doubts or concerns were arisen by citizen participants, they answered giving clear explanations, using examples, analogies and understandable language.

On the other hand, answers to the questionnaire from those researchers who attended the stakeholders' workshop (Stage 2) and the final workshop (Stage 3) signalled as main positive aspects the **opportunity to discuss with people from the general public and representatives from companies**, both in terms of addressing topics from very diverse points of view and as a possible way to start collaborations with the private sector:

*"in particular, the discussion with companies' stakeholders allowed us to understand both sides of science, and I think it is a good way to start collaborations with the private sector. Second, the final discussions were really fruitful, and many recommendations were proposed, many of them really interesting"* (Staff scientist)

Two of the interviewed researchers who had participated either in the stakeholders' workshop or in the final workshop also pointed that this opportunity to discuss with other people not directly linked to scientific research was **an enriching experience that contributed to increase their self-reflection**:

*"I didn't have the chance to talk to people from the general public, but I did participate in the dialogue between Principal Investigators, people holding management positions (...) I particularly found it a very interesting discussion, because I had not had the opportunity to talk to people with such different points of view (...) Also, in the group there was a professor of bioethics who asked questions that we almost never have time to think about, that is, it was a very interesting discussion in general (...) they were very interesting discussions for anyone. In fact, I would have done it open to the entire scientific community, this discussion"* (Interviewed CRG Researcher 2)

*"As a personal experience, I think it is an opportunity to contact with people (...) and specially at the end, when we had the general discussion (...) it is kind of very enriching, they have very different ideas than we think, or they think of super different things, I mean as a scientist I wouldn't have thought of (...) I think it is very enriching, and it has changed my perception of how others see us and how I feel about others"* (Interviewed CRG Researcher 3)

As suggested by the organisers during the interview, for those researchers involved only in the community the experience of participating in the CRG-PD might have been less impactful than for those who participated in the workshops with stakeholders, because they interacted in a similar way as in other conventional outreach activities where the focus is on their research topic, they are the experts, and the public is seen mainly as a “receptor”. On the contrary, in the workshops with stakeholders the discussions revolved around more generic topics where people with different expertise could give their opinions and offer other points of view, thus allowing the participating researchers to have a real constructive debate:

*“it is evident that **the experiences were totally different** (...) those who had participated **with the stakeholders** did acknowledge that they had had an experience of exchange and dialogue among all participants, because **there was a construction of a conversation that went beyond the research** (...) on the other hand, **with people [from the general public] they did talk about specific research projects, the researcher was the person who knew about it, and people asked them questions**”* (CRG organiser)

The organisers also pointed out that, although the final workshop with representatives of all the groups allowed having a transversal conversation in which both citizens and stakeholders could contribute their views and suggestions, in order to be able to generate this final debate (in which the citizens also had a broad view about what CRG does) it was necessary and very enriching for them to have the first stage, which allowed citizens to have an understanding about research (and about CRG)

Interestingly, these two types of participation in the CRG-PD (i.e., the asynchronous approach through the online community and the synchronous approach through the workshops) offer different benefits that interviewed researchers consider as important factors for wanting to participate in similar events in the future: on the one hand, the **flexibility** associated to the online community (according to Researcher 1) and on the other hand, the **more genuine interaction** with the general public (according to Researcher 3):

*“what was pretty well for me and I liked is that on the web page where they [participants from the general public] were answering questions, you could see their answers, and it’s much easier because you can interact, but it’s not that I have to answer right now, maybe I have a lot of work and I can’t, but then later on I have 5-10 minutes and I answer (...) yes, it should be this, very flexible”* (Interviewed CRG Researcher 1)

*“interacting with the general public (...) the curiosity and interest they have is awesome, their ideas are very different, and I love this (...) I am especially interested in this interaction with people, in seeing what they think”* (Interviewed CRG Researcher 3)

### 4.3.3. What are the views of citizens and researchers about Open Science after the CRG-PD?

Participating citizens and researchers to the CRG-PD were asked to choose which of the following statements summarised their view on Open Science:

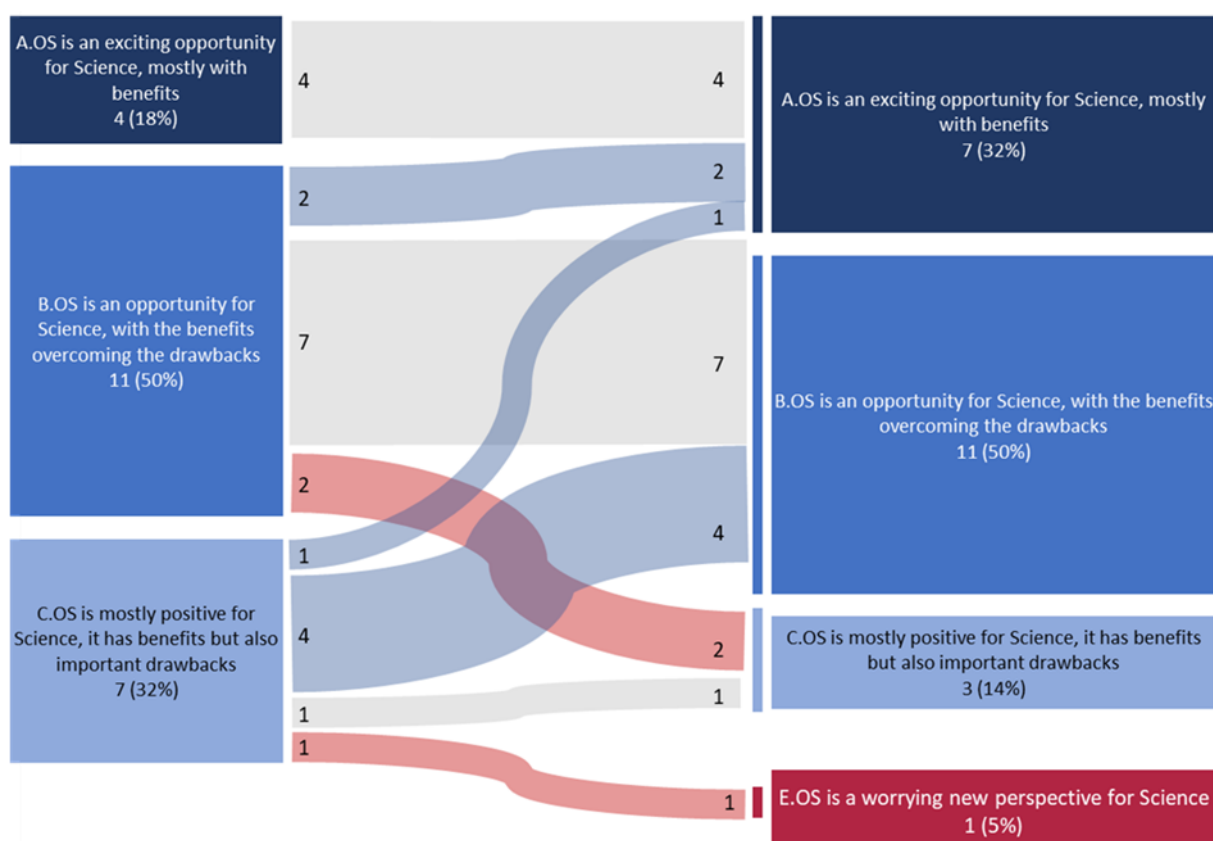
- A. OS is an exciting opportunity mostly with benefits.
- B. OS is an opportunity for Science, with the benefits overcoming the drawbacks.
- C. OS is mostly positive for Science, it has benefits but also important drawbacks.
- D. OS is an unimportant bureaucratic burden for Science.
- E. OS is a worrying new perspective for Science.
- F. OS is a real threat to Science.

Results show that, **prior to the Public Dialogue, OS was perceived as an opportunity for Science among participating citizens** (see Table 9).

| Overall, if you had to summarize your view on Open Science, what would you say? |                                                                                  | % responses (n=32) |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| A.                                                                              | OS is an exciting opportunity mostly with benefits.                              | 19%                |
| B.                                                                              | OS is an opportunity for Science, with the benefits overcoming the drawbacks.    | 44%                |
| C.                                                                              | OS is mostly positive for Science, it has benefits but also important drawbacks. | 38%                |
| D.                                                                              | OS is an unimportant bureaucratic burden for Science.                            | 0%                 |
| E.                                                                              | OS is a worrying new perspective for Science                                     | 0%                 |
| F.                                                                              | OS is a real threat to Science.                                                  | 0%                 |

**Table 9.** Citizens' views on Open Science (prior to the CRG-PD).

When comparing their answers before and after the CRG-PD (see Graph 21), we find that **most people (12, i.e., 55%) do not change their initial view about OS** (as indicated by the fluxes in light grey), and **there are more positive changes** (blue fluxes, corresponding to 7 respondents, i.e., 32%) **than negative changes** (red fluxes, corresponding to 3 respondents, i.e., 14%).



**Graph 21.** Comparison of participants' views (general public) on Open Science before and after their participation in the CRG-PD (n=22).

Researchers were asked in the interview if they think that scientists like themselves have enough **knowledge about Open Science**. While they do acknowledge that the institutes' efforts to promote and inform about Open Science are unquestionable, some of them might perceive a lack of knowledge about the concepts behind and feel that perhaps the information is not reaching some sectors adequately. It is also relevant to highlight that some researchers see Open Science as something not directly related to their research and perceive that the degree of knowledge about these issues is highly dependent on the researchers' personal interest:

*"I think we do lack quite a lot of information (...) we focus a lot on research and in our science, and we leave Open Science very much aside, unless you have a particular interest, because I have friends who really like scientific communication and prioritize it because they like it, but really on the other hand, if it's not one of your priorities, you put it aside a lot, and if you don't want to, you may not get to hear about it throughout your scientific life (...) there are many things that perhaps reach the group leaders, and from them they spread a little more, but those who are lower down it does not reach them"* (Interviewed CRG Researcher 1)

*"I know and I am aware that a lot is being done by the CRG, a lot of work is being done in this direction. On an individual level, I may think I have a lot to learn, I don't*

*know if it's because I haven't shown enough interest, or because I haven't received the information I needed at the moment, but I think I still have a lot to learn"* (Interviewed CRG Researcher 2)

*"I have to say that if being at CRG you don't know about the subject, I don't know, you have a problem, because they send us information continuously (...) from ORION, from communication, we are sent a lot of information about Open Science, how to participate in things, volunteers are constantly requested to participate in a lot of things, so I think the information, at least here at the CRG in recent years, it comes to us, if you are not informed, it is probably because you delete the emails (...) My image is [ORION member's name] saying: "Open Science is not just publishing open articles, it's so much more!", I always have this image (...) for me, I am particularly hyper informed, but I don't know if it is because it is me, but rather it is at the institute level"* (Interviewed CRG Researcher 3)

The interviewed researchers were also asked if they had detected any specific aspect related to Open Science in which they thought they would need to get deeper on. Interestingly, for the researcher with the least experience, the concept of Open Science itself is not clear and raises several unknowns, while the more experienced researcher pointed to data (management, sharing, protection, etc.) since this was perceived as a relevant aspect from their professional point of view:

*"the question for me I think is: what is Open Science, that we talk all the time? What is Open Science for you? (...) I've never had a chance to discuss this, I don't know if it's because the situation has not occurred, or I don't think it's something that is discussed every day, but I think the publishing system itself is a system which is not very geared towards Open Science"* (Interviewed CRG Researcher 2)

*"there is also something else, of course, I am in a computational group, and that for us is very important, which is the data. Data processing is very important to us (...) I think we need to learn to disseminate so that people understand what is done with this data, what it is for, and that they can help us decide what we should do with the data, because of course, the levels of protection are very high, but of course, should data be open?? (...) then, I think this is a topic that we always go around, and I don't know if we and people know enough in fact"* (Interviewed CRG Researcher 3)

#### **4.3.4. What do citizens perceive about their learning and final views regarding CRG research after the CRG-PD?**

Participants to the CRG-PD were asked to rate the event according to how much they agreed with several statements that had been proposed in line with the following four topics defined by the organisers:

- I. Basic research vs applied research
- II. Communication
- III. Funding
- IV. Ethical/Societal concerns related to CRG research

As shown in Graph 22, after the CRG-PD **most participants think that they could explain to another person the kind of scientific research that is carried out at CRG** (91% agree or strongly agree), and in fact 3 of the 22 respondents of the questionnaire indicated they had learnt a lot when asked to add any comment they wished. Regarding their perception of the role of citizens in decision making processes related to scientific research, there is a wide diversity of opinions: 27% of respondents are neutral about the need for citizens to be involved in decisions about scientific research carried out in centres like CRG, and there is the same proportion of those who agree or strongly agree (37%) than those who disagree or strongly disagree (37%) with the need of such an involvement.

Regarding ethical and societal concerns about CRG research, there is a total agreement among respondents on the **need to understand how research works and to know the vision of scientists to have better judgement when making decisions** (100% agree or strongly agree with the statement). On the other hand, there is great diversity on the question on how confident and capable they feel to make judgements about the benefits and risks of genetic research.

Most citizens consider that funding to basic research should be prioritized by centres such as CRG regardless of whether there may be specific applications (45% agree and 36% strongly agree with the statement). When compared with actual applied research, this support is more balanced, as 50% of respondents disagree or strongly disagree (and the other 50% agree or strongly disagree) with the statement “it is normal that research in basic research gets less funding than research in applied science”.

There is also a wide support to the idea that CRG should invest resources in getting private funding and also collaborate with private companies to find and create application opportunities. Citizens’ concerns about funding were also pointed during the online sessions with CRG researchers in the frame of the online community:

*“I am concerned about the issue of funding so that you can continue with your goals, ideas, etc, and that if you abandon an investigation (...) leaving a promising research due to lack of funds, it must be very depressing (participating citizen in session 1<sup>st</sup> Oct. 2020)*

*“It is worrying that a scientist has to be aware of the budget (they must be focused on the work, if they are thinking that this project will not have money...)” (participating citizen in session 1<sup>st</sup> Oct. 2020)*





**Graph 22.** Citizens' responses regarding their perception of learning and change in views after participating in the CRG-PD.

#### 4.3.5. What do researchers perceive about their learning and impact at personal level regarding Open Science after the CRG-PD

When CRG researchers were asked during the interviews about the **main things they gained or learnt** from their participation in the CRG-PD, they mentioned that **interacting with other people** (general public and stakeholders) had **helped them realising that more communication about scientific research to the public is necessary** and had offered them the **opportunity to reflect** and think from different perspectives:



*“I learnt (...) that much more intercommunication with the general public is lacking (...) things that you already take for granted (...) then you see that people don’t know it (...) about public funding, that you must apply for it (...) much of the scientist’s job is to get funding for the projects, and then have to go through a lot of committees until we can access to that at the end, and we also have many internal controls.” (CRG Researcher 1)*

*“what I gained is asking me questions that in my day to day I would never ask myself, and having the opportunity to see a problem from different perspective (...) a little bit of reflection from a social point of view of the scientific community...” (CRG Researcher 2)*

*“the final discussion, when we talked all of us, all these possibilities to do outreach (...) the brainstorming was awesome” (CRG Researcher 3)*

None of the researchers explicitly confirmed that participating in the CRG-PD would have made them learn something that would be useful for their professional life. However, according to their comments, **they did perceive it to be helpful on a personal level**, either by giving them greater awareness of the need for more scientific communication or by changing their views on the debate regarding the investment of public funds for private purposes (such as creating spin offs).

*“not professional, I think it’s more personally, maybe trying to do more scientific communication and also trying to enhance this part, especially now that I’m trying to start my own group (...) I think it’s one of the things that I would like to promote, then one thing is what I would like to do and another is to get it, but for now I have it in here, in my mind. So, this is one of the things I would like to implement after having listening and talked to them” (CRG Researcher 1)*

*“I do basic research and I am very supportive of public science (...) there was a lot of discussion about funding, if public science, the knowledge we manage, can be used to create spin offs (...) I think the overall perception was that very well, go ahead, if you can create a spin off, this was the feeling I had, do it (...) if the money invested in science is useful to create a spin off and then it can be later reinvested in science, everything is positive, it is a win-win. Then, I believe this perception helps me to think as well, ok, maybe if there was the chance, why not? I think that, although I am a public worker, it would be nothing wrong and people would find it right if it is useful, if there is a finality” (CRG Researcher 3)*

Researchers’ answers **when asked if their involvement in the CRG-PD had made them have more interest on participating in activities related to Open Science** show a positive trend, although they reveal certain nuances related to the following positionings:

- Time restrictions and having other priorities might play against an actual increase of participation in activities related to Open Science:

*“I would love to, then I start thinking, you have to spend a lot of time on it, and time is running out, being honest I would love to be able to spend much more time on it, but it is true that there comes a point that I must prioritize”* (Interviewed CRG Researcher 1)

- It is not a matter of interest in Open Science but a duty with society:

*“yes. Also because this year, with all this of the coronavirus, there is so many people communicating scientific concepts without any rigor at all that I am a little bit annoyed... also I feel like starting to explain things well, so that people can understand (...) also it is a duty we have at the end, we are paid also, not only for doing, but also for communicating why we do and which impact it can have in society...”* (Interviewed CRG Researcher 2)

- It is something which depends on the initial interest of the researchers.

*“I can’t tell you if it has increased a lot, because deep down I’m already very pro-outreach, and especially Open Science (...) but maybe yes, I think it’s been a very interesting experience... participating in future events, and related stuff, I think it would be really cool”* (Interviewed CRG Researcher 3)

#### 4.3.6. What are the main limitations of the CRG-PD, according to its organisers?

According to the organisers, the design of the CRG-PD was a **long and intense process** (as described in Deliverable D3.7 “Implementation of the public dialogue to inform CRG’s research strategy”, the event was designed in several co-creation stages, starting with a set of workshops with stakeholders and CRG staff conducted in 2018, and being refined in 2019 by Ipsos MORI and the CRG organisers). One of the difficulties was that **it was a very open, not defined project** and **no similar previous experiences existed** that could help to guide them:

*“... but it was also a strong point, the fact that it was, everything had to be done, everything had to be thought and designed (...) but it was obviously a difficulty”* (CRG organiser)

The fact that **the focus of the CRG-PD was placed on the CRG strategy** (rather than on exploring public opinions about a particular technology which is used by many other research institutions around the world) was signalled as an additional challenge because it might imply a higher level of exposure of the institution to the public:

*“... the objective was ambitious, to do something like this, on the CRG strategy, not on a more generic technology (...) look at us, talk about us, about how we do...”*  
(CRG organiser)

In line with this, the organisers recognise that despite having a broad experience in outreach and public engagement activities in the centre, **the open and direct debate with the public added a layer of complexity** which made the organisation of this event much more challenging:

*“... the CRG is very open in dissemination issues and we always want to go one step further, be innovative (...) here there was an added level (...) not only did we talk to people as we do for example in scientific cafes (...) here there was another layer, which is to influence the strategy, to have an influence on the strategy of the centre”*  
(CRG organiser)

Another limitation from the organisers’ perspective was the **low involvement of senior researchers who were part of the CRG-PD Advisory Board in the co-creation process** to design the exercise. This fact was partly attributed by the organiser to not being able to adequately engage these researchers to make them aware of the importance of their participation in the process:

*“... when we organised the first meeting (...) with the Advisory Board and Ipsos to define the project more specifically (...) it was very frustrating because I think that two or three principal investigators did not attend the meeting”* (CRG organiser)

Finally, the fact that **the CRG-PD (which had been initially designed as a face-to-face event) had to be adapted into an online format due to the COVID-19 pandemic** was also signalled as a drawback. However, despite it caused some upheaval, organisers also point out that it had some positive aspects, such as the fact that it might have facilitated the participation of stakeholders to a greater extent than if the event had been held in person:

*“we had to adapt the exercise and do it online (...) this new online format had to be designed, here the role of Ipsos was key, we also had to validate this entire process with the management, etc. (...) and then it is true that, once everything was set up, it surely facilitated participation, especially of stakeholders (...) maybe it is easier, given the situation at that moment, than booking a whole Saturday as it was originally planned (...) and you save the logistical part of the room obviously and everything that implies”* (CRG organiser)

## 5. Final Evaluation of Funding Calls to promote Open Science

### 5.1. Context and sample

Two pilot calls were organised within ORION WP3 actions to promote the openness of the funding research engine in fundamental research in life sciences. Through these calls, which were extensively described and documented in Deliverable 3.5 “Specification of new pilot funding calls”, the two participating Research Funding Organisations (ISCIII and JCMM) worked to explore integration of RRI principles in funding processes.

ISCIII designed an RRI prize to recognise, encourage, promote, and disseminate best practice examples on RRI aspects developed in 2019 by the 31 Spanish Health Research Institutes. The call was open from November 15, 2018 to January 15, 2019; 26 proposals were submitted and three prizes of 10,000€ each were awarded.<sup>3</sup>

JCMM designed and run a student competition aimed to provide support to master and PhD students from Brno universities with a chance to become more professional in Open Science. The call was open from 2 to 20 of January 2020; 45 eligible applications were received and there were 10 winners (prizes being 5,000€ per student).<sup>4</sup>

A personal interview was done with the organiser of the funding initiatives at JCMM and a small focus group with the two organisers of the funding call at ISCIII. The following table shows the dates in which these were conducted.

| Country/Institution | Interviewee    | Date of interview         |
|---------------------|----------------|---------------------------|
| JCMM                | Call Organiser | 6th May 2019 <sup>5</sup> |
| ISCIII              | Call Orgniser  | 1st June 2020             |

<sup>3</sup> See the [Inspiring Story](#) about the awarded prizes within the ISCIII call.

<sup>4</sup> See the [Inspiring Story](#) about one of the winner projects within the JCMM call.

<sup>5</sup> Additional information was gathered in November 2019.

## 5.2. Starting point of the Open Science Funding Calls

- Co-creation processes developed for the definition of the OS funding calls are novel experiences for the organising institutes, who were able to lead them and use them to define practical aspects of the content of the call.
- The co-creation processes were perceived as positive experiences, with two main perceived benefits related to 1) the strengthening of cooperation, both at external (building networks) and internal (propelling internal cooperation) levels and 2) increase in quality, by incorporating diversity of views.
- To improve efficiency, both institutes made use of supporting structures from their respective organisations, but they also tried and tested innovative ones such as open platforms for open peer review.
- To make the call more effective, each organisation targeted leading audiences in their sector. In both cases, the content of both calls was tailored to their context both in terms of applicants but also in terms of the existing knowledge on OS.
- Both calls included Open Science principles not only as evaluation criteria, but also for the call organisation and selection process, such as open peer-review procedures (JCMM), attempting public involvement in evaluation (ISCIII) and improving communication aspects (both).

The main elements of the ORION Open Science funding calls, which were explored through the qualitative analysis of the call documentation and the interviews to respective organisers, are explained below.

### 5.2.1. Insights regarding the organisation of the OS Funding Calls

#### Co-creation processes used for organising the call

The ORION research funding organisations (RFOs) arranged different co-creation processes to become more porous in the way they promote and fund research. These co-creation processes were addressed to receive input from diverse stakeholders regarding the organisation of a call more in line with the Open Science agenda. The co-creation process of **JCMM** consisted in the organisation of **a quadruple helix of stakeholders** to receive input on how to set up a call addressing local societal challenges. **ISCIII organised two professionally guided co-creation workshops** to create rubrics that would define the criteria and sub-criteria for the evaluation of a Prize on RRI.

| Co-creation process                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISCIII call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | JCMM call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><i>Two co-creation workshops</i></p> <p><i>At ISCIII, 2 stakeholder meetings were organised to define the criteria and sub-criteria for the evaluation of a Prize on Responsible Research and Innovation (RRI) within the ORION context.</i></p> <p><i>The second workshop produced a report that stated 10 key strategic points that should be taken into consideration when defining the criteria and sub-criteria of evaluation of the RRI projects candidates to win the prize.</i></p> <p><i>More info at ORION Deliverable 3.5</i></p> | <p><i>Multiple helix of stakeholders</i></p> <p><i>Basic format of the call was first debate at Smart City Brno Committee meeting on June 21<sup>st</sup>, 2018. Representatives included local government, local universities, private companies, people engaged in social challenge calls. Six domains for the grants were identified: life science, environment, social, economics, technology and medicine.</i></p> <p><i>A quadruple helix meeting took place on October 4<sup>th</sup>, 2018 with the assistance of representatives from the “Ambassadors for Brno Eco-system”. In this meeting the guide for applicants drafted by JCMM was fine-tuned.</i></p> <p><i>More info at ORION Deliverable 3.5</i></p> |

The co-creation meetings were organised to discuss different aspects that would be relevant for each call. Both at JCMM and at ISCIII these co-creation meetings addressed practical aspects related to the format and the scope of the call.

*“It was our initiative to bring again the people together. **And we discussed the format of the call and the debate was on how to define the research domains.** One of the key decisions was that we should open it to all nearly spheres and we define seven research domains which really were covering all the areas or 99% of the areas were the students of the Brno universities could participate in. We tried to make the domains to fit the scope of research activities that are within those participating institutions.” (JCMM organiser)*

*“Two workshops were held. In late 2018 and another in early 2019 with the idea of bringing together different actors. To contribute and to continue advancing on the issue of the importance of RRI and then, well, the work groups that were generated, **with the idea of giving light and ideas on how to develop it....** Putting the different stakeholders to work and seeing a bit of their assessment, their input.” (Organiser ISCIII -1)*

The selection of stakeholders participating in these co-creation experiments was done by each institute (in the case of JCMM, in coordination with the ORION consortium) by using mostly their own professional contacts-list and according to their own needs. Despite at different levels, for both funding institutions **there was novelty and a sense of richness** associated to this process of involving actors more than the usual in the co-creation effort of



defining the calls. This novelty was associated also to the profile of those involved, by explicitly including diverse internal professional profiles closer to the final users of the call (ISCIII) or the fact of involving external stakeholders not usually involved (JCMM).

*“The people we invited from the quadruple helix, so the representative of the academia, business, NGO’s, politicians... **upon our contacts and experiences we built this group, at some point there were even surprised that we asked. Because usually, in the past, we didn’t ask anybody.** We organised it our own, and we didn’t you know we didn’t have any need to contact anybody else. Because this is the way we do it and that’s it. And **I think at some point they were quite surprised that they were given this opportunity to sort of form this call and contribute in this debate**” (Organiser JCMM)*

*“It was us together with ORION, with the coordinators (on who decided who the stakeholders that would participate were). So, we were looking a little at the contacts **and choosing different profiles with the idea that they were contributing different values**, right? So, it was not the facilitator who did it but us because of our experience and contacts.” (Organiser ISCIII -1)*

*“Because especially in the 2nd meeting what we did was to **try to invite different profiles within the same institution**, that is, within the bio sanitary research institutes. With the idea that they were from the strategic level and organisation (that decides how to do things) but also researchers or administrative staff [because they] are the ones that are going to develop it and the ones that are going to have a more day-to-day vision. [And the ones who know] more whether things can be done or not. So, what we did was to make a selection of the different roles, within a health research institute ... with the idea of receiving feedback from these different roles. That helps you... (To see) the problem or the situation that the organisational management of the institutes has but also **the possibility of seeing the researcher or the administrative, how can they see or make this a reality.**” (Organiser ISCIII -1)*

In the case of JCMM, the co-creation process of the call allowed the institute to enrich their network of useful stakeholders. They had to get more in touch with relevant stakeholders and they have maintained this network for other actions outside the call.

*“[despite] the very first step was actually not our initiative **it helped us a lot to get in touch with this people.** We are already in touch [with them] due to other activities... **we had to get in touch with these [stakeholders] that are most important to us.**” (Organiser JCMM)*

In the case of the ISCIII, the co-creation process also had an impact in terms of strengthening collaboration mostly at an internal level.

*“At the internal level of the ISCIII structure, what [the call] has done, which is normally a very difficult to do within a public institution such as the ISCIII, **is that it has been collaborative internally, between the evaluation sub-directorate [...] and the international sub directorate.** [...] this has made that many more people within the institution have heard of RRI” (Organiser ISCIII -2)*



In addition to extending both the quantity and way of relating with their existing network, both JCMM and ISCIII organisers valued this experience as a very enriching opportunity regarding the improvement in terms of quality and/or content of the call.

***“I think it’s positive cos you know, anyone who is involved can have a say how it should look like, this is the first positive feature”*** (Organiser JCMM)

***“It was enriching because leaving your job site sometimes makes you think different things and especially when what you are asking for is that they give you information. [...] So, these two actions done with this person who was quite dynamic made us be able to pick up aspects that otherwise we could not have incorporated.”*** (Organiser ISCIII-1)

## Support structures used by institutions to organise the call

To improve efficiency, both institutes made use of their previous professional experience and supporting structures from their respective organisations.

| Support structures                                             |                                                                                                         |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| ISCIII call                                                    | JCMM call                                                                                               |
| <i>Institutional procedures</i><br><i>Administration staff</i> | <i>Resources from previous PhD programmes and SOMOPRO project</i><br><i>Existing pool of evaluation</i> |

JCMM organisers claimed that one of the reasons to participate in the call was to already count with a set of resources they could re-use from previous PhD programmes and international projects that were similar, particularly regarding a database of experts who could help with the evaluation procedures.

***“we have a similar experience with the previous programmes. One of them is the Brno PhD program, where we support the PhD students and the other one is the SOMOPRO, the programme for the experience researchers, the postdocs... (...) for me one of the advantages is that we have this pool of experts that already work with us (...) they understand what we are doing and why we are doing (...) cooperation with them is very smooth and very beneficial for all of them. (...) Yeah, we have around 300 hundred. Yeah, we have a database that we have been building over 10 years.”*** (Organiser JCMM)

However, involving these experts in the actual elaboration of the call implied much longer collaborations than usual. This meant devoting much more effort and time and establishing deeper relationships.

*“[the first meeting] was the only face to face meeting. But we also were in touch with the people through emails and phone. We came up with the conclusions and we sent them the conclusions. And they said ok that’s fine... **we thought on get in touch for a certain period in time...** until we produce the full text of the call.” (Organiser JCMM)*

In the case of ISCIII, however, despite benefitting from their previous experience in the funding field, they very explicitly wanted to really embrace a new way of doing things and design an innovative initiative, so they decided not to follow premises of what is normally done at the institute.

*“**We are absolutely different from that** [regular ISCIII grants] first, because we are not offering the same money. The economic amounts. But not only for that, but because [our normal subsidies] are identified with absolutely regulated administrative processes, marked in a completely closed thing, which are a little ... not that they are not transparent (they are transparent in terms of what the admin does). [but] they are not so flexible. It was necessary to represent a very large differentiation between what is normally done in ISCIII with subsidies and what we wanted to do (...) **it was understood that this was a much more participatory thing, much more open, much more in line with the RRI, (...) while still being institutional, but more open**” (Organiser ISCIII - 2)*

As such, new structures such as external moderation were used in a satisfactory way.

## 5.2.2. Insights regarding the criteria of the OS Funding Calls

To make the call more effective, each organisation targeted leading audiences in their sector or in their stakeholders’ network by developing explicit criteria for their calls.

| Call eligible institutions                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISCIII call                                                                                                                                                                                                                                                                                                          | JCMM call                                                                                                                                                                                                                                                     |
| <i>The contest is open to all accredited IISs and their assigned personnel, with the scope and degree of participation deemed appropriate (IIS as a whole, area/groups of research, interdepartmental multidisciplinary groups with citizen participation, etc.) in the development of the RRI action presented.</i> | <i>Partner universities were the Brno University of Technology; Masaryk University; Mendel University in Brno; University of Veterinary and Pharmaceutical Sciences Brno; University of Defence and Janáček Academy of Music and Performing Arts in Brno.</i> |

ISCIII organisers decided to open the call to a reduced number of research centres (in this case, only to accredited health research institutes in the country) to target the leading institutions in their field of work that could be setting an example.

*“The other main focus ... to inscribe the health research institutes. Which can seem just a few, because it's 31 and we could have done even an international call... but it is the opposite. **It is to hit exactly the target of the objective we want. Because health research institutes are the flagships of biomedical research in Spain.** In some way it is to whom people copy, of what they are doing. So, it's like going to the hard core of research. **If we awaken the interest and awareness about RRI in them ... great successes.**” (Organiser ISCIII-2)*

In the case of JCMM, despite discussing other possibilities, the call was only open to the public universities of the city of Brno, which are funding members of their organisation and the eligible institutions in their other calls. Interestingly, their discussions were in the line of what are the limits in how open (to what institutions, for instance) should be an open call...

*“**I remember there was sort of a funny debate also there are private universities, in Brno... someone suggested that they should also participate... this are not our funding members.** The eligible institutions, these are long term partners of our institution and of JCMM” (Organiser JCMM)*

### 5.2.3. Insights regarding the content and structure of the OS Funding Calls

In both cases, the content of both calls was tailored to appeal as many applicant researchers as possible and taking into consideration both their context in terms of needs and their context in terms of expertise of their potential applicants.

In the case of JCMM, the call focused on co-creation processes built around local societal challenges (of the South Moravian Region and/or the city of Brno) and, therefore, it included several research domains that could fit within a co-creation project. Those were extensively discussed and finally included: life science, environmental, social, economic, technical, or medical. Interestingly, there were no topic restrictions: students could have a theme of their own choice. This approach was preferred due to the broad focus of the competition and involvement of different universities.

*“One of the key decisions was that **we should open it to all nearly spheres and we define seven research domains which really were covering all the areas or 99% of the areas were the students of the Brno universities could participate in. We tried to make the domains to fit the scope of research activities that are within those participating institutions.**” (Organiser JCMM)*

At ISCII, 6 types of participation categories were defined corresponding to the pillars of RRI, including ethics, gender equality, governance, open access, public engagement, and

science education. However, how these categories were understood was flexible, taking into consideration that for some institutes RRI was quite new.

*“[categories] included some of the RRI areas ... **there, we also gave them a little flexibility, let's say ... as this was a start, as there are concepts that are still not clear within the institutes, about what is RRI and what is not (...)** There are some institutes that are already very advanced in the knowledge of RRI and others that are not so much. So that most of them could fit... **so that there would be as much participation as possible.**” (Organiser ISCIII-2)*

#### 5.2.4. Insights regarding the evaluation procedures of the OS Funding Calls

The evaluation procedures differed slightly between the institutes, as we can see in the box below.

| Evaluation criteria                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISCIII call                                                                                                                                                                                                                                                                                                              | JCMM call                                                                                                                                                                                                          |
| <u>Project evaluation score range</u> <ul style="list-style-type: none"> <li>Objectives and methodology 5 points</li> <li>Scientific integrity 5 points</li> <li>Impact 10 points</li> <li>Efficiency and effectiveness of the total activity and its design: Objective/s achieved 5 points</li> </ul> TOTAL = 25 points | <u>Project evaluation score range</u> <ul style="list-style-type: none"> <li>Applicant score 30 points</li> <li>Project score 50 points</li> <li>Team and facilities score 20 points</li> </ul> TOTAL = 100 points |

Both calls were evaluated through an Open Science lens, giving importance to the OS and RRI aspects explicitly included in the presented research projects. However, the weight given to open science in both calls was different. In general, OS and RRI was not included in the parts of the evaluation evaluating the applicants' profiles, where more standard evaluation procedures based on traditional objective evidence, such as qualifications or grants, were used. The well-known difficulty of how to include OS criteria also in the evaluation of the professional quality of research candidates and teams is something not deeply tackled in this very first attempts to introduce OS by funding institutions.

At JCMM, the 50% of the final evaluation score would take into consideration the quality of the project itself, including explicitly OS aspects such as the social impact of the project and co-creation aspects of it. The remaining of the score took into consideration the quality of the applicant's profile (30%, including qualifications and awards) and that of the research team and facilities (20%, including the research institution, supervisor and expert consultants). Interestingly, regarding the supervisor the call included explicitly some criteria about open science or related activities, which shows that it was acknowledged the

importance of choosing projects who were based on a research environment/team that was at least open to opening.

The evaluation criteria at ISCIII, which were addressed to well-recognised top-leading institutions, only took into consideration the project itself. Specifically, it would give 5 points to the objectives and methodology of the project, 5 more to its scientific integrity, 10 points to its impact and 5 points to efficiency of the activity and its design.

Both calls included Open Science principles in the call organization and selection process, such as peer review procedures, active public involvement in the review procedures and rich communication strategies.

| Open Science elements in evaluation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISCIII call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | JCMM call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><u>Descriptive video about the action</u></p> <p><i>Proposals must be accompanied by a descriptive video on the action presented, structured around the following information:</i></p> <ul style="list-style-type: none"> <li>• Main idea (s) behind the action / justification</li> <li>• Framework of the action / location / level of action</li> <li>• Perceived impacts / conclusions</li> </ul> <p><i>The purpose of the videos is to publicise the actions, as well as to publicise the RRI awards mainly to the general public, so the language used must be accessible, easily understandable and with little technical content. Ideally, anyone regardless of background should be able to see the benefits of the action. If there is a specific target of the action, it can be incorporated.</i></p> | <p><u>Open peer review of applications</u></p> <p><i>Adhering to the principles of OS ourselves, we have provided the scientific community &amp; public with the possibility to get acquainted/comment the project proposals on one of the open peer review platforms “Authorea”. Neither the identity of the students nor their teams have been revealed, only the part describing the “co-creation projects” were up-loaded to the page. They can be visited at:</i></p> <p><a href="http://www.authorea.com/users/256183">http://www.authorea.com/users/256183</a></p> |

In order to adhere the principles of Open Science to the call, JCMM set up an open peer review system, through the platform [Authorea](http://www.authorea.com) as a way to provide the scientific community as well as the public with the possibility to get acquainted/comment the project proposals (without revealing the identity of contestants). However, due to its innovative, test-like nature, this evaluation part was not compulsory.

*“Yes, the one thing we have done differently is that we tried for this one month the open peer review, actually it was a test drive. It was a test. So, we, after all the eligibility check, we took the proposal and the proposal had three parts. The description of the participant, the co-creation project itself and then, the teams and facilities. And we took the middle part, which actually, you know, cut the first one and*

*the last one, it was anonymised, and we uploaded it to the Authorea system (...) **we uploaded of all this 45 co-creation projects and, as the webpages completely open, anyone can comment it on.***” (Organiser JCMM)

Despite the interest of the JCMM organisers to test this new form of evaluation, they realised that the chosen platform had strong limitations to involve the general public due to the fact that it is mostly a platform for researchers:

*“What is important to say, is that, you know, actually there is probably no platform that would perfectly suit this requirement because as the name suggests it’s a platform where people can upload their article, preprints or manuscripts and they, these articles are exposed to comments from people of these scientific communities. So, what I wanted to say, so we use it but, probably, the format was not the best one. (...) But, for the, well, it was a test.”* (Organiser JCMM)

ISCIII also made efforts to adhere the principles of Open Science in the evaluation process by asking candidates to shoot a video pitching their projects that would be able to be accessed through an open access portal such as *Youtube*. It was asked that the video would be in line with the RRI principles of the call. In addition, it was expected to be desirable and enjoyable for non-experts (with understandable content for the general public) and that it could be included in the repository of ISCIII. For the organisers of the call, this video was highly valued:

*“[the best part of the call was] That they contributed with an explanatory video of their project, this also seems to me one of the best things the prize has. Yes, it is somewhat open. That your dossier is available on social networks for everyone.”* (Organiser ISCIII - 2)

In addition, organisers at ISCIII aimed to incorporate citizens not only in the prize evaluation process as active juries, but also in other calls of the institution. However, this was not possible due to global COVID-19 pandemic situation.

*“the person in charge of managing the strategic relationship in health, has already wanted to incorporate citizen participation in the decision of the subsidies of the strategic action in health itself (...) We would have wanted to do a more open thing in what is evaluation of the jury and we have not been able to... have citizen representation within the jury”* (Organiser ISCIII-2)



### 5.3. Insights from the organisation of the Open Science Funding Calls

- The main impact of the call is in the involved participants, both applicant-researchers and organisers from funding institutions.
- For applicant-researchers, the organisers consider that the call, by valuing new aspects of their work (such as communication with the public) helps them to change towards OS.
- In addition, organisers consider that participating in the call helps them in their future work of introducing OS in funding by providing actual examples about how this can be done.
- Despite organising a funding call within the OS perspective, not all funding institutions had the same level of knowledge on OS at the beginning and they continue to hold different views at the end.
- Organisers think higher management at their institutions has been supportive of the ORION OS funding calls.
- The overall view is that these sorts of calls, despite requiring extra funding, have shown to be feasible in their institutions.
- Enough funding to support OS calls is critical and the most limiting factor, not only regarding the actual funding scheme for researchers but in order to cover the extra time and support institutions need to make funding calls more open.

#### 5.3.1. Perceived impact of the calls: general assessment

Both organisers referred to the networking advantages the call prompted them to develop, which has been already mentioned.

Another aspect mentioned as impact is the perception that funders have regarding changing the playing field and triggering a change in culture in their natural applicants, by involving them in a call that pull them out of their comfort zone. According to them, this effort they have done would make future attempts of OS funding calls much easier.

*“The difficult part of the job was to arouse interest. **Now that you have already got people [researchers applying] to make that change**, that everyone talks about it, and that they also understand that the way of presenting themselves within this project is different, that they have to value communication within it. Well, once you have achieved that, which is difficult, **you can get more out of it**” (Organiser ISCIII -2)*

In addition, organisers also refer to the benefits of the call for organisers themselves, in the sense that they have done something that can be exemplary for other organisers.

*“**We have given an example of what can be done.**” (Organiser ISCIII -1)*



In terms of impact in the knowledge of Open Science of the participating funding institutions, however, results are not so positive. The concept of Open Science and RRI at JCMM and ISCIII was quite different at the beginning of the call and, despite both institutions have learnt a lot in terms of processes and techniques and have been able to conduct successful calls, they continue to hold views of Open Science at a similar level than at the beginning.

For example, at JCMM the concept of Open Science held by organisers was quite naïve at the beginning (due to lack of promotion of OS in their country) and it was not very enriched by the call. Their view of OS continues to be related with knowledge about science or the way science works, rather than efforts done to challenge the traditional way science works.

*“Well in our perception is that we’ve been doing open science [because] we are giving the opportunities to students and young people to see what science means. The activities that, you know, make you a future science [what students do when they win a scholarship] sort of corresponds in a way, how the researchers act. You know, they first get to know the subject matter. Then they do the experiments and then they produce and article. So, we offer the students a simplified version of what the life of scientists’ means.” (Organiser JCMM)*

At ISCIII, on the contrary, organisers hold a quite mature idea of Open Science from the beginning, which they still hold at the end. However, it is not clear how this Opening of the research engine experience has contributed to their own view of OS.

*“Because I think it is essential, in a world that is changing and that tends to make everyone participate in everything ... it is very important that science also participates in this opening. That it cannot be that science is done as it was done before culture was done, in a lost abbey ... and the rest of the world cannot find out about it unless they are investing a lot of money. In other words, science cannot be impermeable. Science has to be as permeable as culture and the rest of things. Science is done to improve the life of the citizen and of society. It is not done for the pleasure of the researchers themselves. And after all, science is still a product, in most cases, it is financed with public money. So, there is this obligation to do it. Citizens would like to know how many good things are done in research. And that would also make work much easier for all scientists.” (Organiser ISCIII - 2)*

### 5.3.2. Main limitations of organising Open Science calls at funding institutions

During the interviews with organisers there was only one aspect which was identified as a limitation, and in general there is a very positive view regarding the organisation of the call. For instance, organisers think higher management at their institutions has been quite supportive of the ORION funding call.

***“The involvement of the management, the spirit they showed was of great interest. And the director was involved, and that it is not easy for the director of an institute like Carlos III, to get involved in such a small project”*** (Organiser ISCIII - 2)

***“It does show when a management level person has clear ideas and wants to move things, because you go much easier than when that perspective is not clear.”*** (Organiser ISCIII -1)

***“The most important impact so far... is that what I have heard [from the staff working with the Director], he said [that] if it works well, this call and the student projects are a result of good dissemination and they are happy with it, he said that if this works well, he will be willing to fund money for another call like this.”*** (Organiser JCMM)

Moreover, both funding institutions consider that despite the aspects that could not be achieved (such as public peer review or public involvement in the evaluation process), the OS calls worked really well and have demonstrated that they are viable and feasible in their institutions.

***“I think it is viable, that it is feasible. But it does not depend on us ... I think this example will be taken into account and if it is feasible, we will keep it.”*** (Organiser ISCIII-1)

***“if we get the funding, we can do an activity we are supposed to do based in the project... it has worked well. Of course [...] it is our opinion that it worked well. Hopefully it's also the opinion of the others that it worked well from their perspective...”*** (Organiser JCMM)

As such, the most limiting factor for further efforts of OS calls identified is the aspect of funding. For the organisers funding is crucial, as these sorts of calls will only be feasible if there is enough economic support not only regarding the actual funding scheme they promote (economic amounts for scholarships or prizes) but also regarding the extra time and effort that is needed from their institution to co-create a call and evaluate it openly.

***“it depends whether [the Director] can arrange some money from the local government, from the regional government, or if we generate some money from the universities or we have from someone else or we are authorised to use this money in a different way.”*** (Organiser JCMM)

***“What depends on it being feasible? Of resources. There is an economic issue (...) you involve people who have to be dedicated to it. Resources are scarce in most institutions. Then, endow the prize, even if it is small ... but well, it is rather I believe the dedication of time that involves articulating all this, having people who can follow it. Find evaluators, it requires a lot of time. It's a matter of resources.”*** (Organiser ISCIII -1)

## 6. Final Evaluation of the Citizen Science initiatives

### 6.1. Context and sample

As part of the open experiments' strategy for ORION of WP3, a call for the promotion of innovative Citizen Science projects in the field of Life Sciences was launched<sup>6</sup> to support initiatives that enable scientists and citizens to work together with the ultimate goals to 1) generate new scientific knowledge and 2) create bridges and new collaborative opportunities between citizens and scientists. The design of this call has been extensively documented and described in Deliverable 3.4 "Design of the Citizen Science call".

The call was open to researchers working at the four research institutes that participate to the ORION project, namely the Centre for Genomic Regulation (CRG), CEITEC, the Babraham Institute (BI) and the Max-Delbrück Center for Molecular Medicine in the Helmholtz-Association (MDC). Proposals to be funded were expected to engage citizens regardless of age, gender or social background, and could also involve individuals or societies with specialised knowledge or expertise.

A total of 5 proposals were submitted from two of the organisations, three from MDC and two from CRG. There were two winning projects, GENIGMA and SMOVE, which are being carried out in close collaboration with ORION staff at the Communication / Public Engagement departments of the host research institutes to facilitate the effective outreach to society.



**GENIGMA**, led by CRG, is a project aimed at developing a game for smartphones to explore the genomic alterations in cancer cells. The idea of the game is the result of a collaboration between the scientific team and a group of citizens who have participated in co-creation events previous to the game development. The project started in January 2019 and the game is expected to be launched at the end of September 2021.

More info can be found in Deliverable D3.10 "Multistakeholders Citizen Science projects" and on the [website](#)



**SMOVE** (Science that makes me **MOVE**), led by MDC, is a project aimed at researching the relationship between environmental influences and sedentary behaviour. The project is developed by researchers in epidemiology and nutrition and involves the participation of 152 schoolchildren from Berlin and Brandenburg. SMOVE started in June 2019 and the study is still ongoing (the data entry phase is expected to be finished by August 2021).

More info can be found in Deliverable D3.10 "Multistakeholders Citizen Science projects" and on the [website](#)

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<sup>6</sup> [ORION CS call guidelines](#) (last accessed 30/06/2021)

| Project | Event / participants                                   | Date                  |
|---------|--------------------------------------------------------|-----------------------|
| SMOVE   | Practical field phase – 2 school classes (33 students) | Feb. – Mar. 2020      |
|         | Practical field phase – 6 school classes (77 students) | Sep. – Dec. 2020      |
|         | Practical field phase – 4 school classes (42 students) | May 2021              |
| GENIGMA | 3 co-creation events (120 people)                      | Jan. – Apr. 2019      |
|         | Analogic prototype playtest (23 people)                | May 2019              |
|         | First digital prototype (150 people)                   | Oct. 2019             |
|         | Event with genome researchers (12 people)              | Nov. 2019             |
|         | Beta version presentation (30 people)                  | Dec. 2019 – Jan. 2020 |
|         | Set of online playtests                                | Jan. 2021             |
|         | Online participation sessions (150 people)             | Apr. 2021             |

In the context of this call a series of interviews were undertaken. Initial interviews to key people of interest included interviews to the organisers of the call in each ORION RPOs. In addition, once the research winning teams of the call were identified, different interviews were done both to researchers and public engagement (PE) experts of the two winning institutions, at an initial and at the final stages of the process. The relation between institutes, respondents and the date of interviews is shown in Table 10.

| Institution                 | Interviewee                                    | Date                       |
|-----------------------------|------------------------------------------------|----------------------------|
| <b>BI, CRG, CEITEC, MDC</b> | Call organisers of each institution            | July 2018                  |
| <b>MDC</b>                  | Researcher 1 (initial moment)                  | 9 <sup>th</sup> Oct. 2018  |
| <b>MDC</b>                  | Researcher 2 (initial moment)                  | 9 <sup>th</sup> Oct. 2018  |
| <b>CRG</b>                  | Researcher 1 (initial moment)                  | 11 <sup>th</sup> Oct. 2018 |
| <b>CRG</b>                  | Researcher 2 (initial moment)                  | 11 <sup>th</sup> Oct. 2018 |
| <b>CRG</b>                  | Senior researcher (initial moment)             | 24 <sup>th</sup> Apr. 2019 |
| <b>MDC</b>                  | Public Engagement (PE) expert (initial moment) | 4 <sup>th</sup> May 2019   |
| <b>CRG</b>                  | Public Engagement (PE) expert (initial moment) | 29 <sup>th</sup> May 2019  |
| <b>CRG</b>                  | Researcher 1 (final moment)                    | 3 <sup>rd</sup> Mar. 2020  |
| <b>CRG</b>                  | Researcher 2 (final moment)                    | 7 <sup>th</sup> Mar. 2020  |
| <b>MDC</b>                  | Researcher 1 (final moment)                    | 8 <sup>th</sup> Apr. 2021  |
| <b>MDC</b>                  | Public Engagement (PE) expert (final moment)   | 7 <sup>th</sup> Jun. 2021  |
| <b>CRG</b>                  | Public Engagement (PE) expert (final moment)   | 10 <sup>th</sup> Jun 2021  |
| <b>CRG</b>                  | Senior researcher (final moment)               | 7 <sup>th</sup> Jul. 2021  |

**Table 10.** Relation of institutes, respondents and dates of interviews considered for the evaluation of the ORION Citizen Science Initiatives call.

Thus, the evaluation of both projects presented in this report has been performed from the viewpoints of the call organisers and the participating researchers and Public Engagement experts. Although two questionnaires were designed (as shown in Annex III) with the purpose of evaluating the impact on other stakeholders involved in the initiatives, such as participating students, gamers, etc., no data from these groups has been included here. Reasons involve the difficulty in data gathering, due to the pandemic situation, for the initiatives involving schools and difficulties related with having comparable data between both CS initiatives. However, results about the impact on public participants are included in Deliverable 3.10 “Multi-stakeholders Citizen Science projects”.

## 6.2. Starting point of the Citizen Science call

- Despite a very wide range of dissemination strategies have been used at research institutes to promote participation in the Citizen Science call, particularly the calendar but also the timing of the call have shown to be of utmost importance in order to get enough research applicants.
- Regarding the target applicant, the Citizen Science call is considered a good opportunity for junior researchers due to its relatively small size and budget. However, the eligibility criteria related to contract stipulations and support of senior PIs might have hindered participation for junior researchers.
- There is strong appreciation of the effort done in simplifying the application process of the call, with application forms and procedures being simple, short, and clear enough, except for those aspects related with EU H2020 and ethic requirements.
- The evaluation procedures were clear for most participants and organisers, giving enough importance to the Citizen Science component. According to organisers, there is room for improvement regarding the possible involvement of citizens in the project evaluation procedures.
- In the initial stage of the process, researchers have found challenging to participate in co-creation experiences related with the call, such as the initial negotiation/adaptation phase to help improving the original proposal towards more participatory Citizen Science.
- Organisers of the call believe Citizen Science is quite a new concept for researchers, which makes it difficult for them to design an interesting project, particularly in fundamental research.
- Researchers don't think they receive enough training about Citizen Science and believe there is a general need to increase it.
- Both researchers and organisers think there is a lack of examples of how successful Citizen Science projects look like, particularly in fundamental research.

The main elements of the Citizen Science call, which were explored through the qualitative analysis of the call documentation and several interviews to organisers from the 4 ORION RFPOs, are explained below.

### 6.2.1. Insights regarding the organisation of the Citizen Science call

Considering that the call addressed small projects of Open Science in very competitive, high quality Life Sciences institutes, organisers were aware that promoting participation was really a challenge. As such, they tried different dissemination strategies to promote the interest and participation of scientists. Those are summarized in Table 11.

Despite the different dissemination strategies, the number of applications received per institute to the ORION Citizen Science call was rather low: none at BI and CEITEC, 2 at the CRG and 3 at the MDC. These among other reasons made the evaluation to try to go deeper in identifying possible causes. Both organisers and applicant researchers were asked to discuss the way the call was organised, including its focus, general process and the criteria and evaluation procedures followed.

| Dissemination strategy                                                                                             | Stakeholders who used it |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|
| Informative email about the call send to all institute (or to targeted stakeholders within the institute)          | BI, CRG, MDC             |
| Presentations about the call in either regular meetings or to targeted stakeholders                                | BI, CRG, CEITEC          |
| Individual discussions with targeted stakeholders                                                                  | CRG, CEITEC              |
| Others: Drop-in sessions at institute common spaces, handing out of project posters, publication of articles, etc. | All partners             |

**Table 11.** Summary of dissemination strategies followed by ORION partners to disseminate the call for Citizen Science projects in fundamental research in biomedicine.

### 6.2.2. Insights regarding the criteria of the Citizen Science call

#### The eligibility criteria of the Citizen Science call

Organisers and research applicants agreed that the call seemed to be a good opportunity for junior researchers to apply for a grant, considering its relatively small size and budget in the context of life-sciences research, and the fact that there are not so many possibilities to apply for funding at a junior stage in the scientific career.

*“What we were hoping to achieve is basically that **with this call we can provide with an easy way into citizen science with our junior scientists**. It was kind of clear to me that we couldn’t get the super senior scientists to go for this still quite small pool of money when we consider what life science research costs.”* (MDC organiser)



However, the eligibility criteria (specifically the time scale, contract stipulations and the need for the support of the PI, as specified in the box below) might have hindered the potential of the call to attract junior researchers.

#### Citizen Science call eligibility criteria

- The call is open to researchers working at the four research institutes that participate to the ORION Project, namely the Centre for Genomic Regulation (CRG), CEITEC, the Babraham Institute (BI) and the Max Delbrück Centre (MDC). **Researchers should be hired by the institutions for the full duration of the project.**
- **Projects need to be supported by a Principal Investigator**, but they can be run by researchers at different career stages with commitment until the end of the project.
- Projects shall be carried out in close collaboration with the Communication/Public Engagement department of the host research institute to facilitate effective outreach to society.
- The Project shall start in November 2018 with a maximum duration of 2 years, until October 2020. It will not be possible to grant a project's extension as the funding is linked to the ORION project with a specific timeline

*"The criteria of having a contract with the institutes for at least the whole run. Because I think a lot of our PhD students are only having 3 year PhDs so than having a two and a half year contract basically left... they are not too many of them... and the same for some postdocs. **They might only have funding for one or two years so they were not able to apply for the funding call because they would not be able to commit to a two years project.**" (BI organiser)*

*"And **it would also be a good opportunity for a PhD thesis and then it's too short for a PhD**" (MDC Researcher – 1)*

*"If the PhD or postdoc were approaching, **they had to be available together with the PI.** I was stressing that it was ok but not mandatory. We disagreed in this point." (CRG organiser)*

The fact that the call was nonspecific regarding other eligibility criteria (such as conditions to hire external collaborators, etc.) was also highlighted as having a dual role. Despite some researchers found refreshing to have the freedom to design the project as they like it, they were worried it was unclear for them what was actually possible and eligible.

*"The criteria we have to follow to select and hire people for the project. External collaborators, for example. (...) **it's really not clear.**" (CRG Researcher – 1)*



***“I think it was a bit non-specific, but I think that that also gives us the chance to write whatever we want. Not whatever we want but to be more flexible, to talk about other things”*** (CRG Researcher – 2)

## Calendar, timing, and deadlines of the call

The calendar and deadlines of the ORION Citizen Science call were agreed by all ORION participating partners, considering the restrictions and compromises of the official ORION calendar.

### Citizen Science call Timetable

- *Date of publication: 21<sup>st</sup> February 2018*
- *Deadline: 30<sup>th</sup> April 2018, at 15:00 Central European Time (CET)*

Despite having agreed on this timing due to organisational issues (ORION had its own calendar and deadlines that need to be followed), most organisers believed the calendar and timings of the Citizen Science call were not the best, as this was set at a very busy time at research institutes due to competition with other national and international calls. This fact might have made scientists prioritize other calls with a more traditional purpose and higher budgets. In addition, some organisers think the deadlines given were not long enough, considering the effort this sort of call demands from researchers.

***“It was a really busy period for a lot of our group leaders with regards to grant applications they had to write, so then they preferred, they had to focus on that bigger grant proposals for the research projects, and also, they didn’t feel they had the capacity to think about the citizen science on the side.”*** (BI organiser)

***“The other PI senior, they have no time, they say [they had to invest in] the other proposals (...) the timing was very short and they had things to do”*** (CRG organiser)

***“I think our success rate in terms of recruiting scientists to apply would have been much higher if we would have much more time for the call, for the application process, for you know getting people. And also, the period of time where the call was open, the time of the year was not the best.”*** (MDC organiser)

Taking this into account, the calendar for launching an OS call like this needs to be carefully thought and adapt to local constraints. Different options, from “year-long” open calendars to

trying not to conflict with existing important funding programmes, have to be considered and explored in the future.

### 6.2.3. Insights regarding the content and structure of the Citizen Science call

A very carefully thought aspect of the call was the design of its content and structure. Efforts were done to provide an innovative call that reduces the complexity commonly found in scientific funding, which generally places a very demanding overload to applying scientists and institutions.

#### Proposal structure

- *Principal investigator*
- *Abstract*
- *Excellence a) Hypothesis and objectives b) Citizens' engagement*
- *Implementation a) Methodology b) Collaboration c) Description of communication strategy and main activities d) Budget and cost breakdown*
- *Impact*
- *Authors*
- *Ethical issues*

Research applicants and some organisers of the ORION Citizen Science call stated that they appreciated the application forms and procedures (described in the box above), for being simple, short, and clear enough. This gave them freedom to apply on their own (without too much administrative help) and concentrate their efforts in the important aspects of their project. Researchers highlighted the idea of an adequate investment-benefit ratio, that it is not the general case in big, extremely competitive calls. In addition, researchers found that the deadlines of the call, considering that the effort demanded was not so big, were reasonable enough.

***“And now this was really nice short and it was doable you know, like because it was like 10 pages on something, so this is what I liked about it as well, so if it’s not that big actually you can work on it yourself and don’t need this liaison officer or whatever.”*** (MDC Researcher – 2)

***“I think it was quite good so it was straightforward. You knew exactly what it needs to be in the project proposal and so on.”*** (MDC Researcher – 1)

***“I think the application process was so easy that was really that we had this basically 5 page application proposal structure that was very easy for people to apply. That was really like a very quick and easy way to get people thinking about this. I mean, people didn’t have to put that much effort. I mean, if it’s good. Because if you put***

*a lot of effort into something that is super competitive, because we are only awarding two. Then it's not so cool, basically.” (MDC organiser)*

**“Positive, easy to write, easy to put all together, deadlines more or less reasonable.” (CRG Senior researcher)**

Despite the general good perception of both researchers, engagement professionals and organisers regarding the call, some researchers mentioned issues regarding the EU documentation to prepare and other non-scientific aspects of the proposal (such as ethical requirements), that were expected to be done according to the H2020 regulations (because of being part of ORION) despite not being an H2020 project. Although this was easily overcome by researchers with the help of the call organisers, it is important to highlight that the researchers perceived the OS standards associated to H2020 as too strict for this sort of calls.

**“What was less clear were some documents, what now came out that this data management plan needs to be according to the H2020 forms... and also the ethics ...I mean of course we have proposed other studies before so we always take care of the ethics but not in this formal way [...] I'm not sure if the documents that we are now supposed to fill in are really specific for this kind of project because this are the Horizon 2020 projects and we are obviously not, we did not apply for a h2020 grant with a super high budget but it's a subproject so I think it could be a bit more specific, yeah.” (MDC Researcher – 1)**

Interestingly, for some researchers, the interpretation of this call addressing Citizen Science was as “an extension” or supplementary work to that done in previous scientific projects, that is, a possibility to continue researching on scientific topics that they have worked on beforehand, which allowed them to include existing colleagues and contacts.

**“We did this previous project we always had in mind that we would like to extend that and so we were kind of waiting for a citizen science call or something like that” (MDC Researcher – 1)**

**“We had a project which was on teachers. Science and teachers, and that's why we know her and this is like the first project we did with her, so we slowly got into this topic and then when... she was always sending the call around here, with the email, so when we saw it we were like ok we should apply because we did this before and we can make it bigger, nicer.” (MDC Researcher – 2)**

As such, and since the call did not specifically demand for innovative Citizen Science projects, if new citizen science projects want to be promoted this aspect should be specifically addressed by the call.

#### 6.2.4. Insights regarding the evaluation procedures of the Citizen Science call

Most organisers of the call considered the evaluation procedures to be clear enough and highlighted the importance of taking very seriously the Citizen Science component, both from the evaluation criteria to be used to the importance given to expertise in citizen science of the external evaluators involved. The guidelines regarding the evaluation process and the evaluation criteria of this Citizen Science call were open from the beginning and shared via the ORION web site.<sup>7</sup> Despite these facts, some ORION organisers thought that an opportunity was missed by not including citizens in the evaluation procedures.

***“I thought the review criteria were really clear and fair and I really liked that the call was reviewed on the basis of science but also on the citizen science component.”*** (MDC organiser)

*“I think we missed an opportunity when developing the call to (...) have lay involvement ... **we don’t have any lay members of the public in the reviewing process.** (...) If that is the case I think it’s a missed for a call about citizen science, in involving the public, to not involving the public in the reviewing of our grant proposal.”* (BI organiser)

Regarding this possible innovation of future Citizen Science calls, it would be interesting to explore how this public involvement can work and how it is perceived by applicant scientist.

Despite the evaluation procedures to select projects were well regarded by participants in the call, researchers, particularly at CRG, were quite critical with the second part of the evaluation process, which included a negotiation/adaptation phase aimed to help them to improve their original projects regarding its OS and Citizen Science component. The discomfort and strong reluctance to change their original proposals of researchers is easily interpreted from their comments.

***“We didn’t like at all that we have to redo the call because... I have written other grants for just scientific questions and this never happened to me. Once you do the grant, if it’s good then you get the money, if it’s not good then you don’t get the money.***

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<sup>7</sup> [ORION CS call guidelines](#) (last accessed 30/06/2021)

*It's not like you review it because this means that... it's a bit confusing.” (CRG Researcher – 2)*

***“We had to write again, some other paragraph that was not there before, the data management plan, this came out of the blue. (...) Everything is new to me, there's some names and some terms and some ways of doing things that I don't know. I'm happy to learn (...) but it's not a part of my experience. (...) if it's included in the initial call, then we wouldn't complain.” (CRG Researcher – 1)***

***“So, my recommendation, if this should be done again, is to clearly state what they search for (...) or they say clearly from the beginning, and they don't make you go through this process, or they say it in a written way: these are special projects, which is not the typical scenario in which you do your research... we will help you... if we see it's a good project, we will help you adapt it. You know, a priori, that this will happen.” (CRG Senior researcher)***

Despite the comments above were done at a very initial stage of the Citizen Science project, they signal the importance of these sort of cooperative and evolving calls in pushing forward change in the existing funding culture, from one of “prizing researchers' excellence” to one of “collaboration for the benefit of society”. However, it is also important that this issue is clear in the presentation of the calls, as researchers must know in advance that in this call, in order to help them improve in an aspect in which they do not have expertise (such as OS and Citizen Science), flexibility and adaptation are required.

### 6.2.5. Barriers arisen before the development of the Citizen Science projects

The ORION Citizen Science call organisers consider that Citizen Science is quite a new concept for the researchers in their institutes, which makes it difficult and challenging for them to apply to this scientific project scheme, particularly in fundamental research.

*“The concept was quite difficult because we are such a fundamental research institute that a lot [of researchers] struggle to envision citizen science in their research.” (BI organiser)*

*“The scheme was quite new to us... that was the main barrier. We tried to explain, but they were expecting the main idea from us. That we would find the way on how to involve citizens within their researchers...” (CEITEC organiser)*

This view is also shared by researchers themselves, who think they do not receive enough information on Citizen Science within their career and believe there is a general need of

training on OS. In this sense, they acknowledge the efforts done within the ORION project in providing information about Citizen Science:

*“there is no information. Apart from ORION, before I never heard about it. Myself. (...) I think between scientists there is not so much interest.”* (CRG Researcher – 1)

*“For example, at CRG there are courses at the beginning of a PhD career, there should be one course, one class on open science. Because **what I am experiencing right now is that you have to share all your work if you want to publish, you need to have a repository with all your data and codes, and I was not trained to it.**”* (CRG Researcher – 1)

*“through ORION there was a lot of information in the past years about Citizen Science and opportunities of, so much more compared to before, of course.”* (MDC Researcher – 1)

The ORION Citizen Science call anticipated this need of skills and knowledge on Citizen Science by including in their eligibility criteria the need for collaboration between researchers and communication or public engagement professionals of each institution, which despite demanding for both parties, was well received.

*“As a facilitator, you really have to commit, kind of full time at least in the beginning. (...) it’s really important cos it’s when you set the stage for the main project. **I think the scientists in the beginning are just overwhelmed (...) they have this really good ideas but overwhelmed with the execution of these ideas** and then they think they have to do this and this and this and this and they’re like uh-huh and who I’m going to... **because expertise out of their expertise is all of a sudden required. And it’s out of their comfort zone.** (...) **It’s learning a new skill basically.** So, it’s really important to be there. In the beginning, really be there full time and committed.”* (MDC organiser)

*“Really, the coordination, as well as carrying out the project [...] **I don’t see the possibility to do it through a scientific professional profile because they have another way of working and specially, another type of work.** They have to publish, and they have to write the project and ask for the money. Then, having to do what they do in a citizen science project, you need a lot more communication engagement and organisation of events and things like this, than science. In the sense that science is what feeds the Project. But it’s not what pulls it.”* (CRG organiser)

Participants in the ORION call signal also as a limitation the lack of enough well-known examples of successful Citizen Science projects that could inspire and motivate researchers by portraying the interest and benefits of these sort of projects. They believe that sharing of these examples should be promoted to inspire and motivate both scientists to apply and



institutions to include them in their line of work. This is something they want to achieve in their projects.

*“There are not seminars saying, advertising that some citizens or projects were successful, **there is no statistics of how many projects are successful**, I don’t know, I know some projects that are successful but maybe for 2 projects that I know, where a 100 that were unsuccessful (...) **when a PI wants to plan the future of a lab (...) you cannot plan something that will not be most likely successful.**”*  
(CRG Researcher- 1)

*“**To me it is essential to show success stories (...) if they are internal, they can motivate them even more**”* (CRG organiser)

*“Then of course people go like oh, so this is kind of interesting. And specially seeing that is junior scientists doing this. So, in SMOVE is the postdocs taken care of this. The leaders of the project. **Of course, the PI is also involved but it’s mainly the postdocs that are doing the job. And of course, that’s visible. And people see that ok the postdocs got grants.** (...) because as a postdoc, unless it’s a fellowship, you don’t usually apply for grants. (...) so people see ok, you have this independence, I can have this research”* (Organiser MDC)

### 6.3. Impact of the Citizen Science projects

- Public Engagement experts value the impact of Citizen Science projects in their institutions in terms of increasing visibility and raising awareness of Citizen Science both due to its plausibility and funding benefits.
- **Researchers leading Citizen Science projects refer to a quite large number of professional and personal benefits**, including increasing networking, adding diversity of views, improving communication, improving efficiency, feeling their work is worthier and being more self-reflective about their own research.
- **Despite there can be struggles** associated with the change in role and way of working of researchers demanded by Citizen Science projects with a strong co-creation component, **in the long run the process is perceived as worthy.**
- Despite recognising benefits experienced along the process of doing Citizen Science, **for researchers the impact of these projects relies mostly in their scientific results.**
- **The figure of the Public Engagement expert in a Citizen Science project, which has been highlighted as crucial** by both the PE professionals and the researchers involved in the project, **can range from that of a facilitator to an actual co-leader of the Citizen Science project.** In this latter case, researchers, particularly PIs, point out the big challenge this shared leadership model poses to them and demand to be adequately informed beforehand

- **There are important limitations to Citizen Science projects**, particularly for those that involve demanding co-creation processes, **mostly related to the time and resource-consuming nature of these projects. The need to adapt traditional roles of researchers and public engagement experts to a co-leadership model has been also identified as being problematic.**

Before discussing the results of the qualitative analysis performed to assess the initial impact of the two funded Citizen Science projects, it is important to bear in mind that there are some differences between both type of initiatives and their implementation (see table below), which can affect the impact and final views of the involved researchers and PE expert.

|                                 | SMOVE                                                                                     | GENIGMA                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project starting point</b>   | Continuation of a previous project within the group's research line                       | Project developed from scratch, no similar previous experience                                                                                              |
| <b>Topic / scientific field</b> | Epidemiology and nutrition (applied research)                                             | Genomics (basic research)                                                                                                                                   |
| <b>Participant citizens</b>     | School students – grade 8 (aged 13-14)                                                    | Scientists, health professionals, teachers, experts in bioethics, journalists, artists, patients, patients' relatives, patients' associations, gamers, etc. |
| <b>Role of citizens</b>         | Contribute to the design of a questionnaire and collect/provide data for a research study | Collaborate with researchers and game developers to create a game for smartphones                                                                           |
| <b>Funding of the project</b>   | Devoted to cover research personnel costs                                                 | Devoted to cover other direct costs (not personnel) for the project development                                                                             |

### 6.3.1. The public engagement experts' views

The **main impact** of both GENIGMA and SMOVE for the respective institutions, according to the views of the public engagement (PE) experts involved in the two projects, was in terms of:

- **Increasing visibility** of the topic and the research group, mostly through social media and in outreach events.

*“The CRG has gained a lot of visibility (...) we have been very active at the social networks and we have more than 5000 followers and the projects has not even been launched yet”* (PE expert at CRG)

*“And I think also for the scientists, (...) usually when we have events, like outreach events, usually we present SMOVE as well, and I think this is really, since it’s visible and it’s kind of not the common knowledge what Citizen Science is, people kind of stop and think like, oh, Citizen Science here at the MDC? What is this? And then they are talking to each other. So that already spreads the kind of the ideas of Citizen Science among the people. Whether this translates into actual actions, we never know, but at least there’s, the awareness is kind of spreading, so that’s good” (PE expert at MDC)*

- **Raising awareness of Citizen Science among other scientists**, showing it is possible and useful to actively involve citizens in a research study.

*“the idea is already there and will stay that you can actually work with citizens, not just you know study them but actually work with them to study something together. And this definitely came through this project, we already had like similar little projects before going in similar direction, but it wasn’t the big thing, but basically having this project I think really convinced him [the researcher PI] of that this is really useful and it’s something that can be done” (PE expert at MDC)*

- **Increasing relevance of Citizen Science from a strategic point of view** since new funding opportunities have emerged after the development of the two ORION Citizen Science projects.

*“Yes, it has had impact, we are in this EU Project, we have three more years of funding due to the fact that Citizen Science is one of the main research lines at CRG” (PE expert at CRG)*

*“On the MDC level definitely for us it’s been kind of a blessing to have this project in many ways because there is like a new knowledge transfer strategy that has to be now, well first designed and implemented, and basically our funding agency (...) they defined knowledge transfer also as Citizen Science and would like to see more of that. So, there’s a lot of push from above basically that institutes have to do Citizen Science which usually all the institutes that are in this organisation (...) funded by the organisation where in the health area usually say “wow it’s not really possible because we’re doing very complicated molecular biology work” and so on, and then we can show with SMOVE like no, it’s possible, you just have to find the right niche basically. So that was very helpful, it does have an impact on the institute, on the strategies overall” (PE expert at MDC)*

Deeper impact at organisational and research-process level, however, was not observed, particularly at initial stages. Despite the challenge Citizen Science poses when compared to traditional ways of doing science and its typical power structures, there was not a perception of change in these areas. As such, the CRG Public Engagement expert states that despite **the pyramidal structures in research centres and groups contrasts with the horizontal, bottom-up way of working that some of this type of projects require**, this fact did not directly triggered changes in hierarchy and leadership.

*“There has been impact, but not a change in hierarchy, not in the way PIs function or their mentality” (PE expert at CRG)*

*“[the way researchers work] is very hierarchic, they have never worked in a horizontal way, the way I think you have to work in Citizen Science” (PE expert at CRG)*

Regarding their role in the Citizen Science projects, both PE experts have reinforced their initial views of being facilitators and giving support to the development of the project at different levels: from helping the communication between researchers and participant public, to nearly co-leading the project by managing several organisational and coordination aspects of the non-scientific part.

*“I suspected before and now I’ve seen it is that people like me, like Public Engagement specialists, experts, are really crucial in this kind of projects, because if you just let scientists communicate from their point of view and do the project from just their point of view, it’s just not, it’s going to be good but it’s not going to be as good as if you have actually people who are in between and communicate between the target groups, so the target group and the scientists. And also, the other way around, if just citizens would come to the scientist like “oh, let’s do something together”, without an in between person I think doesn’t work either, it’s just two different worlds with to different ways of communicating and different jargons and different ideas, and I think it’s really important to have this in between person (...) I’ve learnt that like, I mean basically my suspicious was confirmed and I think it’s, which I can take as a take home message is really “no Citizen Science project without a facilitator”, basically. It’s just painful.” (PE expert at MDC)*

*“My role has been to accompany them, explaining them what Citizen Science is, how the events should look like, how they have to explain their results, how they should transform what they wanted to do in an actual challenge, that is, to coordinate all the development part of the project” (PE expert at CRG)*

In this sense, and as both PE experts already perceived at the initial stages of the projects, they have realised that including the figure of the science communicator / public engagement professional in a Citizen Science project team is essential to ensure its smooth development, especially given the fact that this sort of projects not only require research and scientific ability, but new skills and competence that are usually out of the scientist’s comfort zone.

*“basically, all these facilitating roles, whatever capacity, they need to be part of the project, they need to be like really written into a project and properly funded with the project, because otherwise it’s just ad on ad hoc thing and it’s just nearly good if something, it’s just, reactive instead of proactive. So, I guess this is something I would recommend definitely that having this clear role in the project from the beginning, like who is doing what and why and how. That’s really important.” (PE expert at MDC)*

*“I think it is really important that the research centre has the professional profile of facilitator [of Open Science] to accompany the scientists in a process which is actually unknown for them” (PE expert at CRG)*

Despite the knowledge on Open Science of the Public Engagement experts to guide and support researchers in OS actions, they also acknowledge the challenge of doing Citizen Science in the basic research field, particularly when the involved researchers are new to this approach. Consequently, for the GENIGMA PE expert, participating in the project triggered an important learning process, both at personal and institutional level, which will allow identifying things that should be improved in future Citizen Science projects.

*“To me this has been a very important learning process, professionally it has allowed me to do new things, and I have had a lot of freedom in this sense and that is always good (...) the experience has been very positive, at the CRG we have learnt a lot, and I will be able in my report to highlight what we have done well, what we have not done well, what we should improve...” (PE expert at CRG)*

### 6.3.2. The researchers' views

The views expressed by the researchers involved in SMOVE and in GENIGMA are very different, probably because the experiences they were exposed to were quite dissimilar.

On the one hand, the SMOVE project was some sort of an “extension” of a previous project, and the involvement of citizens it entailed was not that different from their actual research.

*“before this study we had a pilot study on physical activity and the determinants of physical activity just to find out how you can monitor physical activity and sedentary behaviour in students. And so, there were, we were of course asking about certain determinants but yeah, the interesting thing now is that we get the answers directly from the students, and it's always a very nice and interesting discussion with them” (MDC Researcher – 1)*

*“I am usually working with population studies, so we always do research with people, so we always have study participants, but the big different in Citizen Science compared to my other work is that we actually involve them in the research, so they are not only just the subject that we study, we just do not only want their data but we also want to have their ideas to design the research, and I think that's a very nice way of involving people” (MDC Researcher – 1)*



GENIGMA, on the contrary, was a completely new project that had to be developed from scratch. As such, the project required an important adaptation from the participating researchers. This fact might have entailed that researchers involved in GENIGMA, despite motivated by the newness of the project, also showed an important struggle to adapt to the sort of co-creation process that Citizen Science requires, particularly at the beginning of the project.

*“This is an experiment both for the CRG and for us and I even think for ORION. We still do not know if it works or the impact this is going to have in the citizens (...) for us [researchers] to be able to participate in this project was a new adventure, to do something that in the lab of our PI it is not usually done. It is something we have never done before (...) and for us this was very motivating.”* (CRG Researcher – 2)

*“we had never done a CS project, I have no idea how it is managed, I do not know how to do the co-creations, the communication, I do not know which the best strategies are... no idea. Then of course, everything depended on one single person, who is coordinating. Who is coordinating us.”* (CRG Researcher – 2)

*“At the beginning of the project (...) I was expecting more usual scientific project, when you write it, you get the money then you have the leader unless you co-share it with other scientists, so I was not expecting that there were other people in the team that were no scientists, I was not expecting this organization.”* (CRG Researcher – 1)

### Perceived impact of the projects: general assessment

In terms of satisfaction, overall participant researchers positively assessed their participation in the projects, although at different levels. **The main positive aspects highlighted about SMOVE were the opportunity to conduct a whole study, the possibility to interact with teachers and students, and the involvement of students’ ideas into their research through the joint development of a questionnaire.**

*“One thing I have gained is of course, it’s always nice to be involved in the whole process of conducting a study and collecting data and so on, because normally in my daily work I work with very large studies that have already been accomplished, so this is, I think this is the first time, or well, one of the few times at least where I’m really involved from the beginning to the end, so that’s very nice definitely, and then also I always like the contact with the teachers and with the schools, always nice to go to different schools and see what they look like, how the atmosphere is, that’s interesting”* (MDC Researcher – 1)

*“the good thing is definitely to get to the point what CS is really about, so that we are trying to involve the students’ ideas into our research, so basically with the SMOVE one aim is to monitor the sedentary behaviour and physical activity in students over one week so they wear that device, but the other thing is that we want to investigate determinants on this behaviour, on physical activity and sedentary behaviour, and for*



*that we had a generic questionnaire in a pilot study before, but now it's really, the interesting thing that the students developed a questionnaire themselves and that's already, although we haven't, we have looked a little bit at the data, but already see what questions come out of this newly developed questionnaire, gives you an idea about what is happening in their lives, and what are they thinking about" (MDC Researcher – 1)*

*"it's good, and we learnt about the [co-creation] process and we have learnt how to listen to other people" (CRG Senior researcher)*

*"[the GENIGMA Project] has given us the opportunity to participate in co-creations with other people, and see their opinion, what they think, see how these events are managed (...) it has been very exciting to see people who play and who like it and they ask you and they get excited (...) it is in this moments when you see that the project actually works (...) the first time we saw that [the GENIGMA app working] it was wow!, it was like having a child" (CRG Researcher – 2)*

In fact, all researchers refer to a quite **large number of different professional benefits** of having participated in these Citizen Science projects, from **increasing networking, adding diversity of views, improving research communication and/or improving efficiency**, among others.

*"And for us the truth is that I was very comfortable, I was surprised, we have learned a lot, **we have generated new contacts**, a girl has come who is the one who has done well, one of the basic algorithms (...) I mean without her, practically this could not have been done." (CRG Researcher – 2)*

*"you get in touch with many people that are interested in your work. And this gives you more energy, you feel that what you do is important, that people care about it. Is one of the main benefits, and also to know, to have the opportunity to have students who are interested in your project, **this is useful to meet people and to be interested in science and in your project in particular. So, you feel happy, you feel that your work means something.**" (CRG Researcher – 1)*

*"I have learnt from this, we had a lot of metaphors about the research problem that we want to solve, and (citizens/stakeholders) brought into the table many more that we never have thought about... that will help me actually in the future to talk about my science" (CRG Senior researcher)*

*"I think it is true that you are not going to solve all the problems in the world with citizens, but certain things in which, look, if we invested a little more, **we are many, and each one has a brain and two hands and well, there are many things that could be done.**" (CRG Researcher – 1)*

Participating in Citizen Science projects also provided researchers with personal inputs, such as feeling their work worthier and being more self-reflective and realistic about the social perception of their own research.

*“for the researcher, it’s the opportunity to... to try to, or to, that **you’re kind of forced of thinking why is your research important for society**” (MDC Researcher – 1)*

*“One of the things I’ve learnt, specific one, for example. We always talk about these diseases that we want to treat/diagnose/solve, in our case cancer. And getting people suffering the disease involved in the process was an experience that was totally different of what I expected. I thought always that these people would be crazy to help us, right? (...) **you expect all these people that are having cancer to come to you and say “let me help you in doing this”. Well, that’s not the case.**” (CRG Senior researcher)*

This reflection process triggered by the Citizen Science project is recognised by the participating researchers as also impacting their view of the other types of science projects in which they are involved. For instance, contributing to make the researchers more realistic about the actual social impact of research projects, which is something that will use when writing proposals for future grants:

*“... and I’m probably going to think differently when going to a grant proposal, typical grant proposals, and I write “IMPACT, societal IMPACT”, I will not write the same way I used to write, because it’s not down to earth” (CRG Senior researcher)*

*“**I personally have learnt to let the project evolve without intervening too much in some of the decisions that I would have changed personally, I would have gone another way**” (CRG Senior researcher)*

We see, however, some diversity regarding researchers’ perception of the potential impact that participating in these Citizen Science projects might have in their professional career. While some believe that this will positively contribute to improve their CV and to have higher chances to get funding for future projects, others show some fears and uncertainties about their career development, expressing concerns about the fact that this sort of projects could be negatively impacting their careers due to lack of proper recognition:

*“definitely when I now see calls for Citizen Science projects, I’m of course more interested in applying than before, and also, I think that hopefully the chances are higher now to get funded, once you have some experience in that” (MDC Researcher – 1)*

*“I feel that is still not something that is very highly recognized. So, the way I show it in my CV for example is that I gained money for doing a project but you usually don’t see that you participated to a co-creation event etc. unless it is explicitly asked, for example, in a Marie Curie fellowship application. In the application, you are asked to write down in your CV dissemination events, project meetings, etc. but in general, I don’t know, I don’t do it because I don’t know if the people that read my CV will*

*understand it, so if they don't understand they say ok this guy just lost time with these activities, it's not useful, I don't do it... because maybe other people don't value them, I save space for other things that I'm sure that they value" (CRG Researcher – 1)*

*"[when asked if the project had or will have an impact in the researchers' professional career] totally. I think this, there are many competitive grants at European level. One of the things they value is that you have participated in outreach projects (...) I think it looks good in my CV (...) this guy applied for a project and got it. And this is obviously super positive" (CRG Researcher – 2)*

On the other hand, researchers from both projects signal it is important that participating in Citizen Science projects can be relevant for their own research and bring good quality scientific results, which is the main and final goal of Citizen Science projects. While the researcher leading SMOVE perceives this can be relatively feasible in their field of research, for projects which have a more innovative and challenging approach it might not be that clear. In fact, in the case of GENIGMA the senior researcher expresses concerns about the quality of the final scientific results that will come out of the experiment. In this sense, researchers signal that impact of or satisfaction with Citizen Science research projects should not only be related to the processes involved in this sort of research projects, but mostly in terms of its contribution to the science itself. Unfortunately, at this stage we still lack this data because both projects are still ongoing.

*"I think that there are very like really interesting Citizen Science examples from basic research or from genetic research and so on, but then the problem is that, or the question is whether the scientific output from such a Citizen Science project is equivalent to what the researchers do otherwise, and for us this is more close, like we will always be able to get something out of such a study, and in other areas I don't know, I can only imagine that it's maybe a bit more difficult." (MDC Researcher – 1)*

*"I have to be honest with you, I don't know, I don't know whether we are going to get much better science or more accurate results, let's put it this way, more accurate results by using the citizens than not because we have not performed the experiment yet" (CRG Senior researcher)*

*"I do care for the science, this is my objective, my final objective. The way I reach the place it's important but it's not essential, is not "THE", it's a mean rather than the objective." (CRG Senior researcher)*

## Perceived impact of the projects: views regarding Citizen Science

There is a general agreement among participant researchers that Citizen Science projects, compared to "regular" research projects, require an extra effort from their side. This effort is related not only to the fact that they have to open their research to allow incorporating the views of participant citizens, but also that they have to become open to external criticism and share leadership with other stakeholders. This puts researchers out of their comfort

zone regarding their role and how to do research, as they lose a little bit of control of what is going on and have to operate in ways researchers are not used to:

*“in a way you also give away a little bit of the control, I mean, normally for us in a normal research project it’s only the researcher who decides which questions are asked for instance in the questionnaire. So, in a way you have to be more open and then also see what is coming and then you have to figure out how you can analyse this data that is now being assessed because the students decided that this is now part of the questionnaire. So, in a way it makes it a bit more complex but on the other hand there is also of course very interesting data coming out of this also” (MDC Researcher – 1)*

*“The first time we presented the project, we did it in a very scientific way (...) we were told we could not communicate a project in that way (...) I think changing the tone of how you present is devastating. And scientists are not at all adapted to do this. It costs us a lot. And it is a huge difference.” (CRG Researcher – 2)*

*“when we write a proposal, we want to do it our way, and we get the money and nobody is asking us until the very end, and then we do it our way. And this is not the case here. You’re not doing your way, you’re doing it the way that the process is bringing you to. And is totally normal, I’m still worried that the research that we’re going to get, that the science that we’re going to get from the game is better or at least as good as the science that we’re going to get from just doing it the classical way, computing our algorithms” (CRG Senior researcher)*

However, having struggled with the new processes that truly co-created Citizen Science projects demand does not mean that researchers did not value this experience. For instance, researchers involved in GENIGMA expressed that participating in the project had contributed to open their views regarding the potential of Citizen Science and teaching them different ways of working. Nevertheless, they also recognise there are compromises and an important cost involved, for instance, regarding their limited role in the decisions taken along the project or the time and effort devoted to it.

*“what I take with me, I believe that this project is a way of working. It seems to me that many times we scientists are very focused on seeing things, and always solving problems in the same way. And sometimes, using an alternative solution, as in this case is citizen science (...) obviously not all problems, but some problems, from this perspective, can be solved” (CRG Researcher – 2)*

***“we did not have that much freedom of decision I would say, although at the end we made the decisions (...) in a sense we had to adapt our view to everything else and that was a learning process. And that learning process has a pay that I have to make personally which is the final product of this process is not exactly the one that I envisioned” (CRG Senior researcher)***

This cost of Citizen Science projects might be highly dependent on the scientific field where they are framed and on the type of initiative or approach that is followed. First, as suggested by the researcher leading SMOVE, the cost/benefit balance is probably more positive in certain areas (such as nutrition and epidemiology) compared to other fields. And second, as expressed by one of the researchers involved in GENIGMA, some Citizen Science projects are not so demanding or time consuming because they require a lower degree of complexity and interaction with citizens. Whether all aspects of research, regardless of the scientific area, can be equally addressed through the lenses of Citizen Science is in fact an interesting debate.

*“we combined a generic questionnaire that was already there, and the data, the physical activity data that we would have collected also in another like epidemiological study, we used this device also in other studies, then to combine this with the Citizen Science component, so for us I think it’s easy in epidemiology to think in the direction of Citizen Science. I think in other research groups that work with cells or animals or I don’t know, that’s a completely different story there to involve society”* (MDC Researcher – 1)

*“A year ago, or so, we went to a Citizen Science school. But I saw the projects that were there, and they had nothing to do with it (...) The rest of the projects were “take a picture of the squirrel you have at home” (...) they are all like that. And then it’s when I also realised that I don’t know of any other project that has been done at this level of, not even genomics. Perhaps that is also a good thing, that we are pioneers in a strictly genomics Citizen Science project”* (CRG Researcher – 2)

### Perceived impact of the projects: the role of facilitators

As already mentioned, one of the eligibility criteria of the ORION Citizen Science call was the need to include communication or public engagement professionals of each institution as part of the team to develop the project. This decision has shown to be very appropriate, as the researchers of both projects recognise the importance of having this kind of support. However, the level of implication of this Public Engagement expert as facilitator of Citizen Science depends on the specific nature of the Citizen Science project. As an example, in the case of SMOVE, the initial stages of the project required much dedication from the PE expert at MDC to establish the communication with schools but after that they supported the researchers only whenever it was necessary, for instance to inform them about opportunities to disseminate the project.

*“We are really trying to do the scientific part, and then if there are other issues then they help us (...) and they help us again to get in contact with schools and teachers to find more participating schools (...) they contacted with me also every time when there was an opportunity where they thought SMOVE could be presented to a greater public. So, there was the, I think the Berlin Science Week or something, so that’s also something they keep track on, that this also presented outside a little bit”* (MDC Researcher – 1)



*“I was definitely much more involved in the beginning when was about to set it up and get started and pretty much now the scientists have it in their own hands. In the beginning there was quite some help with basically reaching the target groups, reaching the networks and also with designing materials so these are, you know, appropriate for the target group, so this was a lot of back and forth between us, not just me, it was in the team there several people actually helping out, or being involved in one way or the other, but pretty much since last year (...) I’m more like just the check in now on and then person, and the scientists are carrying on themselves” (PE expert at MDC)*

Regarding GENIGMA, the innovative nature of the project, which represented a completely new way of working for the researchers and was planned as a very demanding co-creation exercise, required a deeper and more constant implication of the PE expert along the whole process. In fact, this initiative can be somehow seen as a project where the leadership is co-shared between researchers (in charge of the scientific part) and the PE expert (in charge of the organisational/co-creative part), so that each one equally contributes from their field of expertise to the proper development of the project.

*“we had never done a Citizen Science project, I have no idea how it is managed, I do not know how to do the co-creations, the communication, I do not know which the best strategies are... no idea. Then of course, everything depended on one single person, who is coordinating. Who is coordinating us” (CRG Researcher – 2)*

*“specially to accompany the scientists in a process which is actually unknown for them (...) accompany in everything related to Citizen Science which is not the scientific part, and it should be like a tandem, it shouldn’t be disproportionate, because both parts are fundamental” (PE expert at CRG)*

### 6.3.3. Main limitations of the Citizen Science projects

There is general agreement among both researchers and public engagement experts on the fact **the main limitation for the development of Citizen Science initiatives is the lack of enough funding for such demanding research process.**

*“I think the problem is that if there is no funding, then nobody will do it (...) I think basically if there is no, if I would have now funding for a Citizen Science where we could announce to the MDC, look, there is this funding for Citizen Science, is anybody interested? And we do have SMOVE so you know we have experience, so I can help you with the application or something (...) I am 100% sure there would be a lot of responses and people would be interested. But as long as there is no funding, nobody is going to start a new hobby, you know, besides” (PE expert at MDC)*



*“the thing is that of course it needs to be funded. So, of course, it can be done when it’s funded and when this is fully considered as equivalent to the other research we are doing, which in my field, in epidemiology is easy” (MDC Researcher – 1)*

More specifically (and as it happens in many other projects), **funding is particularly important to cover personnel costs of the people involved** (being researchers or PE experts), something which needs to be considered when budgeting resources for a Citizen Science project. In fact, although researchers often participate in “regular” outreach activities without being paid for it (either during their working hours or allocating extra personal time), for longer and more time-consuming initiatives such as these Citizen Science projects covering the actual research personnel expenses is necessary for a proper development of the project.

*“So, with SMOVE we were really lucky because we could just start it up and get it going and then, since we found [Researcher 2] who actually is now working on the project, I mean he’s in a half position, but all of his half position goes to SMOVE, it’s really good because he can really get deep and take care of it” (PE expert at MDC)*

*“The lack of funding for scientists, they demanded this a lot (...) [the project] required much more time from them than they expected” (PE expert at CRG)*

*“[participating in Citizen Science projects] is enriching really in a way that we are not used to it. But I would probably put a salary of a person in the project, so that person really dedicate to the project” (CRG Senior researcher)*

Interestingly, being involved in the Citizen Science project did not only cost more than expected, but also attracted some extra funding. This aspect should be further explored, as it could help to co-fund Citizen Science efforts.

*“Fortunately, we got an agreement with a company that paid part of it, which is one advantage as well, if we wouldn’t have been Citizen Science, probably this company would have not paid for the kits and the reagents, they paid because they thought it was cool thing and their logos in the website, and... But anyway, it costs.” (CRG Senior researcher)*

Another issue which arose from the experience of GENIGMA and SMOVE is that **young researchers’ turnover can be problematic for the development of Citizen Science projects**. This is particularly the case if the leaders of these projects are post-doctoral researchers, who usually have a limited time in their RPO. Although researchers’ turnover also affects other types of projects (e.g. those which constitute the general research lines of the groups), the effect might be higher in Citizen Science projects which are still assigned to individual researchers rather than being an integral part of a research group:

*“[Researcher 0] who was actually the one who came out with the project together with [Researcher 1], but [Researcher 0] was the driving force, she left the MDC just before this project started. And just at the same time [Researcher 1] went on maternity leave, so it was a bit of a delay of getting sorted, it was not planned (...) but with [Researcher 0] leaving MDC it was not planned, so that was the kind of trouble at the beginning, and then it took some time to find the right person for the position to actually do the project because it’s a very unique set of skills that you have to bring to a project like that, so it’s not just the scientific expertise but also the willingness and the ability to work with school kids and doing this kind of work it’s not everybody’s cup of tea so to say” (PE expert at MDC)*

*“we decided to open it to young people, to postdocs (...) knowing that at CRG they can be a maximum of 5 years and these people had 2 years left (...) and this was a limitation” (PE expert at CRG)*

In this regard, despite the ORION Citizen Science call was perceived to be an opportunity for junior researchers to lead a project, the CRG PE expert pointed out that, in order to become consolidated, Citizen Science projects should be clearly embedded in the research group so as not to jeopardize its continuity due to the additions and dismissals of personnel.

*“If they [junior researchers] lead it [the Citizen Science project], it must be together with the senior at the same time and the continuity must be clear from the beginning in the senior, that is, it must belong to the research group, not to an individual person (...) because then the project is left to the group regardless of the people who come and go” (PE expert at CRG)*

Besides these shared barriers, SMOVE and GENIGMA participant researchers and experts referred to other particular drawbacks they had encountered during the development of both projects.

In the case of SMOVE, the PE expert referred as the main difficulty the high time investment which was required at the beginning of the project to establish communication with the different stakeholders:

*“the first communication had to be facilitated, so that was the, it was quite some time involvement basically (...) in this kind of project it’s really important to become kind of, like form relationships with all the teachers, with all the kids we’re working with, the school directors, so it’s a lot of stakeholders that have to be pulled together and involved in this project. And that was a bit of difficulty in the beginning when we realised, ok, it’s not just enough that scientists just do it, you really need help how to approach the people and how to advertise the project, and how to reach teachers, how to reach the parents because the parents have to give consent, and so on (...) it’s just a very typical problem of Citizen Science project is you have interdisciplinary work and maybe even intersectoral and you’re also working with very diverse*

*stakeholders, and this of course is not something that just you can ignore in a project, it has to be taken care of.” (PE expert at MDC)*

From the researchers’ perspective, there were two main drawbacks, that are related to the “school-oriented” nature of the project. On the one hand, the need to follow certain administrative rules (such as the requirement of ethical approvals to collaborate with school students or data protection issues to assure anonymity) was signalled as a common difficulty in this kind of projects involving schools. On the other hand, the lack of feedback from teachers (because of the school’s lockdown due to the COVID-19 pandemic) was another drawback which meant that the desired amount of data could not be obtained to carry out the study.

*“it’s always a little bit of a challenge that you need, I mean, on top of getting ethical approvement and data protection approvement, and if you work with schools you also need the approvement of the school authorities, and one thing that is a bit difficult is that, when you get the approval or when you ask for the approval, you need to name exactly all schools that you want to include in your studies, so you need, you cannot add schools or, yeah, schools who want to participate any time. So that’s another administrative step in doing such a study, but that’s a school specific thing (...) at the moment we don’t have enough feedback, the teachers who agreed to participate are suddenly not available any more or don’t react on our contact, tries to contact them. So that’s unfortunate. (...) in Berlin it’s especially difficult at the moment, because some teachers say they don’t want a fully digital version, they prefer to have it done when the students are in schools” (MDC Researcher – 1)*

Regarding GENIGMA, the main barriers highlighted by both the expert and the researchers seem to be related to the demanding and novel character of the project.

On the one hand, they consider that the slow path and time-consuming nature of the project conflicts with the extreme competition and high pace of today’s science and the workload they already have.

***“In general, these projects are much slower than the normal scientific projects, so in this sense it is difficult to have an idea that is new, and that stays new for two years. Yes, it also happens for other projects, that you have 5 years projects so you, usually have many tasks in the project. In this case with just one task and there could have been other labs doing the same thing maybe with other tools that we don’t know. (...) So, this is the main drawback.” (CRG Researcher – 1)***

***“This is not our only scientific project. In other words, we cannot dedicate 8 hours a day we work, 9 hours whatever, to this project, which is progressing very, very slowly, right?” (CRG Researcher – 2)***

*“[the CRG] is a centre of excellence (...) citizen science does not give results for Nature in the 1<sup>st</sup> year, so not everyone is interested [in CS] because it is a very competitive centre” (PE expert at CRG)*

On the other hand, when asked about limitations all participants referred to issues related to the internal governance of the project (i.e., leadership and need to adapt to the different roles of both researchers and public engagement experts), which were especially difficult to deal with during the initial stages of the process, as it has previously been mentioned. This fact is not surprising, considering that GENIGMA followed quite a different approach compared to the way researchers usually work. While most scientists are used to collaborate with other colleagues (either from the same area or not), this kind of “horizontal” cooperation with people from the outside of scientific field was perceived as a challenge which required researchers adapting their roles, points of view and expectations to a new way of working. In any case, and as suggested by the senior researcher, this is something that researchers should be aware of before getting involved in such kind projects.

*“The fact that I started the project as a scientific project and then you have to do something that you don’t expect, all the events with the citizens, I was not expecting it but it was not bad at the end so... I didn’t feel bad about it. Just at the beginning you have to change your point of view. But once you do it its ok so. (...) Now I already thing I overcome it so its ok.” (CRG Researcher – 1)*

*“The fact that you think that you are the leader of the project but at the end you are not because you have to co-share with other people. I thought it was a normal scientific project but at the end it was not, not the same thing. And now it’s ok, now I don’t have a problem.” (CRG Researcher – 1)*

*“The main problem of the 1<sup>st</sup> phase was an issue of internal governance, it was very difficult for us to adjust to the roles (...) they had to do a lot of things that they had never done before, such as the co-creations and the creation of new things which is not like the way to do a normal project, and then they did not understand my role” (PE expert at CRG)*

*“a PI should now that this is a totally different way of doing science and they should be open to do so. And then it doesn’t come as a surprise the fact that there is this figure, which I find is totally essential (...) which is the liaison between all this world of CS and the PIs or the scientist, this person needs to, is essential without that it won’t work at all, but the PI should now that there is going to be such a figure and that that figure will play a prominent role on making decisions and helping moving the project forward. So, this is the first suggestion, a sort of a disclaimer or warning or I don’t know how you want to call it, at the very beginning, because this is not a regular research project” (CRG Senior Researcher)*

## 7. Final Evaluation of the call on Novel co-creation initiatives

### 7.1. Context and sample

The aim of this funding call was to support long-term cross-sector collaborations to carry out co-creation initiatives that bring together different stakeholder groups (such as academia, industry, civil society, public sector, etc.) in innovative and exciting ways. The goal is making research activities in the life sciences and biomedicine more open, transparent, accessible, relevant, and impactful for research and society. A co-creation process was followed to design the call, involving collaboration of ORION partners with representatives from the quadruple helix of stakeholders, i.e., the public sector (EU Commission DG research), industry (IMI<sup>8</sup>), academy (scientists from own organisation and from Eurodoc<sup>9</sup>) and civil society (ANT Foundation<sup>10</sup>).

Proposals to be funded were expected to be research-related, co-creative, innovative, relevant, and impactful, with a clear alignment with the ORION Open Science and RRI perspective. The information about this call was disseminated by ORION communication channels (newsletters, new flash, social media, website) and by each partners' communication channels.

A total of 15 proposals were submitted covering topics ranging from fundamental life sciences research projects, point of care applications, to projects in science education, public engagement, and science communication. The details of the evaluation process are reported in Deliverable D3.6 "Selected New Co-creation Initiatives". There were two winning projects: MELTIC (which started in March 2020) and VACCINE (which started on 2<sup>nd</sup> November 2020).

**MELTIC**<sup>11</sup> (Ideas **MEL**ting pot for **TIC** and health science for citizens in small communities), led by ISCIII, is a proposal for co-creation of research in the disciplines of Health and Information and Communications Technologies to improve the quality of life of European citizens in small communities. Its objective was to generate, through co-creation methodologies, suitable ideas for research in ICT in Health and Biomedicine, including topics such as self-learning, false information discrimination and prevention in order to innovate about the use of existing public spaces and/or build new ones.

**VACCINE**<sup>12</sup> (Virtual Activity Co-Creation Initiative for Novel Engagement), led by BI, is a digital approach for engaging people with the science behind infections, immunity and

<sup>8</sup> The Innovative Medicine Initiative (IMI) is an EU public-private partnership funding health research and innovation (<https://www.imi.europa.eu/>).

<sup>9</sup> The European Council of Doctoral Candidates and Junior Researchers (EURODOC) is an international federation of 28 national organisations of PhD candidates, and more generally of young researchers from 26 countries of the European Union and the Council of Europe (<http://www.eurodoc.net/>).

<sup>10</sup> The ANT Foundation is one of the largest organisations in the field of home support for cancer patients in Europe and one of ORION partners.

<sup>11</sup> More details about MELTIC on this [webpage](#) (last accessed: 01/07/2021).

<sup>12</sup> More details about VACCINE on this [website](#) (last accessed: 01/07/2021).



vaccinations. The seed of the project is a virus simulator developed by BI researchers, which was used as the focus point for the co-creation of an interactive digital game. The game, which was co-developed with young people at a local state secondary school, is expected to be launched in September 2021.

Due to the COVID-19 pandemic, both projects had to be adapted to an online version, which means that all the workshops and co-creation meetings that were initially planned as face-to-face events had to take place virtually.

| Project | Event                                            | Date                       |
|---------|--------------------------------------------------|----------------------------|
| MELTIC  | Kick-off meeting                                 | 29 <sup>th</sup> Jun. 2020 |
|         | Co-creation design process (several sessions)    | Jul-Aug 2020               |
|         | Workshop 1 (design and revision of materials)    | Nov. 2020                  |
|         | Several co-creation experiments (with partners)  | Nov-Dec. 2020              |
|         | Workshop 2 (activities and recollection of work) | 22 <sup>nd</sup> Dec. 2020 |
|         | Workshop 3 (creation of digital dossier)         | 26 <sup>th</sup> Jan. 2021 |
| VACCINE | Kick-off meeting                                 | 9 <sup>th</sup> Dec. 2020  |
|         | Design workshop (co-creation session 1)          | 27 <sup>th</sup> Jan. 2021 |
|         | Testing workshop (co-creation session 2)         | 14 <sup>th</sup> Apr. 2021 |
|         | Virus Break game completed (scheduled)           | 23 <sup>rd</sup> Jul. 2021 |

With the purpose of evaluating the call to obtain evidence-based insights about these co-creation exercises, a series of interviews were undertaken both to its organisers and to the communication / public engagement (PE) experts and principal investigators (PIs) of the two funded projects. The relation between institutes, respondents and the date of interviews is shown in Table 12.

| Institution | Interviewee                   | Date                        |
|-------------|-------------------------------|-----------------------------|
| BI          | Call organiser                | 7 <sup>th</sup> April 2021  |
| ISCIII      | Public Engagement (PE) expert | 19 <sup>th</sup> April 2021 |
| ISCIII      | Principal Investigator (PI)   | 5 <sup>th</sup> May 2021    |
| BI          | Public Engagement (PE) expert | 20 <sup>th</sup> April 2021 |
| BI          | Principal Investigator (PI)   | 7 <sup>th</sup> May 2021    |

**Table 12.** Relation of institutes, respondents and dates of interviews considered for the evaluation of the ORION Novel Co-creation Initiatives call.



Due to the calendar of the mentioned projects and the pandemic situation, no data has been obtained regarding co-creation participants and final target audience of both the MELTIC and VACCINE projects. As such, the evaluation of both projects that is feasible during the duration of the ORION projects takes into account the viewpoints of the call organisers and the project leaders involved (researcher Principal Investigators and Public Engagement experts) about the preparation and implementation of the call and projects.

## 7.2. Starting point of the call on Novel Co-creation Initiatives

- According to organisers, coherence in the creation of a call on Novel Co-creation Initiatives is achieved by co-creating the actual design of the call, ensuring the highest possible diversity of participating stakeholders within reasonable numbers of participating people.
- Criteria highlighted by organisers for a call on Novel Co-creation Initiatives include the need to involve more than 2 stakeholders and doing so from an Open Science perspective that promotes active stakeholder engagement.
- Engagement of different stakeholders in the exercise of co-creating a call is not an easy task due to the existence of different viewpoints regarding Open Science, lack of enough training in the field and lack of participation incentives.
- Early career researchers have shown to be the most active group of participating stakeholders.

The main elements of the call on Novel Co-creation Initiatives, which were explored through the qualitative analysis of the call documentation and the interview to its organisers, are explained below.

### 7.2.1. Insights regarding the organisation of the call on Novel Co-creation Initiatives

As already mentioned, the design of the call on Novel Co-creation Initiatives followed a co-creation process (which has been extensively described in Deliverable D3.6 “Selected New Co-creation Initiatives”) consisting in two main stages:

1. An initial interactive session for ORION consortium members was organised during the first ORION Annual General Meeting in Bologna (April 2018). In this workshop participants discussed mainly about the focus and target groups of the call and the type of projects/topics to be funded.

2. A half a day co-creation workshop with multiple stakeholders was organised in the offices of the Swedish Research and Innovation Office in Brussels (April 2019). This session involved collaboration of 15 ORION delegates with representatives from the quadruple helix of stakeholders (academia, industry, government and the public sector, and civil society) and aimed to co-design the specific aspects of the funding call, such as what to fund, who will be potential applicants, and how to organise both the application process and the evaluation and selection processes.

Regarding this second workshop, the call organisers emphasized their strong willingness to involve as diverse a group of participants as possible in the co-creation process to define the call, for which they took an active role in the search for key people:

*“what guided my actions was that **I wanted to have as broad an scope as possible, so therefore I wanted to invite as a diverse group of stakeholders as possible (...) in my mind was also “I need to reach out to the quadruple helix of stakeholders”**, so I tried to visualize those four different stakeholders and who in my networks already exist there, or who in the scientific community is sitting in those different ones, and I just called, call-knocking reached them out.”* (Call organiser)

The participation of external members to ORION was positively valued by the call organisers, although they also considered that a greater number of attendees to the co-creation workshop would have been desirable:

*“it was a beautiful exercise of reaching out and convincing people that this was meaningful and it was going to have an impact and it did work and we had quite a lot of (...) and **there was quite a significant number of delegates in that workshop that were not per se ORION staff, which is really good**. But there were also limitations as in how many people could attend, for several reasons, probably (...) **if I could have wished for something better, would have been a little bit stronger representation of all those different stakeholder groups**. So, let’s say, maybe for each stakeholder group we had like, (...) but let’s say that we have 1 or 2 representatives from each group, **it would have been way nicer to have 3 or 4, not many more, because it gets really messy** but to have at least 3 people from all the stakeholder groups, right?”* (Call organiser)

### 7.2.2. Insights regarding the content and key characteristics of the call on Novel Co-creation Initiatives

As a result of the co-creation process followed to design the call, a set of key characteristics were defined that the proposals had to address, as shown in the box below. Among them, **the co-creative and innovative nature** were highlighted aspects by the call organiser when asked about their expectations regarding the call.

**Key characteristics required to be addressed by Novel Co-Creation initiatives:**

- **Research-related:** Building on a relevant research topic in life sciences/biomedicine and directly engaging researchers, especially early-stage researchers.
- **Co-creative:** Including at least three different stakeholder groups throughout the whole lifetime of the project, to produce a new product, programme, policy or project.
- **Innovative:** Original and inventive ideas are encouraged. Classic public engagement and two-way stakeholder projects will not be considered (e.g., scientific cafés, school workshops, academia-industry collaborations etc.).
- **Relevant and impactful:** Addressing their relevance to society and how they will achieve long-term impacts.
- **ORION-aligned:** Projects should follow Open Science and RRI principles. Projects are also encouraged to include an international dimension.

*“I guess **my only expectation for this funding call was what we have put in the call criteria, which is funding projects that include more than 2 stakeholders, as in usually, or usually it is very normal to get a collaboration between researchers and another group, usually another group of researchers, but it could also be another stakeholders group, like for example in citizen science projects it is the researchers and the public. However, for this one, this specific one, as we put it in the call criteria, it was to include more than two stakeholder groups, so the researchers on the one hand, but then another two, so it was not a bilateral collaboration, but it was more like a diverse collaboration**”* (Call organiser)

In fact, **the requirement of involving multiple stakeholders was a highlighted element** mentioned by the organisers when asked about the main differences between this kind of co-creation call compared to a regular scientific call. This idea is related with the need for the projects to be aligned with the approach to Open Science and RRI in ORION, which is closely connected with the idea of active stakeholders’ engagement, and particularly public engagement:

*“I think the two main ones in general lines would be, first the fact **that it had to be multiple stakeholders, so in the call criteria we called it “co-creative”, including at least three different stakeholder groups. So, in a normal research project it’s mainly the researchers, and then if they reach out to another group it would be probably another researcher or in citizen science projects it can be the public, but the added level of complexity and beauty in this call was to add a third group (...)** And then the second one, the second thing that was different from a conventional research funding call would be that **it had to be aligned with ORION** and, as I said, so the purpose of ORION is Open Science but with the approach of stakeholder engagement, so Public*

*Engagement, so **how can we support opening-up fundamental life sciences research by involving different stakeholders.***” (Call organiser)

### 7.2.3. Insights regarding the eligibility and evaluation criteria of the call on Novel Co-creation Initiatives

The call was open to all proposals involving at least one of the ORION consortium partners. They could also involve legal entities that are outside the ORION consortium and are based in one of the European Union member states or associated countries. Funded projects were required to meet two main eligibility criteria:

1. Include research in the life sciences/biomedicine.
2. Involve at least three different stakeholders, including an ORION partner.

Regarding the evaluation, as specified in the Funding Call Guidelines<sup>13</sup>, there were four evaluation criteria equally weighted: (i) Originality; (ii) Co-createness; (iii) Quality and efficiency; and (iv) Impact.

However, according to the organisers, it would have been useful to define in more detail the evaluation procedure (e.g., coordination of the evaluators through face-to-face or online meetings, or by email, the timeline for the evaluation, etc.) and publishing this information in the call guidelines, since this could have facilitated the call resolution. On the other hand, the call organisers also suggested that offering an economic reward to the evaluators to acknowledge their commitment with the terms and timelines defined in the project could have been considered.

Despite the call was not restricted to the ORION community, the 15 submitted proposals were led by ORION partners. The lack of applications from groups outside ORION was highlighted by the call organisers, who mentioned that they would have felt more satisfied if there would have been any submitted proposal(s) coming from participants external to ORION who had attended the workshop that was organised to co-design the call:

***“if you ask me, I would have seen a really successful, this task as really successful if we have had a bid, an application, a proposal, from groups that were in the workshop but were not ORION, (...) I would have been really proud and felt realised and accomplished if there would have been a proposal in which some of the people who were at the workshop were actually submitting a collaboration proposal with someone from ORION.”*** (Call organiser)

<sup>13</sup> [https://www.orion-openscience.eu/public/2019-06/ORION\\_Co-creation\\_Call\\_Guidelines.pdf](https://www.orion-openscience.eu/public/2019-06/ORION_Co-creation_Call_Guidelines.pdf) (last accessed 21/05/2021)

## 7.2.4. Barriers identified during the organisation of the call on Novel Co-creation Initiatives

One of the challenges of organising this call, according to the views of its organisers, had to do with the fact that the ORION project has a very broad focus and there are very different understandings of how to integrate Open Science and RRI principles in RFPOs within the project. As such, the co-creation initiative joined people with different meanings of Open Science, which in this particular context was perceived as quite challenging. Specialization within Open Science, in this case referring to specialization on stakeholder engagement, was considered very important.

***“...the understanding is very different (...) if you want to achieve impact, then you need to specialize and you need to get specific”*** (Call organiser)

In this sense, the organisers felt that one of their roles within the process of co-creating the call was trying to align the diverse views on Open Science from the different stakeholders, so that everybody could contribute to the definition of the call:

***“all the different stakeholders that came to that meeting came with very different views on what it was possible to do, and what is Open Science, like, I guess one of the challenges of Open Science is making everybody... or, how to say... Open Science is such a diverse and broad thing that, even if you liaise or collaborate with someone in Open Science doesn’t mean that you are precisely talking about the same things. So, because, to put an example, Open Science is Open Access, but Open Science is also Public Engagement, right? And ORION was a bit around Public Engagement, but when I reach out to a lot of stakeholders, when I say Open Science a lot of people think about Open Access, and we are not doing anything with Open Access. So, the challenge here was to bring everybody to the same line into what we are trying to do (...)”*** (Call organiser)

It is worth mentioning that, when asked about the degree of involvement of the different groups in the co-creation workshop to define the call, the organisers highlighted that the representatives of early career researchers were one of the more active during and after the process:

***“there was one specific group that was actually very involved very, very, proactive during the workshop, and very interested, and even afterwards they were really, really, pleased and that was Eurodoc. Eurodoc are actually leading a lot of the activities in Open Science for early career scientists so they were extremely pleased that I reached out to them, that I invited them, they were really pleased to have collaborated during the workshop and so on and so forth.”*** (Call organiser)

From the organisers’ view, this kind of multi-stakeholder collaboration, despite its benefits in terms of allowing to bring together groups of people who are not usually interacting with each other, is perceived as challenging because it is difficult to really engage those who are non-experts in the field or do not see a direct benefit from them, or have other priorities:



*“I would say that a pro can be the fact that **we were trying to break barriers**, we were trying to put together groups of people who have not, who are usually not interacting with each other, when we talk about science and scientific research, so **that is a pro because we were trying to improve the system. We do that by reaching out to different stakeholders and make them explain them that this is very relevant in the long rang to make scientific research more permeable**” (Call organiser)*

*“At the same time there is a con, a limitation there, which is **I guess it is difficult to engage the stakeholders because it’s not their direct field of expertise or their direct project**, or their direct day-to-day work and therefore you are asking, well **I’ve noticed throughout the whole project, you are asking additional workload to people and the benefit is not that clear, or at least it’s not a direct benefit**, let’s put it that way, so **people are happy to contribute because we all want to improve the system**, because we all believe this is important, **but yeah, there are other priorities and other time constrictions**, and therefore it is challenging, in the example of this organisation call, to get those meaningful people to attend.” (Call organiser)*

*“I had the feeling back then in the workshop that people came but they did not have the feeling that they could really have a meaningful input” (Call organiser)*

### 7.3. Insights from the implementation of the funded projects

- **The Novel Co-creation Initiatives evidenced institutional impacts at different levels, including increasing visibility, adding networking possibilities and enriching the existing research focus.**
- At initial stages of participation in Novel Co-creations Initiatives PIs, despite showing satisfaction regarding the societal impact of these initiatives, **do not identify an impact for them at professional or career level.**
- **There are dual and mixed views regarding the value of active co-creation to the project.** Despite the products are considered of good quality, the process can be perceived as beneficial or not depending on contextual, organisational and/or personal factors.
- **Co-creation initiatives can place researchers far outside their comfort zone**, particularly for those with an unidirectional view of public engagement. Sources of discomfort are: perception that their scientific expertise is not respected enough and that the rigour of the scientific message could be endangered. **More preparation and transparency regarding the co-creation process and results is needed beforehand**, particularly regarding the co-leading role of public engagement experts with researchers.



Before discussing the results of the qualitative analysis performed to assess the impact of the two funded Novel Co-creation<sup>14</sup> projects, it is important to bear in mind that there are some differences between them (which are summarised in the table below) that may have influenced in some way the views of the respective principal investigators (PIs) and Public Engagement (PE) experts.

|                                                                                           | MELTIC                                                                                                                                                                                                | VACCINE                                                   |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Topic / scientific field</b>                                                           | ICTs and health (applied)                                                                                                                                                                             | Immunology (basic research)                               |
| <b>Main aim</b>                                                                           | Research transfer                                                                                                                                                                                     | Educational                                               |
| <b>Non-scientific stakeholders involved in the co-creations</b>                           | Citizens from small communities (mainly senior people and youngsters), local public administration, NGOs and rural businesses, from 5 different municipalities in Spain, Romania, Italy and Portugal. | Students (aged 11-14) from a local state secondary school |
| <b>Direct (on-line) interaction between non-scientific stakeholders and researcher PI</b> | YES                                                                                                                                                                                                   | NO                                                        |
| <b>Main project output</b>                                                                | Vademecum (co-creation dossier with 100 ideas for health and wellbeing related solutions for small and isolated communities) and technological application based on these 100 ideas.                  | On-line game / gamified learning lesson (Virus Break)     |

### 7.3.1. The project leaders' views

In terms of satisfaction, the PE experts pointed out that both projects had positive impacts on their respective institutions at different levels, including new research focus and new networking possibilities particularly:

- MELTIC is seen as a “little revolution” which contributed to change the views about the kind of research that can be done in a particular field, in this case telemedicine, which is typically associated to very technical problems. As such it constitutes an example that other research projects in this field can be developed including a more social component:

<sup>14</sup> For the sake of brevity, the acronym “NCC” will be used along the text from now on to refer to these initiatives.

*“MELTIC has triggered... some sort of small revolution because, of course, telemedicine are many different things (...) and it makes them [the unit in telemedicine involved in MELTIC] to change their opinions, in the sense that (...) they can also do other kind of projects that had to do with telemedicine of course but with much more involvement of human beings and with how scientists participate (...) Then, this adds to, this is helping to open paths, to make everything (in science) more porous” (PE expert at ISCIII)*

- VACCINE will be an ongoing project for the institution and the game itself is going to form a major part of their Public Engagement initiatives. An implementation plan is being developed, including a potential partnership with a charity to design an educational tool around the game and a series of outreach activities. As such, in addition to the educational purpose of the project, it has the potential to increase visibility of both the institute and the research group, while facilitating new networking possibilities.

*“we’re partnering with a charity (...) who work with schools in the Cambridge area (...) we’re working with them to design an interactive kind of whole sort of lesson plan around the game, so the idea would be that this could either be, well both, a facilitated not lesson but it would fit into a lesson slot within schools (...) it will also be available as a series of online resources (...) So that’s one way in which we’re hoping to use the game in the future, and we’d also like to be sharing it off at different science festivals” (PE expert at BI)*

At personal level, both PE experts of MELTIC and VACCINE show satisfaction for having participated in the NCC initiatives, and overall, they perceive this had a positive impact in their professional life, either in terms of learning useful skills or in terms of the networking opportunities offered through these multi-stakeholder collaborations.

*“With MELTIC I’ve learnt a lot about how to do a project from the beginning (...) I am very excited about the fact that, the feeling I have that what I have learnt is helping me to support the project” (PE expert at ISCIII)*

*“Oh, yeah, definitely! So, this is probably the biggest project of this sort that I have [led], as I said, I am relatively new to the Public Engagement sector (...) **I think that it’s definitely being benefit to me personally for being involved in the project because it’s given me more experience of managing a major project which involves several different stakeholders** (...) I would say that there has been impact from the designers themselves and from the scientists and from the students and from me as a Public Engagement person” (PE expert at BI)*

In the case of the PIs, despite showing personal satisfaction regarding the societal impact of both projects, **at these initial stages they do not refer to clear impact of the project for them at professional or career level**. For instance, the MELTIC PI, despite being very satisfied with the project process and outcomes, particularly its networking possibilities, sees a possible professional impact associated with publications in the long run, due to the long-time required to publish in the scientific field. In a more critical fashion the VACCINE PI, despite acknowledging the satisfaction gained for contributing to kids' learning about vaccination, clearly states that he does not see any impact yet of this co-creation project on his professional life as a scientist and relates this lack of professional impact to the value system of science which is only focused on scientific results. The fact that it is not easy for scientists to perceive the value of participating in this kind of activities from a professional perspective, particularly at initial stages of these actions, suggests that, in order to promote their involvement, it would be good to explore other incentives and re-orient this type of projects to benefit the researchers as well.

*"I think so (...) it has been a very innovative project, and I think with very good results (...) [about impact] networking, of course! About publications, as I said, since it is such a short project, scientific publications, I mean in classic journals, it takes a long time" (ISCIII Researcher)*

*"No. You know, I'm a scientist, I get judged on the science I do. These types of activities will probably be ignored by my colleagues, they're going to look at my science, not look at my public engagement activities. That's fine, though, I don't need to get an advantage from doing this, I think it's something that I will have a lot of personal satisfaction of if a bunch of kids learn two messages about vaccination, then that's the satisfaction I get, not that I'm going to get any advantage of it in my professional career" (BI Researcher)*

In terms of benefits associated to these initiatives, the MELTIC PI highlighted the co-creation nature of the project as being the most positive aspect:

*"... involving multiple actors, I found it super enriching (...) of course, we need actors with decision-making capacity (...) the initiative needs to come from above to give stability (...) it is very important to listen to the needs of those who are involved, you want to give a solution to real people..." (ISCIII Researcher)*

This aspect was also highlighted by the PE expert, who thinks that MELTIC offered the possibility to show that scientific projects (which are usually very standardised) can be developed in a co-creative way with the involvement of other actors apart from researchers, as it was required by this call:

*"not all projects have to be done in the same way, right? It seems that all scientific projects have a somewhat determined parametrization, but this project was much more about sharing science with people, and these [kind of projects] are equal or more interesting than the others" (PE expert at ISCIII)*

Moreover, according to its PE expert, MELTIC also contributed to publicize other ways to get funding from external sources (outside the own institution) so that other researchers can be more active in looking for funding for their projects:

*“MELTIC got funding within another European project, which is a bit beyond, how to say, the normal type of grants they usually have, right? Because the ISCIII a priori can only concur with its own funding initiatives within the internal strategic action”* (PE expert at ISCIII)

In the case of VACCINE, both the PI and the PE expert highlighted as the main benefit of the project the transferability of research through education, that is, having obtained an engaging tool for kids to learn about vaccination.

*“it gives us an extra tool, which is actually a really great tool, to engage with audiences in a new way, in a slightly different way.”* (PE expert at BI)

*“I think it is something that has got the potential to, if it’s taken up by teachers and science centres to very easily engage kids to learn one or two messages quite quickly, so that’s important.”* (BI Researcher)

Particularly, the PI signals as other potential benefits of this tool its usefulness to:

- Contribute to promote participation of more people in future research studies:

*“we’re doing a big vaccine, systems vaccinology study which has never been done in kids before (...) And **we are going to be, you know, using this game to engage the kids’ enrolments, teach them about why it’s important, you know, I think this is a fantastic tool, I’m really happy that we are part of that and about the outcome**”* (BI Researcher)

- Allow reaching a wider audience in a way that other (more conventional) outreach actions might not be able to achieve:

*“if we are going to have a generation of kids that just understand because they’ve simulated themselves that vaccination protects everyone, that will be huge because that is going to contribute to bringing down the anti-vacs movement and just rechanging that narrative. And getting me giving seminars on immunology and vaccination is never going to do that whereas engaging of the kids at an early stage in that kind”* (BI Researcher)

However, VACCINE project leaders show quite different views regarding how beneficial the co-creation process was for the researchers themselves and for their own project. Regarding benefits of the co-creation process for the researchers themselves, while the PE expert hopes it has been a positive experience for the researchers, the PI does not have a positive recall of the experience and he does not refer to any benefit for him. Even when he acknowledges that it might positively contribute to the professional development of the PhD students involved in the project, he refers not so much to their personal or professional growth through the experience, but in terms of external credit or recognition:

*“And hopefully for the researchers involved there’s a benefit to them as well, you know they can tell you more about whether that has been or not, but it gives them a chance to be involved in a project which is slightly different to their kind of day-to-day land work”* (PE expert at BI)

***I did not like that at all. And I don’t think I will do another co-creation thing again.*** (BI Researcher)

*“It’s probably going to be good for the CV of my students to have been involved in it and to get credit for it, so that’s probably a positive.”* (BI Researcher)

In terms of the benefits of co-creation for the project, the PE expert considers that involving students in the design of the game was clearly positive to obtain a final product that would be more engaging for students of the same age, who are the main target groups. In a similar way, despite the VACCINE PI critical views of the co-creation process, he acknowledges the satisfaction for having created a useful and engaging tool:

***“in terms of the benefits of running it as a co-creation project (...) it’s a game that is aimed at key-stage 3, so age 11-14 students, so it kind of makes a lot of sense to me that you would want to make sure that they’re involved in designing something that is actually of interest to them”*** (PE expert at BI)

*“The product that we’re making is something that I’ll be proud of, and something that the students in my lab who are being working on it, you know, they’re going to be proud of it (...) we’ve got the game, we’ve done a kids book and other activities that we are trying to do, this is something that I am very proud of the team we’re being part of, very proud of the product, very happy to have been a part of it even if I found the process to be suboptimal”* (BI Researcher)

It is worth mentioning that, in terms of disposition to participate in similar co-creation activities in the future, there is an overall positive attitude among project leaders, which can indicate they see benefits on being involved in this kind of multi-stakeholder collaborations.

*“Oh, yes, yes! In fact, I think it is good to be, having participated in a co-creation project because I hope to be a bit of a reference within the institution so that, when they have to [develop a co-creation project], they ask me”* (PE expert at ISCIII)

*“Yes, certainly, yes. Sure, if everything goes well and normal, of course” (ISCI Researcher)*

*“Oh, yes, absolutely. And hopefully one of those kinds of even more interactive than this (...) it would be really nice to do future co-creation projects when everything is more normal and you can actually meet and have some kind of really engaging face-to-face conversations with people and so, it's yeah, it's definitely something that I would be interesting in doing again in the future” (PE expert at BI)*

However, as suggested by VACCINE PI, researchers might prefer doing outreach activities aimed at communicating / educating the public rather than leading other more innovative initiatives which require working out of their comfort zone. This is something which should be taken into consideration when planning to involve researchers in Public Engagement actions, as although co-creation processes are, overall, positively valued, for those who are more reluctant it is important to have incentives (particularly economical ones) because they recognise that these more bi-directional or interactive processes are more demanding:

*“[regarding co-creation] It's not my preferred mechanism. I would certainly do plenty more public outreach events, that's part of my job, is to educate and engage the public. If possible, I would prefer not to work in this particular manner. On the other hand, you know, we do whatever we have to to get the resources to complete our mission, so I would participate in a co-creation project if that was the mechanism by which I could fund a public outreach event, yes” (BI Researcher)*

### 7.3.2. Main limitations of the Novel Co-creation projects

Despite being identified only in one of the analysed projects, the more important limitation or problem detected in Novel Co-creation Initiatives is related with the VACCINE PI strong criticism to the way the co-creations were developed. His strong viewpoints and manifested discomfort are explicitly related with his perception of the co-creation process as not respecting enough the expertise of each professional involved (particularly scientists) and the risk of endangering the scientific message by subordinating it to the engagement purposes.

*“I like experts, and if we have a project that requires for two parts of expertise then I want to be able to say: “on my expertise, this is what we need, that part is your expertise, you do that...” and get the results that way. **The idea of everyone sticking their fingers into the areas they are not expert in, to me did not add any value, and probably made the whole thing slightly worse and certainly a lot more painful (...)** So, yes to working with collaborators, not to working with them the way we just did” (BI Researcher)*



*“the point is to get across the scientific message. What I want is for collaborators to say: ok, that’s the message, I get it, this is how it should be implemented. Or feedback saying: I think they’re going to get the wrong message if we do this, let’s do it this way. That is great feedback. Saying: let’s do a different message, is to me... it’s engagement for the point of engagement. It creates a worst product just so that you can say that you had engagement (...) the negative part is the trying to take away the scientific message, to redirect the scientific message. (BI Researcher)*

As signalled by this PI, one of the tensions that needs to be negotiated in these co-creation processes is how to share the leadership of the project and what the expected roles and contributions of each partner or stakeholder are. This signals the importance of sharing rich descriptions and justifications about the co-creation process with the researchers beforehand and deciding early who will lead each step and what sort of transformation of knowledge will be needed.

*“Multistakeholders’ collaboration I like, **but for me the way to collaborate is for everyone to work in their area of expertise. And the way our co-collaboration event worked was not like that.** (...). You know, I’m the scientists there, I’m responsible for making sure that these messages are scientifically accurate, and having had 30 years of training, 25 years of training in this area that’s something that is in my area of expertise. I’m not going to tell the people coding the game how to code the game, and you know, they shouldn’t be put on the spot and after come up with what they think the key messages of immunology are that should be in the game. **I like to collaborate with people where we have clearly demarcated areas of expertise, and the way this co-collaboration, co-creation event was managed was much more, well, I felt that I did not have control of the scientific messaging the way I would like to** (BI Researcher)*

In addition to this, and perhaps closely related to it (as it affected the way the co-creations were organised), the main drawback encountered by both MELTIC and VACCINE, according to its PE experts, was the fact that no face-to-face interactions were possible due to the COVID-19 pandemic. Apart from the logistical/operational difficulties associated to the change of the working plans (which had to be adapted in a relatively short period of time to accomplish with the calendar of the ORION project), the main problem highlighted by the PE experts is related to the lower impact that both projects might have achieved through the online format.

*“the other big problem has been not being able to see each other, of course, not being able to meet (...) the work was also distorted a bit, because of course, online you cannot do it so cool, in the same way (...) and the conversations that come up, and the ideas, and the way you work in person” (PE expert at ISCIII)*

*“one thing that we have struggled with is, purely from a kind of practical perspective, the fact that everything had to be conducted online and while we’ve tried to find the best ways to get around this, it has meant that the project, there hasn’t been as much*

*interaction between the students and the researchers as I had hoped” (PE expert at BI)*

*“what was actually happening is they being quite sort of separate stakeholders and I’ve kind of almost acted as an intermediary, I’ve gone to the students, found that information from them, collected it from them, and taken it to the game developers and the researchers they’ve said, ok, what are we going to do with this? And the main reason for that is because things are being online” (PE expert at BI)*

*“actually direct interaction with students was quite limited (...) oh, but this would be so good if it was, you know, [the PI] in person and these two groups were really getting to interact” (PE expert at BI)*

*“I think there’s some kind of broader interactions and broader benefits have just kind of being able to chat with scientists that unfortunately we haven’t been able to add in as much as we would have liked.” (PE expert at BI)*

In the case of MELTIC, however, both its PE expert and PI agree that the limitation of having to adapt the project to the on-line format was somehow balanced by the possibility to reallocate the funding that had initially been planned for travels to attend the meetings for dissemination purposes and for the development of a technological application based on the co-creation dossier (Vademecum) with 100 ideas for health and wellbeing related solutions for small and isolated communities:

*“as we have done everything online, of course, we have money left over, so we have been able to make the technological proposal and do all these dissemination actions that we are going to do” (PE expert at ISCIII)*

*“one third [of MELTIC’s Budget] was for travel, and so well, we have reallocated it in another way, I think it’s fine” (ISCIII Researcher)*

## 8. Summary and conclusions

The main findings of the evaluation of the ORION Public Dialogues are the following:

- **ORION Public Dialogues are events that attract participants from the general public who already have positive views regarding Open Science.** These views include democratic reasons of fairness and ethics for these dialogues, opening mostly to other scientists and specially concerned groups and signalling that all aspects of research should be open to citizens, with a clear focus on research results and outcomes. The aspects of Open Science with less support by participating citizens included opening of the research process to industries and companies.
- **Citizens participating in ORION Public Dialogues (PDs),** either in those focused on science (e.g., concrete scientific concepts such as Genome Editing) or on science strategy (e.g., the research strategy of a research centre), and both in PDs organised in face-to-face and on-line format, **show very high levels of satisfaction regarding meeting their expectations, the format and length of the dialogues and the information and materials used.** They also perceived they learnt about the scientific topics of the dialogue.
- **Public engagement experts organising the Public Dialogues signal aspects of expertise, logistics, format, and content of the PDs that could be improved. In all PDs they raised concerns regarding the need to involve senior researchers and slow the pace of the event.** For the face-to-face PDs on Genome editing, concerns were raised also about the need to: identify suitable locations and timing for both researchers and the public; involve other relevant experts (e.g., ethical experts), better adapt the language and promote more direct and less regulated interaction with scientists. In the case of the PD on CRG research strategy, they were also concerned about how to ensure equity in participation as the open and direct debate with the public adds a layer of complexity.
- **Public engagement experts organising Public Dialogues, despite highlighting the importance of these events in allowing a necessary bidirectional exchange of views and information between scientists and the public and increasing their network, recognise these co-creation initiatives as expensive and time-consuming.** Issues regarding their suitability in terms of cost-effectiveness were raised and remain unclear.
- In the views of those experts organising Public Dialogues, a **more local, decentralised approach works better than a centralised, international one.** Issues such as the selection of the topic to be discussed, but also other organisational variables, needed to be more adapted to the local context. This has shown to **increase the capacity of PDs to inform management and policy making** at each RFPO.

- **The most valued characteristic of Public Dialogues for all participants**, including citizens, organisers, and researchers, **relates to their dialogic nature: the direct interaction that is established between scientists and other members of society.** This interaction showed to be more bidirectional between scientists and other stakeholders than with the general public. Interestingly, the online format experienced for PD during the Covid pandemic did not seem to have limited this dialogic nature with citizens.
- **To researchers, participating in a Public Dialogue with the general public is a satisfactory experience they will repeat in the future, which has a positive impact, particularly improving their communication skills.** When the PD fosters interaction of researchers with other stakeholders, impact also included other professional aspects, such as **opening their views regarding private funding.**

The main findings of the evaluation of the ORION Open Science funding calls are the following:

- **The ORION Open Science funding calls were novel experiences for the involved organisations which included Open Science principles both in the preparation of the call and in its evaluation criteria** (what the call would value). Examples of the introduced novel strategies were improving communication aspects, open peer-review procedures and attempting public involvement in evaluation. This needed the use of new resources such as open platforms for open peer review.
- **Co-creation processes developed for the definition of the OS funding calls were perceived as positive experiences which, despite requiring extra funding and considerable Open Science knowledge, showed to be feasible and impactful in their institutions.** Two main perceived benefits related to the strengthening of cooperation both at internal and external level and increase in quality, by incorporating diversity of views.
- **Organisers of the ORION Open Science funding calls consider that the call had also impact in the applicant-researchers, helping them to include Open Science principles in their work that would be useful along their research career.**

The main findings of the evaluation of the ORION Citizen Science and Novel Co-creation initiatives are the following:

- **The elaboration and launching of a call for promoting multiple stakeholders' engagement in science**, either as Citizen Science projects or Novel Co-creation

initiatives, **is a demanding process. A crucial aspect is ensuring coherence** between the level of co-creation and multi-stakeholder engagement expected in the applicant projects and the way the calls are developed and evaluated.

- **There is strong appreciation of the effort done in simplifying the application process of these calls on Citizen Science or Novel Co-creation initiatives**, with application forms and procedures being simple, short and clear enough. **However, those aspects related with general Open Science requirements, particularly regarding data management and ethics, were pointed out as adding complexity.**
- **Early career researchers showed to have an interesting role in Citizen Science and multiple stakeholder engagement projects**, both at the levels of co-creation of calls and as desirable applicants. However, in this latter case the calls need to be better adapted to their needs and possibilities.
- **The participation in science projects that involve active multiple stakeholders' engagement, either as Citizen Science or Novel Co-creation initiatives, showed to be very demanding for researchers, particularly at initial stages of the project.** They explicitly state to be “out of their comfort zone” and worried about the scientific adequacy and results of the project. Reasons behind this discomfort seem to be related with the sharing of leadership and loss of control on the whole decision-making process that these co-created projects with multiple stakeholders entail.
- **The role of Public Engagement experts in these projects is recognised by all involved actors as crucial.** Ranging from strong initial support to a shared leadership model, in all the analysed projects there was the need of an important involvement of the Public Engagement experts that largely exceeds their usual role in more standard scientific projects, in which concrete facilitation is provided when demanded from scientists.
- **According to the views of those participating in active, multiple stakeholders' engagement projects in science, either as Citizen Science or Novel Co-creation initiatives, these projects have benefits both at personal and professional level for those involved in the team.** Important benefits signalled by researchers are related with increasing networking, adding diversity of views, improving communication, improving efficiency, feeling their work is worthier and being more self-reflective about their own research. For Public Engagement experts, these projects help to increase visibility of the research group/topic and raise awareness on the possibilities of Open Science, particularly regarding funding benefits. Even when there is initial struggle and reluctant views at the beginning of some projects, in those that have been running for a while in the long run the process is perceived as worthy.
- **Some researchers leading the active, multiple stakeholders' engagement projects that were launched and evaluated at ORION show a certain**

**preoccupation regarding the quality of the science being used or produced** in these projects. Examples could be feeling that the scientific message could be endangered and that their scientific expertise could be trivialised by giving more importance to the engagement aspect than to the scientific one.

- **Scientific projects that involve demanding co-creation processes are described as more time and resource-consuming than more standard scientific projects.** Particularly for Citizen Science ones, researchers highlight that the impact of these projects relies mostly in their scientific results, which is not guaranteed during the process of the project. The need to adapt traditional roles of researchers and public engagement experts to a co-leadership model has been also identified as being problematic.



## 9. Main recommendations

From the conclusions of the previous section and the knowledge gathered through the ORION actions and professional exchanges, a series of recommendations can be made:

### **RECOMMENDATION NUMBER 1**

Co-creation experiments can take multiple forms, from internationally organised Public Dialogues to other multi-stakeholder engagement initiatives. Whatever the scale, to meet expectations and showing impact, these initiatives need to be carefully planned, locally adapted, clearly communicated, generously funded, and strongly facilitated from professionals with enough expertise in public engagement. A focus in these characteristics is crucial to ensure coherence between the way the initiatives are developed, selected and/or promoted and the way they are expected to run in practice.

### **RECOMMENDATION NUMBER 2**

The ORION Open Science principles of active involvement of a great diversity of stakeholders in the co-creation through all the different phases of these projects, from call design to final presentation of results, showed to be feasible in practice in all the participating RFPOs. However, it was not exempted of tensions. These projects showed to be very demanding in terms of organisation and development, mostly for the researchers involved. The more demanding the project is in terms of the level of co-creation expected to be achieved, the more tension it presents with respect to the standard, non-cocreated way of doing science. These tensions should not be underestimated, as they seem to be more related with the role researchers are expected to have in the project they lead and their responsibility towards the knowledge produced than with just personal characteristics. Ways of reducing and negotiating these tensions could be introduced, such as carefully explaining that these projects usually imply a shared leadership model, that their initial rhythm is slower at the beginning of the project and that there are important personal and professional benefits other researchers highlighted.

### **RECOMMENDATION NUMBER 3**

The most important characteristic that is emphasised in all ORION co-creation experiments is the benefit introduced by the exchange of different viewpoints produced, mostly through direct interaction and dialogue between researchers, citizens and other stakeholders. When this interaction involves expert stakeholders the establishment of a bidirectional communication is easily achieved, and benefits are clearly perceived by all actors. However, when involving the general public, even in sophisticated co-creation initiatives, it shows difficult to overcome a model of unidirectional exchange where scientists mostly share with citizens their results and outcomes and/or lead all aspects of their scientific endeavour. Challenging this model requires that co-creation initiatives give an important role to citizen, including a learning phase to ensure authentic empowerment, so that participation is perceived as relevant by both citizens and scientists. Interestingly, the direct communication is limited but not hindered by on-line formats of organising co-creation initiatives.

### **RECOMMENDATION NUMBER 4**

Introducing the Open Science principles of co-creation and multiple stakeholder engagement in funding organisations showed easier than expected and it is recognised as strongly beneficial both internally for the organisation and externally. There is a promising horizon in this respect, as funding strongly guides not only which science is done but also how to do it. By funders experiencing themselves the benefits but also the limits and problems of introducing co-creation and multi-stakeholder engagement in their own organisations and in the ways they actually do their job, they construct a more realistic view on the introduction of Open Science principles in actual practice. This could lead to more plausible, targeted, focused, and simplified funding schemes that could actually promote particularly useful co-creation and active stakeholder engagement, rather than just broad requirements of as much Open Science as possible in all initiatives.

## **RECOMMENDATION NUMBER 5**

Despite its promising initial impacts and triggering very positive perceptions from all participants, co-creation initiatives generate certain doubts and critical views. Being in general very time and resource-consuming initiatives, issues of sustainability, cost-effectiveness and impact on both society and science are raised. This fact does not diminish their suitability and potential: democracy is also a very expensive way of organising society. However, it signals the importance of 1) providing enough resources, particularly in terms of funding and time, but also in terms of training and access to professionals, particularly public engagement ones; and 2) carefully choosing in which initiatives introduce co-creation and multiple stakeholder engagement principles and at what level to do so. In addition, it shows the importance of analysing long-term impact rather than short-term one. This implies a compromise not only regarding the promotion of co-creation initiatives but regarding its evaluation.

## Annex I – Public Dialogue to inform CRG’s research strategy: Participants’ questionnaire template (English version)

### Pre-questionnaire

Introduction (for general public)

#### **CONGRATULATIONS!**

You have been invited to participate in the Public Dialogue of the Centre for Genomic Regulation (CRG). A Public Dialogue is a technique for bringing together citizens and experts to debate and reflect on complex or controversial scientific research topics. Through this questionnaire, we want to know what you think about bringing scientific research (for example, like the one done in the CRG) to non-scientists like you. Can you help us by answering the following questions?

[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers!

Introduction (for CRG researchers)

Thanks for participating in the Centre for Genomic Regulation (CRG) Public Dialogue. A Public Dialogue is a technique to bring together citizens and experts to discuss and reflect on complex or controversial scientific research topics. Through this questionnaire, we want to find out what you think about bringing scientific CRG research (such as that carried out at CRG) to non-scientists. Will you help us by answering the following questions?

[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers!

Introduction (for stakeholders)

Thanks for participating in the Centre for Genomic Regulation (CRG) Public Dialogue. Through this questionnaire, we want to find out what you think about bringing scientific research (such as that carried out at CRG) to non-scientists. Will you help us by answering the following questions?

[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers!

Please, write your initials ONLY (Name/Surname)

Please, write YOUR Date of Birth

**Q1. Why do you think that scientific research centres organise events like this Public Dialogue to which you have been invited to participate?**

**Q2. Which are your expectations about this Public Dialogue?**

**Q3. In your opinion, who should attend events like this Public Dialogue? For each item, rank it from 1 to 5 (1=attendance is not important, 5=attendance is very important) [Choose only ONE ANSWER IN EACH LINE]**

|                                            | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------|---|---|---|---|---|
| scientists working on the genome field     |   |   |   |   |   |
| scientists from other disciplines          |   |   |   |   |   |
| all citizens                               |   |   |   |   |   |
| civil and social organizations             |   |   |   |   |   |
| specially concerned groups (e.g. patients) |   |   |   |   |   |
| funders and policy makers                  |   |   |   |   |   |
| industry and companies                     |   |   |   |   |   |

**Q4. In your opinion, how open do you think the different aspects of the scientific process should be to citizens like yourself? For each item, rank it from 1 to 5 (1=should NOT be open, 5=should be very open) [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                        | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------|---|---|---|---|---|
| <b>The research priorities</b> (what topics, how much funding...)                      |   |   |   |   |   |
| <b>The design of the research</b> (what methodologies, what ethical considerations...) |   |   |   |   |   |
| <b>The research process</b> (data gathering, data management...)                       |   |   |   |   |   |
| <b>The research results</b> (knowledge, publications, patents...)                      |   |   |   |   |   |
| <b>The research outcomes</b> (design of end products for end users...)                 |   |   |   |   |   |

**Q5. In your opinion, which of the following reasons justifies the organization of events like this Public Dialogue? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                        | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Diversity</b><br>Incorporation of underrepresented groups in science (gender, ethnicity, cultures, etc.)                                                            |                               |                               |                     |                                            |                                                   |
| <b>New and innovative economic possibilities</b><br>Scientists opening up to new forms of funding that include society (e.g. crowdfunding, new types of funders, etc.) |                               |                               |                     |                                            |                                                   |
| <b>Efficiency</b><br>Scientists having to share the data they use/create, having to use procedures to optimize the data, etc.                                          |                               |                               |                     |                                            |                                                   |
| <b>Equity</b><br>Everyone having access to scientific results, methods, software etc. regardless of economic capacity or institutional affiliation                     |                               |                               |                     |                                            |                                                   |
| <b>Ethics</b><br>Science being aligned with principles for research integrity                                                                                          |                               |                               |                     |                                            |                                                   |
| <b>Fairness</b><br>Science is often funded by society, so all results from the research should be available to society                                                 |                               |                               |                     |                                            |                                                   |
| <b>Impact</b><br>To outperform traditional metrics for scientific impact: to get to larger audiences, to achieve a higher engagement, etc                              |                               |                               |                     |                                            |                                                   |
| <b>Rigour</b><br>Using Open Access, Open data and/or open replicability mechanisms to make science easier to review                                                    |                               |                               |                     |                                            |                                                   |

**OTHERS**



**Q6. In your opinion, why should science NOT be open? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                                                                  | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Not a priority now.</b><br>Currently, there are higher priorities in the scientific community.                                                                                                                |                               |                               |                     |                                            |                                                   |
| <b>Publics' lack of understanding.</b><br>Society cannot make decisions or have a useful input without an understanding of science/the scientific process.                                                       |                               |                               |                     |                                            |                                                   |
| <b>Public is not ready now.</b><br>Society is not ready for participation in science (lack of skills, tools, etc).                                                                                               |                               |                               |                     |                                            |                                                   |
| <b>Risk to fundamental research.</b><br>Open Science would only benefit applied science and be detrimental to fundamental research                                                                               |                               |                               |                     |                                            |                                                   |
| <b>Low quality.</b><br>By releasing publications prior to classical peer-review, the veracity of papers will be difficult to assess by individual researchers Quality is not guaranteed by preprint servers.     |                               |                               |                     |                                            |                                                   |
| <b>Danger and potential misuse.</b><br>Open Science may interfere with research integrity (ex: release of medical personal data). It could also facilitate misuse of research results (e.g. biological weapons). |                               |                               |                     |                                            |                                                   |
| <b>Lack of incentives</b><br>Open data / publication runs counter "meritocracy" and individual effort, and they are not captured and rewarded through traditional metrics.                                       |                               |                               |                     |                                            |                                                   |

|                                                                                                                                                                            |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| <b>Unfairness.</b><br>If a research group generates knowledge with own resources, it could be unfair if others use this knowledge to get economic benefits for themselves. |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|

## OTHERS

**Q7. Overall, if you had to summarize your view on Open Science, what would you say?**

- ☐ Open Science is an exciting opportunity for Science, mostly with benefits
- ☐ Open Science is an opportunity for Science, with the benefits overcoming the drawbacks
- ☐ Open Science is mostly positive for Science, it has benefits but also important drawbacks
- ☐ Open Science is an unimportant bureaucratic burden for Science
- ☐ Open Science is a worrying new perspective for Science
- ☐ Open Science is a real threat to Science

We want to know a little more about you...

**Q8. Your gender**

- ☐ Female
- ☐ Male
- ☐ Others

**Q9. Which is your highest completed level of education? [Choose ONLY ONE option]**

- ☐ Without completed education; Primary school;
- ☐ Secondary education
- ☐ Tertiary education

**Q10. In your opinion, which is your level of attachment to science? (1=not very attached; 9=very attached) [Choose ONLY ONE option]**

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

*(the next question was only present in the questionnaires distributed to CRG researchers and stakeholders, not the general public)*

**Q11. In your opinion, your level of attachment to science is a consequence of...**

**[Choose ONLY ONE option]**

- ☐ Exposure to mass media (e.g. I get acquainted to scientific issues through news, I watch science documentaries, I read science magazines etc.)
- ☐ Having a special interest in a science related area (e.g. I have a hobby related to mechanics, electronics, nutrition, etc.)
- ☐ Own studies/academic background (e.g. I have studies related to the scientific field)
- ☐ Own job (e.g. My job is somehow related to a scientific field)
- ☐ Others' job (e.g. I have a relative or close friend that works in a science related field)
- ☐ Others. Please specify which one: .....

## Post-questionnaire

At the beginning of the CRG Public Dialogue we asked you to answer some questions...  
Now, we would like to ask you to answer some of them again (and new ones).

[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers!

**Please, write your initials ONLY (Name/Surname)**

**Please, write YOUR Date of Birth**

**Please indicate which of the following events within the Public Dialogue you participated in:**

- ☐ Online community and/or online sessions (between 28th September and 13th October)
- ☐ Online workshop (20th October)
- ☐ Final online workshop (4th November)

**Q1. Why do you think that scientific research centres organize events like this Public Dialogue to which you have been invited to participate?**

**Q2. To which extent did the Public Dialogue fulfil your initial expectations? Please, rate from 1 (very low) to 10 (very high).**

1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

**Q3. Which aspects of the Public Dialogue would you highlight as more positive? Please, describe them.**

**Q4. Which aspects of the Public Dialogue would you point as less positive? Please, describe them.**

**Q5. In your opinion, who should attend events like this Public Dialogue? For each item, rank it from 1 to 5 (1=attendance is not important, 5=attendance is very important) [Choose only ONE ANSWER IN EACH LINE]**

|                                            | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------|---|---|---|---|---|
| scientists working on the genome field     |   |   |   |   |   |
| scientists from other disciplines          |   |   |   |   |   |
| all citizens                               |   |   |   |   |   |
| civil and social organizations             |   |   |   |   |   |
| specially concerned groups (e.g. patients) |   |   |   |   |   |
| funders and policy makers                  |   |   |   |   |   |
| industry and companies                     |   |   |   |   |   |

**Q6. In your opinion, how open do you think the different aspects of the scientific process should be to citizens like yourself? For each item, rank it from 1 to 5 (1=should NOT be open, 5=should be very open) [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                        | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------|---|---|---|---|---|
| <b>The research priorities</b> (what topics, how much funding...)                      |   |   |   |   |   |
| <b>The design of the research</b> (what methodologies, what ethical considerations...) |   |   |   |   |   |
| <b>The research process</b> (data gathering, data management...)                       |   |   |   |   |   |
| <b>The research results</b> (knowledge, publications, patents...)                      |   |   |   |   |   |
| <b>The research outcomes</b> (design of end products for end users...)                 |   |   |   |   |   |

**Q7. In your opinion, which of the following reasons justifies the organization of events like this Public Dialogue? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                        | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Diversity</b><br>Incorporation of underrepresented groups in science (gender, ethnicity, cultures, etc.)                                                            |                               |                               |                     |                                            |                                                   |
| <b>New and innovative economic possibilities</b><br>Scientists opening up to new forms of funding that include society (e.g. crowdfunding, new types of funders, etc.) |                               |                               |                     |                                            |                                                   |
| <b>Efficiency</b><br>Scientists having to share the data they use/create, having to use procedures to optimize the data, etc.                                          |                               |                               |                     |                                            |                                                   |
| <b>Equity</b><br>Everyone having access to scientific results, methods, software etc. regardless of economic capacity or institutional affiliation                     |                               |                               |                     |                                            |                                                   |
| <b>Ethics</b><br>Science being aligned with principles for research integrity                                                                                          |                               |                               |                     |                                            |                                                   |
| <b>Fairness</b><br>Science is often funded by society, so all results from the research should be available to society                                                 |                               |                               |                     |                                            |                                                   |
| <b>Impact</b><br>To outperform traditional metrics for scientific impact: to get to larger audiences, to achieve a higher engagement, etc                              |                               |                               |                     |                                            |                                                   |
| <b>Rigour</b><br>Using Open Access, Open data and/or open replicability mechanisms to make science easier to review                                                    |                               |                               |                     |                                            |                                                   |

**OTHERS**



**Q8. In your opinion, why should science NOT be open? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                                                                  | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Not a priority now.</b><br>Currently, there are higher priorities in the scientific community.                                                                                                                |                               |                               |                     |                                            |                                                   |
| <b>Publics' lack of understanding.</b><br>Society cannot make decisions or have a useful input without an understanding of science/the scientific process.                                                       |                               |                               |                     |                                            |                                                   |
| <b>Public is not ready now.</b><br>Society is not ready for participation in science (lack of skills, tools, etc).                                                                                               |                               |                               |                     |                                            |                                                   |
| <b>Risk to fundamental research.</b><br>Open Science would only benefit applied science and be detrimental to fundamental research                                                                               |                               |                               |                     |                                            |                                                   |
| <b>Low quality.</b><br>By releasing publications prior to classical peer-review, the veracity of papers will be difficult to assess by individual researchers Quality is not guaranteed by preprint servers.     |                               |                               |                     |                                            |                                                   |
| <b>Danger and potential misuse.</b><br>Open Science may interfere with research integrity (ex: release of medical personal data). It could also facilitate misuse of research results (e.g. biological weapons). |                               |                               |                     |                                            |                                                   |
| <b>Lack of incentives</b><br>Open data / publication runs counter "meritocracy" and individual effort, and they are not captured and rewarded through traditional metrics.                                       |                               |                               |                     |                                            |                                                   |

|                                                                                                                                                                            |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| <b>Unfairness.</b><br>If a research group generates knowledge with own resources, it could be unfair if others use this knowledge to get economic benefits for themselves. |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|

## OTHERS

**Q9. Overall, if you had to summarize your view on Open Science, what would you say?**

- ☐ Open Science is an exciting opportunity for Science, mostly with benefits
- ☐ Open Science is an opportunity for Science, with the benefits overcoming the drawbacks
- ☐ Open Science is mostly positive for Science, it has benefits but also important drawbacks
- ☐ Open Science is an unimportant bureaucratic burden for Science
- ☐ Open Science is a worrying new perspective for Science
- ☐ Open Science is a real threat to Science

**Q10. Please, rate the Public Dialogue according to how much you agree with the following statements: *After participating in this event...***

|                                                                                                                                                                    | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| ... I think that research centres such as CRG should prioritize basic science even though there are still no specific applications of the research they carry out. |                |       |         |          |                   |
| ...I could explain to another person the kind of scientific research that is carried out at CRG.                                                                   |                |       |         |          |                   |
| ... I think that the CRG should invest resources in seeking and obtaining private funding, both from small and large donors.                                       |                |       |         |          |                   |
| ... I feel unconfident and incapable of making judgments about the benefits and risks of genetic research.                                                         |                |       |         |          |                   |

|                                                                                                                                                                                                      |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| ... I think it is normal that research in basic science gets less funding than research in applied science.                                                                                          |  |  |  |  |  |
| ... I think that the CRG should collaborate with private companies to find and create application opportunities (for instance, in clinics)                                                           |  |  |  |  |  |
| ... I think that citizens should not necessarily be involved in decisions about scientific research carried out in centres like the CRG.                                                             |  |  |  |  |  |
| ... I think that it is necessary to understand how research works and to know the vision of scientists to have better judgment when making decisions on ethically and socially controversial issues. |  |  |  |  |  |

**Q11. Please, rate the Public Dialogue according to how much you agree with the following statements:**

|                                                                                                                         | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|-------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| The duration of the online community has been adequate.                                                                 |                |       |         |          |                   |
| The duration of the online sessions was sufficient to be able to discuss the topics of debate.                          |                |       |         |          |                   |
| The information and materials provided prior to the Public Dialogue have been helpful to my participation.              |                |       |         |          |                   |
| The format of the event and the technological means used have been adequate.                                            |                |       |         |          |                   |
| The online sessions have been correctly moderated to promote the participation of the different agents in the Dialogue. |                |       |         |          |                   |
| Interaction with other participants has been satisfactory.                                                              |                |       |         |          |                   |
| The scientific projects ("case studies") selected for discussion have been relevant.                                    |                |       |         |          |                   |
| The investment of time required for my participation in the Public Dialogue has been adequate.                          |                |       |         |          |                   |

**Q12. Please, rate how much you agree with the following statement.**

|                                                                              | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| I would recommend taking part in events like this Public Dialogue to others. |                |       |         |          |                   |

**Q13. Do you have any suggestions on how this Public Dialogue could be IMPROVED in the future? (Both in its content and format)**

**Q14. Please add any other comments you might wish.**

*(the next questions were only present in the questionnaires distributed to CRG researchers, not the general public)*

**Q15. Your professional experience at CRG**

- ☐ Less than 1 year
- ☐ 1 to 5 years
- ☐ More than 5 years

**Q16. Your position at CRG**

- ☐ Profile A. Principal Investigator (PIs)
- ☐ Profile B. Senior researcher (staff scientists, etc)
- ☐ Profile C. Post-docs
- ☐ Profile D. PhD students
- ☐ Profile E. Technicians
- ☐ Profile F. Staff at Core Facilities
- ☐ Profile G. Science communication / Outreach officers
- ☐ Profile H: Management and administrative staff
- ☐ Profile I: Funding programmer manager

## Annex II – National Public Dialogue on Genome Editing: Participants' questionnaire template (English version)

### Pre-questionnaire

#### CONGRATULATIONS!

If you are filling in this questionnaire it means that you are about to participate in the ORION Public Dialogue on genome editing. A Public Dialogue is a technique to bring together citizens and experts to discuss and reflect on complex or controversial scientific research topics.

Through this questionnaire, we want to find out what do you think about bringing scientific research to non-scientists, like you. Will you help us by answering the following questions?

[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers 😊

**Please, write your initials ONLY (Name/Surname)**

**Please, write YOUR Date of Birth**

**Q1. In your opinion, who should attend events like this? From each item, rank it from 1 to 5 (1=should NOT be open, 5= should be very open) [Choose only ONE ANSWER IN EACH LINE]**

|                                                       | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------|---|---|---|---|---|
| scientists working on the genome/genome editing field |   |   |   |   |   |
| scientists from other disciplines                     |   |   |   |   |   |
| all citizens                                          |   |   |   |   |   |
| civil and social organizations                        |   |   |   |   |   |
| specially concerned groups (e.g. patients)            |   |   |   |   |   |
| funders and policy makers                             |   |   |   |   |   |
| industry and companies                                |   |   |   |   |   |

**Q2. In your opinion, how open do you think the different aspects of the scientific process should be to citizens like yourself? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                        | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------|---|---|---|---|---|
| <b>The research priorities</b> (what topics, how much funding...)                      |   |   |   |   |   |
| <b>The design of the research</b> (what methodologies, what ethical considerations...) |   |   |   |   |   |
| <b>The research process</b> (data gathering, data management...)                       |   |   |   |   |   |
| <b>The research results</b> (knowledge, publications, patents...)                      |   |   |   |   |   |
| <b>The research outcomes</b> (design of end products for end users...)                 |   |   |   |   |   |

**Q3. Which of the following reasons justifies the organization of events like this one? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                        | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Diversity</b><br>Incorporation of underrepresented groups in science (gender, races, cultures, etc.)                                                                |                               |                               |                     |                                            |                                                   |
| <b>New and innovative economic possibilities</b><br>Scientists opening up to new forms of funding that include society (e.g. crowdfunding, new types of funders, etc.) |                               |                               |                     |                                            |                                                   |
| <b>Efficiency</b><br>Scientists having to share the data they use/create, having to use procedures to optimize the data, etc.                                          |                               |                               |                     |                                            |                                                   |
| <b>Equity</b><br>Everyone having access to scientific results, methods, software etc. regardless of economic capacity or institutional affiliation                     |                               |                               |                     |                                            |                                                   |
| <b>Ethics</b><br>Science being aligned with principles for research integrity                                                                                          |                               |                               |                     |                                            |                                                   |
| <b>Fairness</b><br>Science is often funded by society, so all results from the research should be available to society                                                 |                               |                               |                     |                                            |                                                   |



|                                                                                                                                           |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| <b>Impact</b><br>To outperform traditional metrics for scientific impact: to get to larger audiences, to achieve a higher engagement, etc |  |  |  |  |  |
| <b>Rigour</b><br>Using Open Access, Open data and/or open replicability mechanisms to make science easier to review                       |  |  |  |  |  |

## OTHERS

**Q4. How likely are you to participate in an activity similar to this one within the next 12 months?**

(1=not very likely; 9=very likely) **[Choose ONLY ONE option]**

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

We want to know a little more about you...

**Your gender** **[Choose ONLY ONE option]**

- ☐ Female  
☐ Male  
☐ Other

**Your age**

**Which is your highest completed level of education?** **[Choose ONLY ONE option]**

- ☐ Without completed education; Primary school;  
☐ Secondary education (Secondary school 6th form; Diploma – Foundation; Diploma – Higher Diploma – Advanced; National Vocational Qualification (NVQ) Level 1; NVQ Level 2; NVQ Level 3);  
☐ Tertiary education (NVQ Level 4; NVQ Level 5; Higher National Certificate (HNC); Higher National Diploma (HND); Diploma of Higher Education; Foundation degree; University education – Bachelor's degree; University education – Master's degree; University education – Doctorate).

**In your opinion, which is your level of attachment to science?**

(1=not very attached; 9=very attached) **[Choose ONLY ONE option]**

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

**In your opinion, your level of attachment to science is a consequence of...**

**[Choose AS MANY OPTIONS AS YOU WANT]**

- ☐ Exposure to mass media (E.g. I get acquainted to scientific issues through news, I watch science documentaries, I read science magazines etc.)
- ☐ Having a special interest in a science related area (E.g. I have a hobby related to mechanics, electronics, nutrition, etc.)
- ☐ Own studies/academic background (E.g. I have studies related to the scientific field)
- ☐ Own job (E.g. My job is somehow related to a scientific field)
- ☐ Others' job (E.g. I have a relative or close friend that works in a science related field)
- ☐ Others. Please specify which one: .....

**WHY have you participated in this Public Dialogue?**

**THANKS FOR ANSWERING**

## Post-questionnaire

**At the start of this Public Dialogue we asked you to respond to some questions...  
Could you answer them again? (And a few more?)**

**[This is an ANONYMOUS questionnaire. Please, answer ALL the questions.]  
And always keep in mind there are NO wrong answers 😊**

**Please, write your initials ONLY (Name/Surname)**

**Please, write YOUR Date of Birth**

**Q1. In your opinion, who should attend events like this? From each item, rank it from 1 to 5 (1=should NOT be open, 5= should be very open) [Choose only ONE ANSWER IN EACH LINE]**

|                                                       | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------|---|---|---|---|---|
| scientists working on the genome/genome editing field |   |   |   |   |   |
| scientists from other disciplines                     |   |   |   |   |   |
| all citizens                                          |   |   |   |   |   |
| civil and social organizations                        |   |   |   |   |   |
| specially concerned groups (e.g. patients)            |   |   |   |   |   |
| funders and policy makers                             |   |   |   |   |   |
| industry and companies                                |   |   |   |   |   |

**Q2. In your opinion, how open do you think the different aspects of the scientific process should be to citizens like yourself? [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                        | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------|---|---|---|---|---|
| <b>The research priorities</b> (what topics, how much funding...)                      |   |   |   |   |   |
| <b>The design of the research</b> (what methodologies, what ethical considerations...) |   |   |   |   |   |
| <b>The research process</b> (data gathering, data management...)                       |   |   |   |   |   |
| <b>The research results</b> (knowledge, publications, patents...)                      |   |   |   |   |   |
| <b>The research outcomes</b> (design of end products for end users)                    |   |   |   |   |   |

**Q3. Which of the following reasons justifies the organization of events like this one?**  
**[Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                                                        | Not a reason for Open Science | A relatively important reason | An important reason | The most important reason for Open Science | I don't know it / I don't have enough information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------|--------------------------------------------|---------------------------------------------------|
| <b>Diversity</b><br>Incorporation of underrepresented groups in science (gender, races, cultures, etc.)                                                                |                               |                               |                     |                                            |                                                   |
| <b>New and innovative economic possibilities</b><br>Scientists opening up to new forms of funding that include society (e.g. crowdfunding, new types of funders, etc.) |                               |                               |                     |                                            |                                                   |
| <b>Efficiency</b><br>Scientists having to share the data they use/create, having to use procedures to optimize the data, etc.                                          |                               |                               |                     |                                            |                                                   |
| <b>Equity</b><br>Everyone having access to scientific results, methods, software etc. regardless of economic capacity or institutional affiliation                     |                               |                               |                     |                                            |                                                   |
| <b>Ethics</b><br>Science being aligned with principles for research integrity                                                                                          |                               |                               |                     |                                            |                                                   |
| <b>Fairness</b><br>Science is often funded by society, so all results from the research should be available to society                                                 |                               |                               |                     |                                            |                                                   |
| <b>Impact</b><br>To outperform traditional metrics for scientific impact: to get to larger audiences, to achieve a higher engagement, etc                              |                               |                               |                     |                                            |                                                   |
| <b>Rigour</b><br>Using Open Access, Open data and/or open replicability mechanisms to make science easier to review                                                    |                               |                               |                     |                                            |                                                   |

**OTHERS**

**Q4. How likely are you to participate in an activity similar to this one within the next 12 months?**

(1=not very likely; 9=very likely) **[Choose ONLY ONE option]**

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

We want to know a little bit more...

**Q5. Please, rate the event according to how much you agree with the following statements: *After participating in this event I have learnt valuable knowledge...***

**[Choose only ONE ANSWER IN EACH LINE]**

|                                                                            | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|----------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| ... about how genes and the genome work                                    |                |       |         |          |                   |
| ... about the CRISPR-Cas9 technology                                       |                |       |         |          |                   |
| ... about uses and applications of genome editing in real life             |                |       |         |          |                   |
| ... about how and when I can participate in scientific research activities |                |       |         |          |                   |

**Q6. Please, rate the event according to how much you agree with the following statements: *After participating in the Public Dialogue...*** **[Choose only ONE ANSWER IN EACH LINE]**

|                                                                                                                                         | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| ... I am more confident and feel enabled to judge what the benefits and risks of genome editing might be                                |                |       |         |          |                   |
| ... I feel more confident in participating in scientific activities like this one                                                       |                |       |         |          |                   |
| ... I value very positively events in which citizens participate in scientific research                                                 |                |       |         |          |                   |
| ... I would agree with increasing the public money destined to organize scientific activities (like this one) that incorporate citizens |                |       |         |          |                   |

**Q7. Please, rate the event according to how much you agree with the following statements [Choose only ONE ANSWER IN EACH LINE]**

|                                                                                         | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|-----------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| The workshops met my expectations                                                       |                |       |         |          |                   |
| The overall structure and length of the workshops was appropriate                       |                |       |         |          |                   |
| I think the information and materials used during the workshops are relevant and useful |                |       |         |          |                   |
| I would recommend taking part in events like this one to others                         |                |       |         |          |                   |

**Q8. Do you have any suggestion on how this event could be IMPROVED in the future? (Both in its content and format)**

**THANKS FOR ANSWERING**



## Annex III – Citizen Science projects questionnaires (English version)

### GENIGMA questionnaire

#### Congratulations!

If you are filling out this questionnaire it means that some time ago you participated in a Genigma event and you have just participated in the test of the app (app) designed to collaboratively discover the genomic alterations of cancer cells. . We would be grateful if you could answer the following questionnaire to help us understand your opinion on this type of Citizen Science activities in which citizens participate from the beginning in the project.

#### SECTION 1

- In which GENIGMA activities have you participated?

- ☐ Co-creation I (January 2019)
- ☐ Co-creation II (March 2019)
- ☐ Co-creation III (April 2019)
- ☐ Analogical testing (May 2019)
- ☐ Digital testing (October 2019)
- ☐ Testing alpha version (November 2020)

Q1. What would you highlight about the co-creation process and / or the session (s) in which you participated in the GENIGMA project?

Q2. Please rate how much you agree with the following statements: *“These sessions helped me to see and/or reinforced my opinion on the fact that...”*:

|                                                                    | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|--------------------------------------------------------------------|-------------------|----------|---------|-------|----------------|
| ... citizens can make important contributions to science.          |                   |          |         |       |                |
| ... science benefits from citizen participation                    |                   |          |         |       |                |
| ... citizens are able to collaborate face-to-face with scientists. |                   |          |         |       |                |

Q3. To what extent do you think that the GENIGMA project meets the following principles of good practice in Citizen Science? For each item, rank it from 1 (very low) to 5 (very high):

|                                                                                                          | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| This project will generate new knowledge from which society will be able to benefit.                     |   |   |   |   |   |
| Citizens actively participate in one or more stages of the research process.                             |   |   |   |   |   |
| Citizen participation has been an essential part of creating the foundations of Genigma.                 |   |   |   |   |   |
| The project has been designed in such a way as to bring the whole process closer to non-expert citizens. |   |   |   |   |   |
| The results will be public and open. Communication with the scientific team is encouraged.               |   |   |   |   |   |

Q4. How would you rate the experience of having participated in the GENIGMA tests? Score from 1 (VERY LITTLE SATISFACTORY) to 10 (VERY SATISFACTORY)

1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

Q5. Do you have any suggestions on how this type of process could be improved in the future in Citizen Science projects?

Q6. Do you plan to continue collaborating with the project? In what way?

Q7. Have you ever visited the GENIGMA website or are you following social media (Twitter / Facebook) to find out about the progress of the project?

- ☐ Yes  
☐ No

Q8. Would you like to attend a session with the scientific leaders of the project to find out in more detail how this research is progressing?

- ☐ Yes  
☐ No

## SECTION 2

## We would like to know a little more about you...

- Your gender

- ☐ Female
- ☐ Male
- ☐ Other

- Your age

- The highest level of education you have completed

- ☐ Without completed education; primary school;
- ☐ Secondary education;
- ☐ Tertiary education;

- Some of you were invited to participate in GENIGMA activities for belonging to a specific interest group. Could you tell us which this group is?

- ☐ Scientific area
- ☐ Medical / healthcare staff (hospital area)
- ☐ Teachers
- ☐ Bioethics expert
- ☐ Journalist
- ☐ Artistic field
- ☐ Patient
- ☐ Patient relative
- ☐ Patient association
- ☐ Literary field
- ☐ Frequent player and / or worker in the field of games / video games
- ☐ Other

- Would you like us to give you a brief interview to find out more about your opinion after participating in this project? If so, please tell us your name so we can contact you.

## SMOVE questionnaire

We would be grateful if you, as a teacher who participated in the SMOVE project, could answer the following questionnaire to help us understand your opinion on this type of Citizen Science activities.

Q1. What, if anything, would you highlight about your participation in a Citizen Science initiative such as SMOVE?

Q2. Please rate how much you agree with the following statements:

| Taking part in this project helped me to see and/or reinforce my opinion that... | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|----------------------------------------------------------------------------------|-------------------|----------|----------------------------|-------|----------------|
| ... students can make important contributions to scientific real-life projects.  |                   |          |                            |       |                |
| ... students are empowered to collaborate face-to-face with scientists.          |                   |          |                            |       |                |

Q3. Please rate how much you agree with the fact that the SMOVE project complies the following principles of good practices in Citizen Science:

|                                                                                        | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|----------------------------------------------------------------------------------------|-------------------|----------|----------------------------|-------|----------------|
| This project will generate new knowledge from which society will be able to benefit.   |                   |          |                            |       |                |
| Citizens actively participate in one or more stages of the research process.           |                   |          |                            |       |                |
| Citizen participation has been an essential part of creating the foundations of SMOVE. |                   |          |                            |       |                |

|                                                                                                        |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| The project was designed in such a way as to bring the entire research process closer to the students. |  |  |  |  |  |
| The results will be public and open. Communication with the scientific team is encouraged.             |  |  |  |  |  |

Q4. How would you rate the experience of having participated in the SMOVE project? Score from 1 (very little satisfactory) to 10 (very satisfactory)

1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

Q5. Do you have any suggestions on how this type of activity could be improved for future Citizen Science projects?

**Please, indicate:**

- Your gender

☐ Female

☐ Male

☐ Other

- Your age: \_\_\_\_\_

## Annex IV – Public Dialogue on Genome Editing: Organisers interview template

### Subcontracted coordinator

| Monitoring of the Public Dialogue |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                   |
|-----------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                         | Subdimension  | Leading question/Reformulations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Subquestions (deepening)                                                                                                                                                                                                                          |
|                                   | Concretion    | <ul style="list-style-type: none"> <li>As responsible of the project, could you tell me which were the objectives or the key aims of this Public Dialogue?</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Could you tell me which were the objectives or the key aims of the stakeholders' workshop?</li> </ul>                                                                         |
|                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>Could you tell me which were the objectives or the key aims of the citizens' workshop?</li> </ul>                                                                               |
|                                   | Methodology   | <ul style="list-style-type: none"> <li>Could you explain, which was been the methodology used to design this PD?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Which methodology was specifically used when to carry out the stakeholders workshops?</li> </ul>                                                                              |
|                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>Which methodology was specifically used when to carry out the public workshops?</li> </ul>                                                                                      |
|                                   | Participation | <p>Could you specify about how the different stakeholders were engaged throughout the PD. In particular:</p> <ul style="list-style-type: none"> <li>Was the higher management and research staff involved at any point (during the design, etc.)?</li> <li>Could you tell me how were participants reached (both experts and citizens)?</li> <li>What profile of citizens/experts/scientists has been recruited? Which specific criteria have been used to select them?</li> <li>Were there any recruiting problems?</li> </ul> | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Were the participants' experts/scientists from the ORION institutions?</li> <li>Have they participated in both the stakeholders' workshop and the Public sessions?</li> </ul> |
|                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <u>Citizens workshops:</u>                                                                                                                                                                                                                        |

|  |                |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                               |
|--|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Materials      | <ul style="list-style-type: none"> <li>▪ Could you specify a bit on how were the stimulus materials designed?</li> <li>▪ Who has been the main responsible for the development of the stimulus materials?</li> <li>▪ Are the same materials going to be used in all countries?</li> </ul> | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>▪ How was it managed, having different groups of experts working on the materials during its creation process?</li> </ul> |
|  | Sustainability | <ul style="list-style-type: none"> <li>▪ How is the design being developed in the different countries? Is this design the same for all countries or will it be different?</li> </ul>                                                                                                      | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>▪ Were the materials clear enough for the public to understand them?</li> </ul>                                             |

| Views and opinions about OS activities |                                           |                                                                                                                                                                                        |                                                                                                                                                                                                                                                           |
|----------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                              | Subdimension                              | Leading question/Reformulations                                                                                                                                                        | Subquestions (deepening)                                                                                                                                                                                                                                  |
|                                        | Empowerment                               | <ul style="list-style-type: none"> <li>▪ What do you think is the role of experts like yourself in Open Science and public engagement activities like this Public Dialogue?</li> </ul> | <ul style="list-style-type: none"> <li>▪ What do you think is/should be the difference between the roles between IM and the scientists/experts (giving information, moderation, etc.)? and between the experts and the citizens participating?</li> </ul> |
|                                        | Empowerment                               | <ul style="list-style-type: none"> <li>▪ Who is (or should be) the main responsible actor for the development of Public Dialogues? Who should not be responsible? Why?</li> </ul>      |                                                                                                                                                                                                                                                           |
|                                        | Benefits/potential                        | <ul style="list-style-type: none"> <li>▪ Can you think of any benefits related to the development of this Public Dialogue?</li> </ul>                                                  | <ul style="list-style-type: none"> <li>▪ What would be needed for more benefits (in this PD and in other public engagement activities)?</li> </ul>                                                                                                        |
|                                        | Drawbacks/difficulties                    | <ul style="list-style-type: none"> <li>▪ Can you think of any drawbacks related to the development of this Public Dialogue?</li> </ul>                                                 | <ul style="list-style-type: none"> <li>▪ What would be needed for less drawbacks (in this PD and in other public engagement activities)?</li> </ul>                                                                                                       |
|                                        | Comparison “regular” science/Open Science | <ul style="list-style-type: none"> <li>▪ What is the difference between organizing a Public Dialogue in relation to other public engagement activities, in your opinion?</li> </ul>    |                                                                                                                                                                                                                                                           |



| Impact of the Public Dialogue in participants |                        |                                                                                                                                                                                 |                                                                                                                                                                                                                                                                              |
|-----------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                     | Subdimension           | Leading question/Reformulations                                                                                                                                                 | Subquestions (deepening)                                                                                                                                                                                                                                                     |
| Impact                                        | Impact on public       | <ul style="list-style-type: none"> <li>In your opinion, in which what ways do you think this initiative has had an impact in participant citizens?</li> </ul>                   | <ul style="list-style-type: none"> <li>As a general feeling, do you think the sessions allowed to identify the public's hopes and fears and any 'red lines'?</li> <li>Do you think people learned something? Do you think there was a shift in opinions about GE?</li> </ul> |
|                                               | Impact on institutions | <ul style="list-style-type: none"> <li>In your opinion, in which what ways do you think this initiative will have an impact in the participating ORION institutions?</li> </ul> | <ul style="list-style-type: none"> <li>How useful is it going to be to the [ORION institution]</li> </ul>                                                                                                                                                                    |

## ORION national coordinator

| Monitoring of the Public Dialogue |               |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                         | Subdimension  | Leading question/Reformulations                                                                                                                                                                                                                              | Subquestions (deepening)                                                                                                                                                                                                                                                                                                               |
| Monitoring                        | Concretion    | <ul style="list-style-type: none"> <li>As responsible of the project, could you tell me which were the objectives, or the key aims of this Public Dialogue?</li> </ul>                                                                                       | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Could you tell me which were the objectives, or the key aims of the stakeholders' workshop?</li> </ul>                                                                                                                                                             |
|                                   |               |                                                                                                                                                                                                                                                              | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>Could you tell me which were the objectives, or the key aims of the citizens' workshop?</li> </ul>                                                                                                                                                                   |
|                                   | Methodology   | <ul style="list-style-type: none"> <li>Could you explain, which was been the methodology used to design this PD?</li> </ul>                                                                                                                                  | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Which methodology was specifically used when to carry out the stakeholder's workshops?</li> </ul>                                                                                                                                                                  |
|                                   |               |                                                                                                                                                                                                                                                              | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>Which methodology was specifically used when to carry out the public workshops?</li> </ul>                                                                                                                                                                           |
|                                   | Participation | <p>Could you specify about how the different stakeholders were engaged throughout the PD. In particular:</p> <ul style="list-style-type: none"> <li>Was the higher management and research staff involved at any point (during the design, etc.)?</li> </ul> | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>Have the experts participated in both the stakeholders' workshop and the Public sessions?</li> </ul>                                                                                                                                                               |
|                                   |               |                                                                                                                                                                                                                                                              | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>Could you tell me how were participants reached (both experts and citizens)?</li> <li>What profile of citizens/experts/scientists has been recruited? Which specific criteria have been used to select them?</li> <li>Were there any recruiting problems?</li> </ul> |

|  |           |                                                                                                                                                                                                                      |                                                                                                                                                                                               |
|--|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Materials | <ul style="list-style-type: none"> <li>▪ Could you specify a bit on how were the stimulus materials designed?</li> <li>▪ Who has been the main responsible for the development of the stimulus materials?</li> </ul> | <u>Stakeholders workshop</u> <ul style="list-style-type: none"> <li>▪ How was it managed, having different groups of experts working on the materials during its creation process?</li> </ul> |
|  |           |                                                                                                                                                                                                                      | <u>Citizens workshops:</u> <ul style="list-style-type: none"> <li>▪ Were the materials clear enough for the public to understand them?</li> </ul>                                             |

| Views and opinions about OS activities |                                           |                                                                                                                                                                                     |                                                                                                                                                     |
|----------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                              | Subdimension                              | Leading question/Reformulations                                                                                                                                                     | Subquestions (deepening)                                                                                                                            |
|                                        | Empowerment                               | <ul style="list-style-type: none"> <li>▪ Who is (or should be) the main responsible actor for the development of Public Dialogues? Who should not be responsible? Why?</li> </ul>   |                                                                                                                                                     |
|                                        | Benefits/potentials                       | <ul style="list-style-type: none"> <li>▪ Can you think of any benefits related to the development of this Public Dialogue?</li> </ul>                                               | <ul style="list-style-type: none"> <li>▪ What would be needed for more benefits (in this PD and in other public engagement activities)?</li> </ul>  |
|                                        | Drawbacks/difficulties                    | <ul style="list-style-type: none"> <li>▪ Can you think of any drawbacks related to the development of this Public Dialogue?</li> </ul>                                              | <ul style="list-style-type: none"> <li>▪ What would be needed for less drawbacks (in this PD and in other public engagement activities)?</li> </ul> |
|                                        | Comparison “regular” science/Open Science | <ul style="list-style-type: none"> <li>▪ What is the difference between organizing a Public Dialogue in relation to other public engagement activities, in your opinion?</li> </ul> |                                                                                                                                                     |

| Impact of the Public Dialogue in Citizens |                      |                                                                                                                                                                 |                                                                                                                                                             |
|-------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                 | Subdimension         | Leading question/Reformulations                                                                                                                                 | Subquestions (deepening)                                                                                                                                    |
| Impact                                    | Impact on citizens   | <ul style="list-style-type: none"> <li>In your opinion, in which what ways do you think this initiative has had an impact in participant citizens?</li> </ul>   | <ul style="list-style-type: none"> <li>Do you think people learned useful content about GE? Do you think there was a shift in opinions about GE?</li> </ul> |
|                                           | Impact in scientists | <ul style="list-style-type: none"> <li>In your opinion, in which what ways do you think this initiative has had an impact in participant scientists?</li> </ul> |                                                                                                                                                             |

| Impact of the Public Dialogue in participant organisations |                     |                                                                                                                                                                                                                    |                          |
|------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                            | Dimension           | Leading question/Reformulations                                                                                                                                                                                    | Subquestions (deepening) |
| Starting point                                             | Documentation       | <ul style="list-style-type: none"> <li>What is the starting point of your institution in Open Science? Is there any documentation/action plan/policy at your institution?</li> </ul>                               |                          |
|                                                            | Actions             | <ul style="list-style-type: none"> <li>What is the starting point of your institution in Open Science? Is there any activity/training being organized?</li> </ul>                                                  |                          |
|                                                            | Institution culture | <ul style="list-style-type: none"> <li>Do you think organizing a Public Dialogue like this one fits into the culture of your institution? To what extent? In what way?</li> </ul>                                  |                          |
|                                                            | Perception          | <ul style="list-style-type: none"> <li>OS could be perceived in many ways, if you had to predict what would be the main view hold by researchers in your institution and OS, what would these views be?</li> </ul> |                          |

|                              |                           |                                                                                                                                                                                                                          |                                                                                                              |
|------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Future of OS at institutions | Next steps (Actions)      | <ul style="list-style-type: none"> <li>Is there any actions planned in your institution for the near future promoting OS?</li> </ul>                                                                                     |                                                                                                              |
|                              | Next steps (Expectations) | <ul style="list-style-type: none"> <li>What would be necessary for activities such as this Public Dialogue to become more part of the culture of your institution?</li> <li>Would this be a desirable future?</li> </ul> |                                                                                                              |
|                              | Future Agenda             | <ul style="list-style-type: none"> <li>To what extent do you think open science would be in the future agenda of your institution?</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>In which ways? What would be necessary for this to happen?</li> </ul> |

## Annex V – Public Dialogue on Genome Editing: Experts interview template

| Impact of the Public Dialogue in participant experts |                        |                                                                                                                                                                                                                                                                                           |                                                                                                                                                     |
|------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                            | Subdimension           | Leading question/Reformulations                                                                                                                                                                                                                                                           | Subquestions (deepening)                                                                                                                            |
| Starting point                                       | Interest               | <ul style="list-style-type: none"> <li>Why did you attend the Public Dialogue? What attracted you to this particular event?</li> </ul>                                                                                                                                                    |                                                                                                                                                     |
|                                                      | Knowledge              | <ul style="list-style-type: none"> <li>Had you heard the term Public Dialogue before?</li> </ul>                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Which have been the channels through which information about Public Dialogues has arrived to you?</li> </ul> |
|                                                      | Action                 | <ul style="list-style-type: none"> <li>Had you participated in a Public Dialogue (or similar) before?</li> </ul>                                                                                                                                                                          |                                                                                                                                                     |
|                                                      | Expectations/Relevance | <ul style="list-style-type: none"> <li>Which were your expectations/objectives about your participation (and/or the development) of this Public Dialogue?</li> <li>At the start of the PD, did you have any doubts or fears regarding the development of this public dialogue?</li> </ul> | <ul style="list-style-type: none"> <li>Have these been met? How?</li> <li>Have they materialized?</li> </ul>                                        |

|        |             |                                                                                                                                            |                                                                                                                                                                                                     |
|--------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact | Reaction    | <ul style="list-style-type: none"> <li>How do you assess the Public Dialogue?</li> </ul>                                                   | <ul style="list-style-type: none"> <li>What did you like the most about the PD? What did you like the least?</li> <li>Is there anything that you would change about the Public Dialogue?</li> </ul> |
|        | Knowledge   | <ul style="list-style-type: none"> <li>In which manners do you think participating in PD can/will contribute to your work life?</li> </ul> |                                                                                                                                                                                                     |
|        | Disposition | <ul style="list-style-type: none"> <li>Do you think you will participate in a similar activity, in the future?</li> </ul>                  | <ul style="list-style-type: none"> <li>If so, why? If not, why not?</li> </ul>                                                                                                                      |

| Views and opinions about Open Science |                        |                                                                                                                                                                                             |                                                                                            |
|---------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Dimension                             | Subdimension           | Leading question/Reformulations                                                                                                                                                             | Subquestions (deepening)                                                                   |
| Personal opinion on open science      | Meaning given          | <ul style="list-style-type: none"> <li>If you had to describe what a Public Dialogue is to a colleague, what would you tell them?</li> </ul>                                                |                                                                                            |
|                                       | Benefits/potential     | <ul style="list-style-type: none"> <li>Can you think of any benefits [positive things] related to the development of this Public Dialogue (in general and at your institution)?</li> </ul>  | <ul style="list-style-type: none"> <li>What would be needed for more benefits?</li> </ul>  |
|                                       | Drawbacks/difficulties | <ul style="list-style-type: none"> <li>Can you think of any drawbacks [negative things] related to the development of this Public Dialogue (in general and at your institution)?</li> </ul> | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul> |



|  |                         |                                                                                                                                                                                          |                                                                                                                                                                                          |
|--|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Meaning given           | <ul style="list-style-type: none"> <li>Who is (or should be) the main responsible actor for the development of Public Dialogues? Who should NOT be responsible? Why?</li> </ul>          | <ul style="list-style-type: none"> <li>Has your involvement in this Public Dialogue changed your perception about the roles of the different actors participating in science?</li> </ul> |
|  | Empowerment             | <ul style="list-style-type: none"> <li>What do you think is the role of research experts/scientists like yourself in Open Science activities like this Public Dialogue?</li> </ul>       |                                                                                                                                                                                          |
|  | Disposition (Financing) | <ul style="list-style-type: none"> <li>If you had to justify to a friend the money that is destined to create activities like this Public Dialogue, what would you tell them?</li> </ul> |                                                                                                                                                                                          |

## Annex VI – Public Dialogue to inform CRG’s research strategy: Scientists interview template

| Impact of the Public Dialogue |              |                                                                                                                                                                                      |                                                                                                                                                                                                                          |
|-------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                     | Subdimension | Leading question/Reformulations                                                                                                                                                      | Subquestions (deepening)                                                                                                                                                                                                 |
| Impact                        | Reaction     | <ul style="list-style-type: none"> <li>If you had to explain to a friend your experience as a participant in the PD, what would you say?</li> </ul>                                  | <ul style="list-style-type: none"> <li>How did you feel when talking with the participants from the general public? Which was your perception about their attitudes and opinions towards scientific research?</li> </ul> |
|                               | Knowledge    | <ul style="list-style-type: none"> <li>Which are the main things you gained/learnt from participating in this PD?</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Do you think that participating in the Public Dialogue (PD) made you learn something that will be useful for your professional life?</li> </ul>                                   |
|                               | Disposition  | <ul style="list-style-type: none"> <li>After your participation in the Public Dialogue, do you have more interest on participating in activities related to Open Science?</li> </ul> | <ul style="list-style-type: none"> <li>Could you describe which factors would make you want to participate in similar events in the future?</li> </ul>                                                                   |

| Views and opinions about Open Science |                                                                                                                               |                                                                                                                                                                                                                                                               |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                             | Leading question/Reformulations                                                                                               | Subquestions (deepening)                                                                                                                                                                                                                                      |
| Knowledge                             | <ul style="list-style-type: none"> <li>Do you think researchers like you have enough knowledge about Open Science?</li> </ul> | <ul style="list-style-type: none"> <li>Which are the main channels through which info about OS gets to you? What info/knowledge is missing for you at the moment? Do you think more info/training is needed in OS for researchers? Regarding what?</li> </ul> |

## Annex VII – Public Dialogue to inform CRG’s research strategy: Organisers interview template

| Monitoring of the Public Dialogue |                      |                                                                                                                                  |                                                                                                                                |
|-----------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Dimension                         | Subdimension         | Leading question/Reformulations                                                                                                  | Subquestions (deepening)                                                                                                       |
| Monitoring                        | Concretion/Relevance | <ul style="list-style-type: none"> <li>Which were your expectations/objectives regarding the organisation of this PD?</li> </ul> |                                                                                                                                |
|                                   | Participation        | <ul style="list-style-type: none"> <li>Could you please assess the co-creation process used to organise this PD?</li> </ul>      | <ul style="list-style-type: none"> <li>Which stakeholders participated in the project? Which of these are relevant?</li> </ul> |

| Impact of the Public Dialogue at participating institution |                |                                                                                                                                                          |                                                                                                                                                                                         |
|------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                                  | Subdimension   | Leading question/Reformulations                                                                                                                          | Subquestions (deepening)                                                                                                                                                                |
| Impact                                                     | Starting point | <ul style="list-style-type: none"> <li>Do you think this kind of events fit in the culture of your institution? To what extent? In which way?</li> </ul> | <ul style="list-style-type: none"> <li>What would be necessary for Open Science/RRI to become more part of the culture of your institution?</li> </ul>                                  |
|                                                            | Reaction       | <ul style="list-style-type: none"> <li>Do you think the organisation of this PD will have an impact in your institution?</li> </ul>                      | <ul style="list-style-type: none"> <li>As a general feeling, do you think that this PD was useful to align the strategic plan with society’s views, values and expectations?</li> </ul> |

|  |                         |                                                                                                                                                                                                                                                                                   |                                                                                                                                                  |
|--|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Drawbacks/ Difficulties | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to the organisation of this PD?</li> </ul>                                                                                                                                                          |                                                                                                                                                  |
|  | Benefits/Potentials     | <ul style="list-style-type: none"> <li>Can you think of any benefits related to the organisation of this PD?</li> </ul>                                                                                                                                                           |                                                                                                                                                  |
|  | Empowerment             | <ul style="list-style-type: none"> <li>What do you think is the role of managers like yourself in this process?</li> <li>Is your involvement in the organisation of this PD changing your perception about the roles of the different actors participating in science?</li> </ul> | <ul style="list-style-type: none"> <li>Who is (or should be) the main responsible actor for Open Science projects?</li> </ul>                    |
|  | Knowledge               | <ul style="list-style-type: none"> <li>What did you learn from your experience of having organised this PD?</li> </ul>                                                                                                                                                            | <ul style="list-style-type: none"> <li>If you were to organise a similar event in the future, what would you take into consideration?</li> </ul> |

## Annex VIII – Open Science Funding Calls: Organisers interview template

| Monitoring of the Funding call            |                                                                                                                                                                                                           |                                                                                                                                |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                 | Leading question/Reformulations                                                                                                                                                                           | Subquestions (deepening)                                                                                                       |
| Concretion/Relevance                      | <ul style="list-style-type: none"> <li>Which were your expectations/objectives regarding the organization of this call?</li> </ul>                                                                        |                                                                                                                                |
| Accessibility                             | <ul style="list-style-type: none"> <li>Which have been the criteria used to organize the call?</li> </ul>                                                                                                 | <ul style="list-style-type: none"> <li>Could you make an assessment of these criteria?</li> </ul>                              |
| Participation                             | <ul style="list-style-type: none"> <li>Could you please assess the co-creation process used to organize the call?</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>Which stakeholders participated in the process? Which of these are relevant?</li> </ul> |
| Comparison “regular” science/Open Science | <ul style="list-style-type: none"> <li>Which is the difference between organizing an Open Science (co-creation) call in relation to like a “regular” scientific project call, in your opinion?</li> </ul> |                                                                                                                                |
| Drawbacks / Difficulties                  | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to the organization of this call?</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul>                                     |
| Benefits/Potential                        | <ul style="list-style-type: none"> <li>Can you think of any benefits related to the organization of this call?</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul>                                     |
| Disposition                               | <ul style="list-style-type: none"> <li>Would you consider organizing a call like this again? If not, what would make you do it?</li> </ul>                                                                |                                                                                                                                |

| Impact of the Funding Call at participant institutions |                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                   |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                              | Leading question/Reformulations                                                                                                                                                                                                                                                     | Subquestions (deepening)                                                                                                                                                                          |
| Starting point<br>(Institution culture)                | <ul style="list-style-type: none"> <li>Starting point at your institution</li> <li>Do you think this call fits in the culture of your institution? To what extent? In which way?</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>What would be necessary for Open Science/RRI to become more part of the culture of your institution?</li> <li>Would this be a desirable future?</li> </ul> |
|                                                        | <ul style="list-style-type: none"> <li>Do you think the organization of this call will have an impact in your institution?</li> </ul>                                                                                                                                               |                                                                                                                                                                                                   |
| Empowerment                                            | <ul style="list-style-type: none"> <li>What do you think is the role of managers like yourself in this process?</li> <li>Is your involvement in the organization of this call changing your perception about the roles of the different actors participating in science?</li> </ul> | <ul style="list-style-type: none"> <li>Who is (or should be) the main responsible actor for Open Science projects?</li> <li>Who can make Open Science projects a reality?</li> </ul>              |
| Disposition                                            | <ul style="list-style-type: none"> <li>If you had to justify to a friend the money that is destined to Open Science projects, what would you tell them?</li> </ul>                                                                                                                  |                                                                                                                                                                                                   |

## Annex IX – Citizen Science projects: Organisers focus group template

|                                                  | The Babraham Institute (BI) | Centre for Genomic Regulation (CRG) | The Central European Institute of Technology (CEITEC) | Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC) |
|--------------------------------------------------|-----------------------------|-------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------|
| Call organization and dissemination strategies   |                             |                                     |                                                       |                                                                               |
| General reaction to the call                     |                             |                                     |                                                       |                                                                               |
| Difficulties/challenges faced by call organizers |                             |                                     |                                                       |                                                                               |
| Support strategies                               |                             |                                     |                                                       |                                                                               |



## Annex X – Citizen Science projects: Public Engagement experts interview template

### Public Engagement expert interview (pre)

| Monitoring of the Citizen Science call/project and impact at the institution |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                  |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                                                    | Leading question/Reformulations                                                                                                                                                                                                                                                                     | Subquestions (deepening)                                                                                                                                                                         |
| Starting point<br>+<br>Relevance (expectations)                              | <ul style="list-style-type: none"> <li>Which were your expectations regarding the organization of this call?</li> </ul>                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Which are your expectations now?</li> <li>In which ways do you think this project will contribute to your institution?</li> </ul>                         |
| Starting point                                                               | <ul style="list-style-type: none"> <li>Which were the criteria used [to organize the call]?</li> <li>Which were the criteria used [to review and select the winners]?</li> </ul>                                                                                                                    | <ul style="list-style-type: none"> <li>Why were these criteria used?</li> </ul>                                                                                                                  |
| Drawbacks / Difficulties<br>-<br>Benefits/Potential                          | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to the organization of this call? What about the first stages of the project?</li> <li>Can you think of any benefits related to the organization of this call? What about the first stages of the project?</li> </ul> | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> <li>What would be needed for more benefits?</li> </ul>                                                      |
| Starting point<br>(Institution culture)                                      | <ul style="list-style-type: none"> <li>Do you think the selected project fits in the culture of your institution? To what extent? In which way?</li> </ul>                                                                                                                                          | <ul style="list-style-type: none"> <li>What would be necessary for Citizen Science to become more part of the culture of your institution?</li> <li>Would this be a desirable future?</li> </ul> |

| Views and opinions about Open Science |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                            |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                             | Leading question/Reformulations                                                                                                                                                                                                                                                                                  | Subquestions (deepening)                                                                                                                                                                   |
| Empowerment                           | <ul style="list-style-type: none"> <li>What do you think is the role of managers/OS leaders like yourself in this process?</li> <li>Is your involvement in the organization of this call/project follow up changing your perception about the roles of the different actors participating in science?</li> </ul> | <ul style="list-style-type: none"> <li>Who is (or should be) the main responsible actor for Citizen Science projects?</li> <li>Who can make Citizen Science projects a reality?</li> </ul> |
| Knowledge                             | <ul style="list-style-type: none"> <li>What assessment do you make of your participation in this project up until now?</li> </ul>                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Could you explain what have you learned until this moment?</li> </ul>                                                                               |
| Knowledge                             | <ul style="list-style-type: none"> <li>Which is the difference between organizing a Citizen Science call in relation to like a “regular” scientific project, in your opinion?</li> </ul>                                                                                                                         |                                                                                                                                                                                            |
| Disposition                           | <ul style="list-style-type: none"> <li>If you had to justify to a friend the money that is destined to Citizen Science projects, what would you tell them?</li> <li>Could you describe briefly which factors would make you want to organize similar investigations in the future? (if any)</li> </ul>           |                                                                                                                                                                                            |

## Public Engagement expert interview (post)

| Impact of the Funding Call at participant institutions |                                                                                                                                                      |                                                                                                                                                           |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                              | Leading question/Reformulations                                                                                                                      | Subquestions (deepening)                                                                                                                                  |
| Reaction                                               | <ul style="list-style-type: none"> <li>What assessment do you make of your participation in the project? Which has been your involvement?</li> </ul> | <ul style="list-style-type: none"> <li>Do you think this project will have an impact in your institution?</li> </ul>                                      |
| Knowledge                                              | <ul style="list-style-type: none"> <li>What have you learnt from the experience of this CS project?</li> </ul>                                       |                                                                                                                                                           |
| Benefits                                               | <ul style="list-style-type: none"> <li>Which have been the main benefits related to the development of the project?</li> </ul>                       |                                                                                                                                                           |
| Drawbacks                                              | <ul style="list-style-type: none"> <li>Which have been the main limitations related to the development of the project?</li> </ul>                    |                                                                                                                                                           |
| Empowerment                                            | <ul style="list-style-type: none"> <li>What do you think is the role of facilitators like yourself in this kind of projects?</li> </ul>              |                                                                                                                                                           |
| Future steps                                           | <ul style="list-style-type: none"> <li>What do you think would be necessary to promote more CS projects at your institution?</li> </ul>              | <ul style="list-style-type: none"> <li>Which recommendations would you give to someone with your similar position who will start a CS project?</li> </ul> |

## Annex XI – Citizen Science projects: Scientists interview template

### Scientist interview (pre)

| Monitoring of the Citizen Science call/project |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                        |
|------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                      | Subdimension | Leading question/Reformulations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Subquestions (deepening)                                                                                                                                                               |
| Starting point                                 | Interest     | <ul style="list-style-type: none"> <li>Why did you decide to apply to the ORION Citizen Science call? What attracted you from this particular funding initiative?</li> </ul>                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                        |
|                                                | Action       | <ul style="list-style-type: none"> <li>Are you already participating in any Open Science activity/action at the moment?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Were you aware of other existent funding opportunities on Open Science related projects before applying to this funding opportunity?</li> </ul> |
| Relevance                                      | Expectations | <ul style="list-style-type: none"> <li>Which are your expectations regarding your participation in this project?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                        |
|                                                |              | <ul style="list-style-type: none"> <li>What will you gain from it? What do you think will come out of it?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                        |
| Accessibility                                  |              | <ul style="list-style-type: none"> <li>I am going to ask you to consider if the ORION OS call/funding opportunity adapts to your professional availability, in regard to different aspects:               <ul style="list-style-type: none"> <li>- Eligibility</li> <li>- Funding</li> <li>- Duration</li> <li>- Information (was the information provided clear enough? In terms of eligibility but also content–topic, etc.; did you receive feedback about your project application?</li> </ul> </li> </ul> |                                                                                                                                                                                        |

|            |  |                                                                                                  |  |
|------------|--|--------------------------------------------------------------------------------------------------|--|
| Efficiency |  | ▪ Have you received support/training [from your institution] to apply to the call?               |  |
|            |  | ▪ Have you received any training [from your institution] regarding Citizen Science/Open Science? |  |
|            |  | ▪ Have you encountered any particular difficulty in applying to the ORION Open Science call?     |  |

| Personal Opinions on Open Science |                                                                                                                                                 |                          |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Dimension                         | Leading question/Reformulations                                                                                                                 | Subquestions (deepening) |
| Meaning given                     | ▪ What is suggested to you by the term “Open Science”? If you were to define “Open Science” to a fellow researcher what would you tell her/him? |                          |
| Empowerment                       | ▪ What’s the role of researchers like yourself in Open Science processes?                                                                       |                          |
| Drawbacks/difficulties            | ▪ Can you elaborate on drawbacks or difficulties related to Open Science? What would be needed for less drawbacks in Open Science?              |                          |
| Benefits/Potential                | ▪ What are potential benefits of Open Science? What would be needed for more benefits of Open Science?                                          |                          |
| Comparison benefits/risks         | ▪ Do you think benefits of Open Science outstand risks or risks outstand benefits?                                                              |                          |

| Impact of the ORION Citizen Science call on participant / institution |                                                                                                                                                                                                    |                                                                                                                                                                  |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                                             | Leading question/Reformulations                                                                                                                                                                    | Subquestions (deepening)                                                                                                                                         |
| Reaction                                                              | <ul style="list-style-type: none"> <li>What has your participation in this Open Science call given you? What assessment do you make of your participation in this call?</li> </ul>                 |                                                                                                                                                                  |
| Knowledge                                                             | <ul style="list-style-type: none"> <li>Could you explain what have you learned about Open Science after your participation in the project?</li> </ul>                                              |                                                                                                                                                                  |
| Disposition                                                           | <ul style="list-style-type: none"> <li>After your participation in the Project, do you have more contact with the Open Science community stakeholders? Could you please expand on this?</li> </ul> | <ul style="list-style-type: none"> <li>Could you describe briefly which factors make you want to participate in similar investigations in the future?</li> </ul> |
| Disposition                                                           | <ul style="list-style-type: none"> <li>In your opinion, will this project have an impact in your professional life?</li> </ul>                                                                     |                                                                                                                                                                  |
| Disposition                                                           | <ul style="list-style-type: none"> <li>If you had to justify to a friend the money that is destined to Open Science projects, what would you tell them?</li> </ul>                                 |                                                                                                                                                                  |
| Institution culture                                                   | <ul style="list-style-type: none"> <li>Do you think this project fits in the culture of your institution? To what extent? In which way?</li> </ul>                                                 | <ul style="list-style-type: none"> <li>What would be necessary for Open Science to become more part of the culture of your institution?</li> </ul>               |

## Scientists interview (post)

| Knowledge and opinions about Open Science (post) |                                                                                                                                                                                                       |                                                                                                                                            |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                        | Leading question/Reformulations                                                                                                                                                                       | Subquestions (deepening)                                                                                                                   |
| Expectations                                     | <ul style="list-style-type: none"> <li>Which were your expectations regarding your participation in this project? Were these fulfilled?</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Was there anything about your participation in this project that you were not expecting?</li> </ul> |
| Benefits                                         | <ul style="list-style-type: none"> <li>What have you enjoyed the most about participating in this project?</li> </ul>                                                                                 |                                                                                                                                            |
| Drawbacks                                        | <ul style="list-style-type: none"> <li>What you enjoyed the least about participating in this project?</li> </ul>                                                                                     |                                                                                                                                            |
| Barriers/difficulties                            | <ul style="list-style-type: none"> <li>Have you encountered any particular difficulty in applying to the ORION Open Science call?</li> </ul>                                                          |                                                                                                                                            |
| Meaning given                                    | <ul style="list-style-type: none"> <li>If you have to explain to a friend what citizen science is, what would you say?</li> </ul>                                                                     |                                                                                                                                            |
| Knowledge                                        | <ul style="list-style-type: none"> <li>Do you think researchers like you receive enough information about citizen science? If not, how would you solve this situation? (Which incentives?)</li> </ul> |                                                                                                                                            |
| Knowledge                                        | <ul style="list-style-type: none"> <li>If you had to justify the money that is destined to finance a citizen science project, what would you tell them?</li> </ul>                                    |                                                                                                                                            |



| Impact of the Citizen Science projects on researchers |                                                                                                                                                                    |                          |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Dimension                                             | Leading question/Reformulations                                                                                                                                    | Subquestions (deepening) |
| Knowledge                                             | <ul style="list-style-type: none"> <li>What are the main things that you have gained from participating in this project?</li> </ul>                                |                          |
| Disposition                                           | <ul style="list-style-type: none"> <li>Would you consider participating again in a Citizen Science project?</li> </ul>                                             |                          |
| Reaction                                              | <ul style="list-style-type: none"> <li>Do you think this project will have an impact in your professional life?</li> </ul>                                         |                          |
| Comparison CS vs. OS                                  | <ul style="list-style-type: none"> <li>What is the main difference between participating in a citizen science project and a regular scientific project?</li> </ul> |                          |
| Empowerment                                           | <ul style="list-style-type: none"> <li>What do you think is your role as a scientist in these types of projects?</li> </ul>                                        |                          |
| Benefits                                              | <ul style="list-style-type: none"> <li>Which are the potential benefits about citizen science?</li> </ul>                                                          |                          |
| Drawbacks                                             | <ul style="list-style-type: none"> <li>Which are the potential difficulties/drawbacks about citizen science?</li> </ul>                                            |                          |
| Comparison benefits/drawbacks                         | <ul style="list-style-type: none"> <li>If you had to compare benefits vs. drawbacks, do you think it compensates?</li> </ul>                                       |                          |

| Impact of the Citizen Science projects on institutions |                                                                                                                                                             |                          |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Dimension                                              | Leading question/Reformulations                                                                                                                             | Subquestions (deepening) |
| Institution culture                                    | <ul style="list-style-type: none"> <li>Do you think this kind of citizen science project fits in the culture of the CRG? If so, to which extent?</li> </ul> |                          |
| Future steps                                           | <ul style="list-style-type: none"> <li>What do you think would be necessary to promote more citizen science projects at the CRG?</li> </ul>                 |                          |
| Future steps (desirable future)                        | <ul style="list-style-type: none"> <li>What do you think is the future of citizen science and open science at the CRG?</li> </ul>                           |                          |

### Principal investigator interview (pre)

| Knowledge about Open Science/Citizen Science |                                                                                                                                                        |                                                                                                                                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                    | Leading question/Reformulations                                                                                                                        | Subquestions (deepening)                                                                                                                                                                                   |
| Starting point (Interest)                    | <ul style="list-style-type: none"> <li>Why did you decide to apply to the ORION Citizen Science call?</li> </ul>                                       |                                                                                                                                                                                                            |
| Starting point (action)                      | <ul style="list-style-type: none"> <li>At the time that you applied, were you already participating in any Citizen Science activity/action?</li> </ul> | <ul style="list-style-type: none"> <li>[If not] were you aware of other existent funding opportunities on Citizen Science or any related projects, before applying to this funding opportunity?</li> </ul> |

|                                              |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relevance<br>(expectations)                  | <ul style="list-style-type: none"> <li>Which were your expectations regarding your participation in this project, at the beginning of it?</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Which are your expectations now?</li> <li>In your opinion, will this project have an impact in your professional life?</li> <li>In which ways do you think this project will contribute to your institution?</li> </ul> |
| Accessibility/Efficiency                     | <ul style="list-style-type: none"> <li>Does this ORION call/funding opportunity adapt to your professional availability?</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Did you encountered any particular difficulty in applying to the ORION Citizen Science call?</li> </ul>                                                                                                                 |
| Efficiency                                   | <ul style="list-style-type: none"> <li>Have you received any training [from your institution]?</li> </ul>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>To apply to the call?</li> <li>About Citizen Science/Open Science?</li> </ul>                                                                                                                                           |
| Meaning given                                | <ul style="list-style-type: none"> <li>What is suggested to you by the term Citizen Science? If you were to define Citizen Science to a fellow researcher what would you tell her/him?</li> </ul>                                                                          |                                                                                                                                                                                                                                                                |
| Knowledge                                    | <ul style="list-style-type: none"> <li>When have you heard about Citizen Science for the first time? In which context? It is an old or a new concept for you?</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>What have been the channels through which info about Citizen Science has arrived to you?</li> <li>What info/knowledge is missing for you at the moment? What would be of help?</li> </ul>                               |
| Comparison “regular” science/Citizen Science | <ul style="list-style-type: none"> <li>Which is the difference between participating in a Citizen Science project in relation to like a “regular” scientific project?</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>Comparison “regular” science/Citizen Science</li> </ul>                                                                                                                                                                 |
| Empowerment                                  | <ul style="list-style-type: none"> <li>What do you think is the role of research leaders like yourself in this process?</li> <li>Is your involvement in this project changing your perception about the roles of the different actors participating in science?</li> </ul> | <ul style="list-style-type: none"> <li>Who is (or should be) the main responsible actor for Citizen Science projects?</li> <li>Who can make Citizen Science a reality?</li> </ul>                                                                              |

| Impact of Citizen Science call in researcher / institution |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                  |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                                  | Leading question/Reformulations                                                                                                                                                                                                                                                                     | Subquestions (deepening)                                                                                                                                                                         |
| Knowledge                                                  | <ul style="list-style-type: none"> <li>What assessment do you make of your participation in this project up until now?</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Could you explain what have you learned until this moment?</li> </ul>                                                                                     |
| Disposition                                                | <ul style="list-style-type: none"> <li>Could you describe briefly which factors would make you want to participate in similar investigations in the future?</li> <li>If you had to justify to a friend the money that is destined to Citizen Science projects, what would you tell them?</li> </ul> |                                                                                                                                                                                                  |
| Drawbacks / Difficulties                                   | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to your participation in a Citizen Science project, like (name of project)?</li> </ul>                                                                                                                                | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul>                                                                                                       |
| Benefits/Potential                                         | <ul style="list-style-type: none"> <li>Can you think of any benefits related to your participation in a Citizen Science project, like (name of project)?</li> </ul>                                                                                                                                 | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul>                                                                                                       |
| Institution Culture                                        | <ul style="list-style-type: none"> <li>Do you think this project fits in the culture of your institution? To what extent? In which way?</li> </ul>                                                                                                                                                  | <ul style="list-style-type: none"> <li>What would be necessary for Citizen Science to become more part of the culture of your institution?</li> <li>Would this be a desirable future?</li> </ul> |

## Principal investigator interview (post)

| Insights and impact of Citizen Science call in researcher / institution |                                                                                                                                                                                                                                         |                                                                                                                                                                                                  |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                                               | Leading question/Reformulations                                                                                                                                                                                                         | Subquestions (deepening)                                                                                                                                                                         |
| View/meeting of expectations                                            | <ul style="list-style-type: none"> <li>What view do you have of this project at the moment? Have your expectations been met?</li> </ul>                                                                                                 |                                                                                                                                                                                                  |
| Disposition                                                             | <ul style="list-style-type: none"> <li>Could you describe briefly which factors would make you want to participate in similar investigations in the future?</li> </ul>                                                                  |                                                                                                                                                                                                  |
| Drawbacks / Difficulties                                                | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to your participation in a Citizen Science project, like (name of project)?</li> </ul>                                                                    | <ul style="list-style-type: none"> <li>What would be needed for less drawbacks?</li> </ul>                                                                                                       |
| Benefits/Potential                                                      | <ul style="list-style-type: none"> <li>Can you think of any benefits related to your participation in a Citizen Science project, like (name of project)?</li> <li>Could you explain what have you learned until this moment?</li> </ul> |                                                                                                                                                                                                  |
| Institution Culture                                                     | <ul style="list-style-type: none"> <li>Do you think this project fits in the culture of your institution? To what extent? In which way?</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>What would be necessary for Citizen Science to become more part of the culture of your institution?</li> <li>Would this be a desirable future?</li> </ul> |

| Knowledge about Open Science/Citizen Science |                                                                                                                                                                                  |                                                                                                                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                    | Leading question/Reformulations                                                                                                                                                  | Subquestions (deepening)                                                                                                                                                         |
| Comparison “regular” science/Citizen Science | <ul style="list-style-type: none"> <li>Which is the difference between participating in a Citizen Science project in relation to like a “regular” scientific project?</li> </ul> | <ul style="list-style-type: none"> <li>Comparison “regular” science/Citizen Science</li> </ul>                                                                                   |
| Empowerment                                  | <ul style="list-style-type: none"> <li>What do you think is the role of research leaders like yourself in this process?</li> </ul>                                               | <ul style="list-style-type: none"> <li>Has your involvement in this project changed your perception about the roles of the different actors participating in science?</li> </ul> |

## Annex XII – Novel Co-creation initiatives: Organisers interview template

| Monitoring of the call    |                                                                                                                                                         |                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                 | Leading question/Reformulations                                                                                                                         | Subquestions (deepening)                                                                                                                                |
| Concretion                | <ul style="list-style-type: none"> <li>As the main responsible of the organization of this call, what would you say are its main objectives?</li> </ul> | <ul style="list-style-type: none"> <li>Which were your expectations/objectives regarding the organization of this call? Were they fulfilled?</li> </ul> |
| Participation             | <ul style="list-style-type: none"> <li>Could you please assess the co-creation process used to organize/define the call?</li> </ul>                     | <ul style="list-style-type: none"> <li>Which stakeholders participated in the process? How were they selected? Which were more active?</li> </ul>       |
| Starting point (criteria) | <ul style="list-style-type: none"> <li>Which were the criteria used to organize the call?</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Why did you use these criteria? How did you come up with these criteria?</li> </ul>                              |
| Sustainability            | <ul style="list-style-type: none"> <li>Which dissemination channels were used to publicize the call?</li> </ul>                                         |                                                                                                                                                         |

| Knowledge and opinions about Open Science    |                                                                                                                                                                                 |                                                                                                                                           |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                    | Leading question/Reformulations                                                                                                                                                 | Subquestions (deepening)                                                                                                                  |
| Comparison “regular” science/Citizen Science | <ul style="list-style-type: none"> <li>Which is the difference between organizing this co-creative call in relation to a “regular” scientific call, in your opinion?</li> </ul> | <ul style="list-style-type: none"> <li>Did you include Open Science principles in the call Organization and selection process?</li> </ul> |
| Drawbacks/Difficulties                       | <ul style="list-style-type: none"> <li>Can you think of any drawbacks/negative aspects related to the organization of this call?</li> </ul>                                     |                                                                                                                                           |
| Benefits/Potentials                          | <ul style="list-style-type: none"> <li>Can you think of any positive aspects related to the organization of this call?</li> </ul>                                               |                                                                                                                                           |

## Annex XIII – Novel Co-creation initiatives: Scientists interview template

| Knowledge and opinions about Open Science |                                                                                                                                                    |                                                                                                                                                                                 |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                 | Leading question/Reformulations                                                                                                                    | Subquestions (deepening)                                                                                                                                                        |
| Expectations                              | <ul style="list-style-type: none"> <li>Which were your expectations regarding your participation in this project? Were these fulfilled?</li> </ul> | <ul style="list-style-type: none"> <li>Was there anything about your participation in this project that you were not expecting?</li> </ul>                                      |
| Benefits                                  | <ul style="list-style-type: none"> <li>What did you enjoy the most about participating in this project?</li> </ul>                                 |                                                                                                                                                                                 |
| Drawbacks                                 | <ul style="list-style-type: none"> <li>What did you enjoy the least about participating in this project?</li> </ul>                                |                                                                                                                                                                                 |
| Knowledge                                 | <ul style="list-style-type: none"> <li>Do you think researchers like you receive enough information about Open Science?</li> </ul>                 | <ul style="list-style-type: none"> <li>Did you detect any specific aspect in which you think you would need to get deeper on, related to Open Science?</li> </ul>               |
| Empowerment                               | <ul style="list-style-type: none"> <li>What do you think is your role as a scientist in this type of projects?</li> </ul>                          | <ul style="list-style-type: none"> <li>Did your involvement in this project change your perception about the roles of the different actors participating in science?</li> </ul> |

| Impact of the Novel Co-creation initiatives |                                                                                                                                        |                                                                                                                                                                           |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                   | Leading question/Reformulations                                                                                                        | Subquestions (deepening)                                                                                                                                                  |
| Reaction                                    | <ul style="list-style-type: none"> <li>What assessment do you make of your participation in this project so far?</li> </ul>            | <ul style="list-style-type: none"> <li>Do you think this project will have an impact in your professional life?</li> </ul>                                                |
| Knowledge                                   | <ul style="list-style-type: none"> <li>Which are the main things that you gained/learnt from participating in this project?</li> </ul> |                                                                                                                                                                           |
| Disposition                                 | <ul style="list-style-type: none"> <li>Would you consider participating again in a similar project?</li> </ul>                         | <ul style="list-style-type: none"> <li>Could you briefly describe which factors would make you want to participate in similar projects in the future (if any)?</li> </ul> |



## Annex XIV – Novel Co-creation initiatives: Public Engagement experts interview template

| Knowledge and opinions about Open Science |                                                                                                                                                                               |                                                                                                                                                                                 |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                 | Leading question/Reformulations                                                                                                                                               | Subquestions (deepening)                                                                                                                                                        |
| Expectations                              | <ul style="list-style-type: none"> <li>Which were your expectations regarding the development of this co-creation initiative? Were these fulfilled?</li> </ul>                | <ul style="list-style-type: none"> <li>In which ways do you think this project will contribute to your institution?</li> </ul>                                                  |
| Benefits                                  | <ul style="list-style-type: none"> <li>Can you think of any benefits related to the development of this project?</li> </ul>                                                   |                                                                                                                                                                                 |
| Drawbacks                                 | <ul style="list-style-type: none"> <li>Can you think of any drawbacks related to the development of this project?</li> </ul>                                                  |                                                                                                                                                                                 |
| Empowerment                               | <ul style="list-style-type: none"> <li>What do you think is the role of managers/Public Engagement officers like yourself in this kind of co-creation initiatives?</li> </ul> | <ul style="list-style-type: none"> <li>Did your involvement in this project change your perception about the roles of the different actors participating in science?</li> </ul> |

| Impact of the Novel Co-creation initiatives |                                                                                                                                        |                                                                                                                                                                           |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimension                                   | Leading question/Reformulations                                                                                                        | Subquestions (deepening)                                                                                                                                                  |
| Reaction                                    | <ul style="list-style-type: none"> <li>What assessment do you make of your participation in this project so far?</li> </ul>            | <ul style="list-style-type: none"> <li>Do you think this project will have an impact in your professional life?</li> </ul>                                                |
| Knowledge                                   | <ul style="list-style-type: none"> <li>Which are the main things that you gained/learnt from participating in this project?</li> </ul> |                                                                                                                                                                           |
| Disposition                                 | <ul style="list-style-type: none"> <li>Would you consider participating again in a co-creation project?</li> </ul>                     | <ul style="list-style-type: none"> <li>Could you briefly describe which factors would make you want to participate in similar projects in the future (if any)?</li> </ul> |

## Annex XV – Generic Consent Template

### **CONSENT FORM to conduct interview on experiences in the [name of the ORION co-creation action]**

#### **Open Responsible research and Innovation to further Outstanding Knowledge (ORION)**

You are being contacted as [role] on the [activity], within the ORION European research project about Open Science. This research project is being coordinated by Dr. Michela Bertero from the Centre for Genomic Regulation and funded by the European Commission. One of the main tasks to carry out in this project is to analyse the impact of the ORION Trainings and Open Experiments.

This interview will be an informal conversation about your experience participating in [activity]. As such, it is not necessary that you prepare the interview beforehand, as we will be asking about your personal opinion about the mentioned topics. For the project research purposes, the conversation will be recorded and transcribed, always assuring confidentiality during all the process.

The information gathered will be used to analyse the impact the [activity], as one of the co-creation activities of the project.

We want to highlight that all results from this process will be open to the public but totally anonymous (never giving personal or institutional names in public documents).

Please, check that you agree with the following statements:

1. I confirm that I have read and understand this consent form for a personal interview in the context of the ORION project
2. I agree for the data obtained in the above-mentioned interview to be used confidentially to analyse the impact of the ORION project.

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Name of the Member of the ORION project

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Name of the interviewee