



Grant Agreement No.: 101069813  
Call: HORIZON-CL4-2021-HUMAN-01  
Topic: HORIZON-CL4-2021-HUMAN-01-07  
Type of action: HORIZON-CSA



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## D4.2 NGI DIVERSITY AND INCLUSION REPORT

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Work package	WP 4
Task	Tasks 4.1, 4.2, 4.3
Due date	31/12/2023
Submission date	December 2023
Deliverable lead	IFC
Version	Final
Authors	Giovanni Maccani (IFC), Paola Zanchetta (IFC), Anna Higuera (IFC), Javier Creus (IFC)
Reviewers	Philippe Félix (Tipik), Thomas Wilczek (FBOX)

Abstract	This deliverable documents the research and engagement activities conducted to-date within WP4. This work is drawn upon five pillars: NGI Resources and Tools (to promote equity), the NGI Innovators, the NGI Online Community (to promote diversity and inclusiveness), and the specific efforts on Women in NGI and on engaging grassroots communities and end-users respectively (both addressing diversity and inclusiveness). For each of these pillars, this document presents the results of the analysis conducted and the actions carried out as well as those planned for the future to improve EDI principles across these pillars.
Keywords	Equity, Diversity, Inclusion, Women, Communities

### Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.1	18/10/2023	Table of content, structure, and writing plan	Giovanni Maccani (IFC)
V0.2	01/11/2023	First draft	Giovanni Maccani, Paola Zanchetta, Anna Higuera, Javier Creus (IFC)
V0.3	24/11/2023	Draft Shared with Internal Reviewers (missing sections 4.2 and 4.3)	Giovanni Maccani, Paola Zanchetta, Anna Higuera (IFC)
V0.4	07/12/2023	Review of content and feedback	Thomas Wilczek
V1.0	13/12/2023	Full version shared with partners	Giovanni Maccani, Paola Zanchetta, Anna Higuera (IFC)
V1.1	14/12/2023	Review of content and feedback	Philippe Félix
Final Version	18/12/2023	Integration of comments and feedback and write up of final version	Giovanni Maccani (IFC)

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Project co-funded by the European Commission in the Horizon Europe Programme		
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Dissemination Level		
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## EXECUTIVE SUMMARY

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NGI ultimately addresses the need for a more fair, safe, resilient, sustainable, human-centred and decentralised internet. Equity, Diversity and Inclusion (EDI) are therefore the backbone of this envisioned future. NGI fosters and commits to a condition of fair, just, and respectful treatment for all through reducing disparities in opportunities and outcomes for diverse communities, organisations and individuals involved in the overall ecosystem. This will in turn foster diversity of participation. Diversity is achieved through equity and fostered by inclusiveness. These are underpinned by strategies for creating an environment where everyone is: able to participate fully, welcome, respected, and valued. It's about recognizing the needs of each individual and group and having the right conditions across NGI resources, projects and initiatives, so that each person can contribute with their ideas, experiences and talents to the fullest.

This document presents the activities and findings achieved so far to address EDI principles within the NGI context, consistent with the three tasks included in this work:

1. NGI Equity Diversity and Inclusion;
2. Women Innovator Engagement;
3. End users' involvement.

The actual focus of the effort being undertaken can also be described across five pillars of action and analysis, consistent with the work plan presented in Deliverable 4.1 (December 2022):

- The NGI Resources and Tools (to enable and promote equity).
- The NGI Innovators.
- The NGI Online Community (both to promote diversity and inclusiveness).
- The specific efforts on promoting better gender equality - see Women in NGI
- The engagement of grassroots communities and end-users respectively (both addressing diversity and inclusiveness).

NGI resources and tools are being assessed and improved accordingly, in order to increase accessibility and thus decrease barriers to understandability and usability mainly related to different physical and intellectual abilities. Through systematically exploring currently underrepresented groups in the overall NGI community and among NGI Innovators, new actions are being undertaken to identify, engage, and involve new groups, cohorts, and individuals thus enriching diversity of participation in NGI at different levels, with a specific focus on women innovators and researchers. Finally, the perspectives, concerns, visions and desires of end-users and grassroots communities are being co-created and structured in an integrated taxonomy. The resulting future EU agenda, i.e. the final output of this specific work, will be therefore aligned with the societal demand for a more inclusive, trustable, and safe future internet ecosystem.

This document presents the preliminary findings achieved with respect to these efforts and outlines an overview of the actions carried out to date. With respect to the former, preliminary insights on how to increase diversity in NGI, as well as how to improve its equity and inclusiveness, are presented.

As a result of this focus on EDI principles and actions, we foresee NGI as a more accessible, inclusive, and societally relevant program and ecosystem.

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## ABBREVIATIONS

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<b>NGI</b>	Next Generation Internet
<b>NOO</b>	NGI Outreach Office
<b>RIA</b>	Research and Innovation Action
<b>IT</b>	Information Technology
<b>EDI</b>	Equity Diversity and Inclusion
<b>WP</b>	Work Package
<b>VPN</b>	Virtual Private Network
<b>EC</b>	European Commission
<b>OSS</b>	Open Source Software
<b>EDI</b>	Equity Diversity and Inclusion
<b>AB</b>	Advisory Board



## 1. INTRODUCTION

NGI ultimately addresses the need for a more fair, safe, resilient, sustainable, human-centred and decentralised internet. While doing so, NGI fosters and commits to a condition of fair, just, and respectful treatment for all through reducing disparities in opportunities and outcomes for diverse communities and individuals involved in the overall ecosystem. A significant effort is being placed to ensure Equity, Diversity, and Inclusion (EDI) of NGI across several axes, acting upon the extant knowledge in these crucial and complex topics. As part of NGI4ALL.E, a dedicated work package (WP) is devoted to this: WP4, *NGI Accessibility and Inclusion - Diversify and Evangelise*. This report represents the second deliverable from this effort and provides details about the actions designed and implemented for fostering EDI in NGI as well as the plan for the remaining months.

Overall, the work on Equity, Diversity, and Inclusion is driven by three main objectives:

1. Making the **NGI better accessible and more inclusive**, targeting under-represented groups and aiming at diverse participation in terms of profiles, gender, age, ethnic group, abilities, and nationality;
2. Ensure **increased participation of women researchers and innovators into the NGI**, while promoting the NGI funded women and their work, in close collaboration with NGI intermediaries (indicated as NGI RIAs in this document);
3. **Fostering increased end users' engagement** with the twofold objective of better assessing their needs in terms of a trustworthy, secure and sustainable internet, and broadly promoting the NGI solutions in a simple and understandable language.

These objectives are executed through three main tasks:

- Task 4.1, NGI Equity Diversity and Inclusion (M1 - M36);
- Task 4.2, Women Innovator Engagement (M1 - M36);
- Task 4.3, End-users' involvement (M6 - M36).

These tasks collectively contribute towards increasing equity, diversity, and inclusion in NGI. In particular, Task 4.1 includes cycles of analyses, design, implementation and evaluation to gradually improve accessibility of NGI opportunities, diversity among community members and innovators, while contributing to the overall communication and dissemination of NGI principles, actions, outputs, and outcomes. Task 4.2 and 4.3 focus on engaging women in NGI across different elements of the programme, as well as the view and desires of end-users and grassroots communities involved in preserving human rights in the digital world, i.e. fully aligned with the NGI core principles. After providing an overview of the work plan outlined in Deliverable 4.1 in chapter 2, the core of this document is structured as follows: **chapter 3** is dedicated to **Task 4.1**, with a focus on actions undertaken and findings to improve EDI across NGI Resources and Tools, NGI Innovators, and NGI Community; **chapter 4** is dedicated to **Task 4.2** and focuses on both the interviews and the actions carried out to increase women participation in NGI; **chapter 5** outlines the activities to date with respect to **Task 4.3** and presents preliminary findings with respect to the taxonomy of future NGI topics as advocated by grassroots communities and movements, before **conclusions and future steps** are drawn in **chapter 6**.

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## 2. THE EDI WORK PLAN: A RECAP

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Consistent with the scope and objectives of this Work Package (WP), Deliverable 4.1 presented a comprehensive overview of the work planned for this effort built upon a review of how Equity, Diversity, and Inclusion (EDI) are being applied in similar contexts as well as their key definitions relevant for the NGI programme. This meant outlining the key overarching questions for each concept to be adopted as guidance in this work, underpinned by more specific objectives:

- Working on increasing, promoting and fostering diversity in NGI encompasses the following questions:
  - What is the current level of diversity among members in the NGI community, NGI end-users, and NGI innovators?
  - How can we incentivise participation of diverse members and innovators currently underrepresented?
  - Why aren't people of differing identities aware of NGI / members of the NGI Community / innovators in NGI? How can we address these gaps?
- Efforts to increase inclusion is addressed in this work by the following questions:
  - What is the experience for individuals who represent minorities within the NGI ecosystem?
  - What barriers exist for people with marginalised identities to feel a sense of welcome, belonging, and appreciation?
- With respect to equity, the key questions are:
  - What systematic barriers exist that may limit or impede any diversity efforts NGI is taking?

While these questions serve as general guidelines, a more in-depth reflection has been proposed with respect to the areas of NGI where EDI is sought, and more specifically the areas of intervention foreseen in this work. This is required as the different concepts of equity, diversity and inclusion, apply differently to NGI if these are considered in relation to the NGI Community, its Innovators or end-users. In this case, NGI Innovators involve a bias compared to the community. While in the former the people involved are by definition software developers or IT experts, in the latter the presence of individuals and groups from different backgrounds would benefit the creativity and effectiveness of the overall Community. Also the potential areas of intervention for addressing or improving EDI would be different. For example, if we wanted to increase diversity and equity among NGI Innovators, actions could be potentially taken in the actual open calls promotion, the submission process, or the evaluation criteria. Pursuing the same for the NGI Online Community would mean acting upon what actually happens within it as well as the communication strategies and the subscription process. Because of these reasons, the approach taken in EDI-NGI has been established as based on 5 working pillars (with the overarching guidance of the questions above). On the one hand, (1) NGI Resources and Tools, (2) NGI Online Community (i.e. the NGI Community Platform<sup>1</sup>), (3) NGI Innovators, represent three pillars pertaining to Task 4.1, to increase NGI EDI performance. On the other hand, specific efforts are undertaken with respect to (4) engaging women in NGI and (5) involve end-users and grassroots communities also in the generation of future topics for the NGI agenda. For these last two pillars the

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<sup>1</sup> <https://community.ngi.eu/>



approach is more operational and peculiar. This is aligned with the actual structure of the work package whereas the former three pillars are included in Task 4.1, while pillars (4) and (5) are the focus of Tasks 4.2 and 4.3 respectively. The figure below provides a summary of the objectives and expected outcomes for each of these pillars.

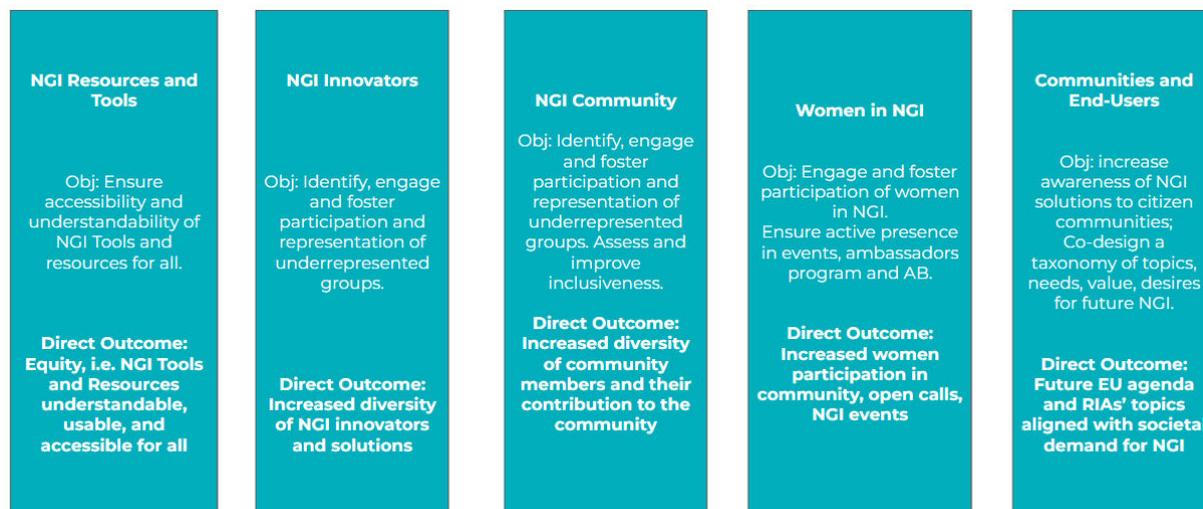


FIGURE 1: WP4'S 5 WORKING PILLARS

According to the proposal, a number of KPIs have been established to guide the work within WP4. An overview of these as well as the extent to which each has been addressed so far is provided in the table below.

KPI	TARGET VALUE	CURRENT VALUE	PILLAR
Structured NGI EDI Work Plan	1	1	Overall - see Deliverable 4.1
Semi-structured interviews <sup>2</sup> to individuals from underrepresented groups	20	2	NGI Innovators, NGI Community
Semi-structured interviews to grassroot communities	20	13	Communities and End-Users
Women in Tech Mentoring Sessions	6	4	Women in NGI
Women in Tech Interviews	10	6	Women in NGI
Taxonomy of future NGI Topics	1	Ongoing	Communities and End-Users
Videos showcasing impact/principles from NGI	2	Production ongoing	Overall
Participatory Workshops	5	1	Communities

TABLE 1 : WP4 KPIs AND PROGRESS TO-DATE

<sup>2</sup> Semi-structured interviews were chosen as these enable respondents to reflect upon and generate new knowledge from their actual lived experiences. See Deliverable 4.1 for more details.

In terms of overall progress to-date, it is noted that prior to engaging with actual underrepresented groups and other entities targeted (e.g. women in tech initiatives and networks, and communities concerned with preserving human rights in the digital world), a substantial part of the work had to be carried out. For instance, before engaging an underrepresented group a careful assessment of who is currently involved had to be contacted followed by evaluation of who should actually be targeted, given the evolving scope of the programme. Similarly, prior to interviewing women-related networks and communities, a mapping exercise had to be undertaken. These are the main reasons why some of the KPIs are currently lagging behind (specifically "semi-structured interviews to individuals from underrepresented groups").

During these initial phases, we considered it relevant to add to the plan semi-structured interviews to representatives (almost in all cases the actual coordinators) of some NGI RIAs that are either completed or close to the end of their funding period. In total, we collected relevant experiences and perceptions from seven NGI RIAs: NGI Pointer, NGI Ledger, NGI Assure, eSSIf-Lab, Ontochain, TrustChain, and NGI Trust. Furthermore, being part of the Impact and Exploitation Working Group allows continuous interactions with the current ones. These interactions have also been leveraged to both collect data for the analysis that was missing, as well as to promote the work on EDI in NGI and share emerging findings and related insights.

In addition, from WP4, contributions are made across all other actions undertaken in NGI4ALL.e. For example, diversity and inclusion is sought as part of the NGI Influencer program, all NGI-related events, the NGI Impact and Exploitation Workgroup, the NGI Impact Stories, among others.

Specific content, e.g. from the interviews, is also being developed, thus contributing to extending the scope of communication and dissemination of the NGI Outreach Office towards also including elements beyond the solutions developed by the actual NGI Innovators. These typically include providing a wider view on the key concepts and pillars behind the overall NGI Programme, i.e. to demonstrate and show how we, as part of NGI, are taking into account more holistic views on a future human-centred, fair, and sustainable internet for all.

### 3. TASK 4.1 NGI EQUITY DIVERSITY AND INCLUSION

According to the structure of this document, this chapter is divided in three sections describing the activities carried out and findings achieved with respect to the first three pillars, i.e. NGI Resources and Tools, NGI Innovators, and the NGI Community respectively.

#### 3.1 NGI RESOURCES AND TOOLS

The work planned on NGI Resources and Tools revolves around ensuring that all online artefacts that allow individuals and groups to engage with NGI and its RIAs are as much accessible as possible. According to what postulated in Deliverable 4.1, “this pillar is relevant mostly to improve equity, i.e. to ensure that all channels and tools are understandable and accessible by everyone, i.e. that equal opportunities to be part of NGI are offered. In turn, this may lead to an increased diversity among community members and innovators as well as a more inclusive experience for everyone wanting to engage with NGI”.

The focus of the analysis has been established on those key channels in place to join NGI, i.e. the website and the “Join NGI” options across the NGI Online Community and the subscription to the newsletter.

The NGI Website is considered the main channel and ensemble of online artefacts for individuals and groups to engage with the programme and has been therefore a keystone in this analysis. As described in the first NGI EDI Plan Document (see Deliverable 4.1), given its online format, the main anchor adopted is the latest Web Content Accessibility Guidelines published by the W3C (version 2.1)<sup>3</sup>. These define web content as accessible when it meets four key criteria according to which the content must be: (1) Perceivable, i.e. the information and user interface must be presented so that all users can perceive it; (2) Operable, i.e. usable in terms of both user interface and navigation; (3) Understandable, with respect to the information provided and the user interface; and (4) Robust, i.e. the content can be interpreted reliably by user agents, including assistive technologies. More specific guidelines (fourteen in total) are included within each of these categories. Furthermore, the analysis covers the issue of identifying missing languages, ensuring that the tools do not ingrain any form of discrimination, and exploring skills and knowledge required to effectively use and understand the tools and resources.

The test conducted with respect to all these elements revealed how the NGI website and its content has a high level of adherence to the W3C Guidelines. An overall score has been calculated as 97.28 (where 100 is considered the maximum). Overall, 970 tests have been conducted with respect to content published on the website which is subject to accessibility parameters described above. The results showcase that 954 tests were passed, i.e. compliance for 954 elements with the W3C guidelines has been verified and ensured. To put this in perspective, a benchmarking provided by existing automated services (e.g. the WAVE Web Accessibility Evaluation Tool<sup>4</sup>) shows that the accessibility score obtained for the NGI website is well above the average in the EU. For example, according to the European Internet Inclusion Initiative, in a study conducted within the University of Agder (Norway) including over 1000 institutional websites, the average score of accessibility and compliance of these websites to the W3C Guidelines is 82, well below the one obtained for ngi.eu (see average score per country below).

<sup>3</sup> Full guide available at: <https://www.w3.org/TR/WCAG21/>

<sup>4</sup> Available at: <https://wave.webaim.org/>



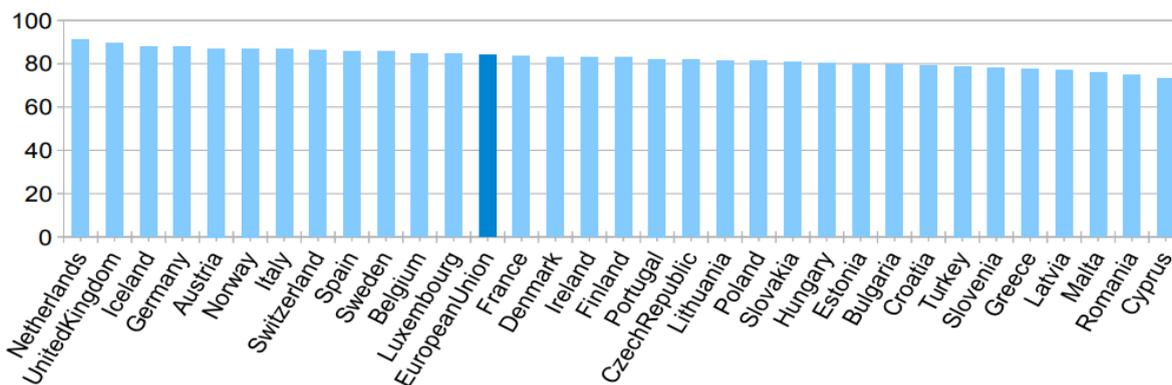


FIGURE 2: AVERAGE ACCESSIBILITY SCORES PER COUNTRY. SOURCE: EUROPEAN INTERNET INCLUSION INITIATIVE<sup>5</sup>.

Back to the actual analysis conducted, while, as mentioned, 954 elements “passed” the W3C compliance test, 16 have failed it. These collectively refer to three categories of misalignments with the W3C guidelines:

1. The same ID attribute value has been encountered in multiple static elements (two occurrences): this means that in two instances the ID assigned to an element of the website is not unique. According to the W3C Guidelines, each HTML element must have a unique ID attribute, for example to point to a style in a style sheet. This may cause issues e.g. when interacting with other applications.
2. Links had no discernible text (eight occurrences): this means that across all pages of the website, eight instances to links published had not included a displayed text telling the users the purpose of the link itself. This was not found in critical sections of the website, and it referred to links only visible through hover over actions with the mouse. One of the consequences of this inconsistency with the W3C Guidelines may be that these links are not visible by screen readers.
3. Contrast between foreground and background colours did not meet the W3C Guidelines’ contrast ratio threshold (three occurrences). These were found in the section related to the NGI Ambassador program, now no longer included in the NGI website.

Since the first deliverable has been submitted, another important feature has been added to the NGI website, i.e. a plug-in for enabling and facilitating consumption of content by visually impaired individuals.

<sup>5</sup> Available at: <https://www.itu.int/net4/wsis/forum/2016/Content/AgendaFiles/document/8d37d397-bc90-43ef-9c8e-030203d54627/EIII-Benchmarking-results-Snaprud-WSIS.pdf>

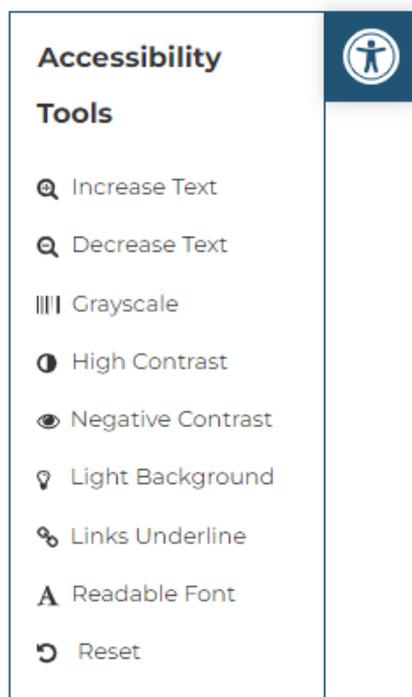


FIGURE 3: ACCESSIBILITY FEATURES EMBEDDED WITHIN THE NGI WEBSITE

As shown in the figure above, the plug-in includes an automated set of options to change how the web content is displayed. This is to enable visually impaired individuals to consume this content. In addition, we went beyond this tool and tested the functionality and navigability of the website with a community of blind people. While it is noted that this workshop has been organised within the scope of Task 4.3 (i.e. in relation to building a taxonomy of priority topics for future RIAs and the overall NGI agenda, see dedicated section below), some time has been dedicated to exploring how blind people experience the consumption of content of the NGI website, and how we can improve its structure accordingly. The exercise consisted of asking participants to enter the NGI website and to verbally describe their experience. The website was accessed by both smartphones and desktop computers to account for a more comprehensive set of insights. It is noted that the experience of blind individuals relies on screen readers, i.e. dedicated applications that literally read the content of a webpage (or any other online content) starting from top left of any given page.

In general, participants have been able to understand what the NGI website is about, but the process has not been straightforward because of mainly two issues:

1. Policies: all websites, to comply with existing cookies and data protection regulations, require users to accept related policies, terms and conditions. Sometimes, long texts are provided prior to the option on clicking on “accept”, “manage” or “reject” the actual policy (in addition to links to its complete text) and this requires blind people to listen to their screen readers throughout this entire text before accepting/rejecting the policy itself. In the case of the actual NGI website, the text is kept concise and short, thus not creating particular inconveniences for them.
2. Dynamic banners: the second, more prevalent issue, refers to dynamic banners often placed at the top of a web page. These typically show scrolling windows showing access to some relevant content. Some of these cases represent a serious bottleneck for blind people. In particular those cases whereby screen readers do not have the time to read the entire content before a next heading appears. This creates a loop where these readers never stop reading the content and do not allow moving on with

lower sections of the pages. This feedback was shared with the consortium, and the text appearing now is short and likely suitable for most solutions used by blind individuals (see example below).

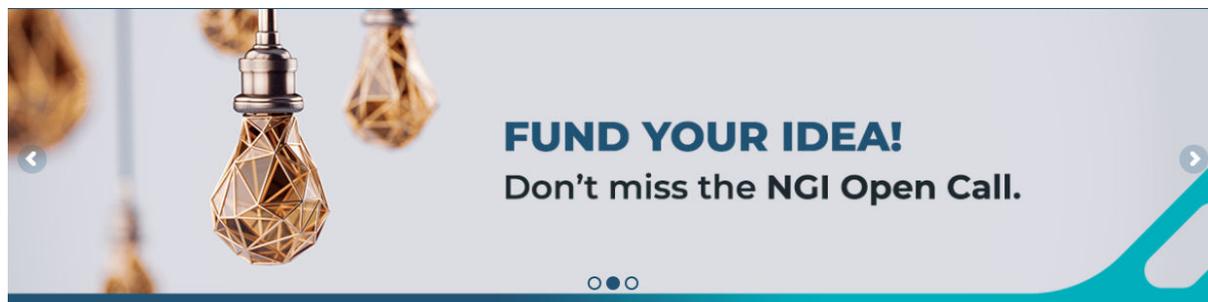


FIGURE 4: EXTRACT OF DYNAMIC BANNER WITHIN THE NGI WEBSITE

Another key recommendation was made in terms of substantially improving their experience. When consuming web content, blind people usually visit specific websites looking for specific information, i.e. with a prior knowledge of what they are visiting and the reason for doing so. On the contrary, it rarely happens that they visit webpages having not a specific purpose or idea what these are about. Because of the specific functioning of screen readers (which, as explained in section 5.3, represent an issue in themselves), one important feature of websites is to place the search functionality at the top left of the page, i.e. as the first element readable by their software and clickable by them. In the NGI website this was originally placed in the top right of the page, i.e. after all social media accounts links and other headings. This was included in the feedback provided to the team responsible for the website during the project's General Assembly, and addressed accordingly.

Also, as a final comment, participants of the blind people community lamented the terminology used for the “visually impaired plug-in”. They argue that blind people are indeed visually impaired, and the plug-in only addresses some, usually lower levels, of visual impairments. Again aligning to the W3C (specifically to the guidelines being developed for people with visual issues<sup>6</sup>), these plug-ins serve the needs of people affected by “low vision” as opposed to the all spectrum of visual impairments. These include individuals affected by visual acuity, light sensitivity, contrast sensitivity, field of vision-related problems, and colour vision ones. In other words, these plug-ins do not address the needs of fully blind people.

Another fundamental part of the website and the NGI interface with the public and its members refers to the NGI Innovators Database. This is a structured, interactive, navigable database including all solutions developed across all NGI RIAs so far. The focus in this case has been primarily on navigating the database i.e. experiencing its features in first person as well as asking others during the interviews whether issues are experienced when consuming and searching this content. So far, no major issue has been encountered. Importantly, the feature works and is fit for purpose. One of the most fundamental elements of it is about the manner in which NGI solutions and innovations are presented, whereby together with a more technical explanation of the specific solution (accessible and understandable mainly by those who possess a technical background), a section entitled “relevance for end users” is also provided. Within this, NGI solutions are explained in a language that is suitable for the general public, thus substantially increasing the outreach and awareness about them beyond the technical software development and IT community. An exemplary text to demonstrate this is provided below for one solution: Egil Scim Client<sup>7</sup>. Its technical description is provided as follows: “*EGIL is an open source client that facilitates the exchange of student information to external providers of study material or administrative services in a standardised way. It*

<sup>6</sup> Full report available at: <https://www.w3.org/TR/low-vision-needs/>

<sup>7</sup> [https://www.ngi.eu/funded\\_solution/egil-scim](https://www.ngi.eu/funded_solution/egil-scim)

*supports attributes based on SCIM (RFC 7642-7644) and extensions, it provides an interface to common directory services and supports federated solutions between a large number of school principals and service providers". On the other hand, its relevance to end user sections includes: "These days organisations work with lots of external services via the internet. When those services require a login, and most do, there is some significant book-keeping to do. Sometimes your organisation will pay a flat rate to a service provider, but many other times you will pay per user or per use. The user may need to receive a personal environment, coupled to their role in your organisation. A manager or teacher may get another view than a student or a flex worker. Other times you as an organisation use the service in such a way, that you need to be able to exchange information with other systems from other providers. That means service providers need adequate and up to date information, in order for their service to properly work"; i.e. in a much more accessible format. Certainly, the availability and quality of the information made available through the database depends primarily on the actual RIAs responsible for its provision. In future meetings, more emphasis will be placed on the importance of this content to make NGI solutions understandable by the wider public, beyond IT savvy individuals.*

For what concerns the **NGI Online Community**, from the interviews undertaken to those already funded by NGI, the NGI RIAs, and those interested in its key topics and activities, the issue resides mainly in the scope and the definition of the Community itself rather than specific accessibility features.



FIGURE 5: WEBPAGE TO JOIN THE NGI ONLINE COMMUNITY

In particular, as reflected upon more in detail in its dedicated chapter of this document (see section 3.3), the community is mainly perceived by participants as an opportunity to gather timely information about NGI activities and opportunities and for obtaining particular information to clarify aspects around submissions of proposals to the open calls. This is well demonstrated by the fact that most active participation in this space is observed in those moments that precede open calls' deadlines, where specific ideas and questions about the technicalities of submissions are posed to both NGI partners and other members of the community. The same level of interaction is not observed on a continuous basis, and the

interviews undertaken highlight two main reasons for this: (1) the fact that open source developers are already actively involved in other well established open source online communities; and (2) the particular traits of NGI innovators which tend to prefer self organised online spaces than those managed by some established entity such as the NGI program itself (and its partners) or the EC in the wider sense. Notwithstanding this, when asking about accessibility and understandability of the process to join the online community and its features, all interviewees confirmed that no barriers were experienced both in terms of technical difficulties and other potential bottlenecks. Some commented about the fact that the community is hosted on one of the partners’ platforms and this requires an additional registration to an entity that is not necessarily known by subscribers. However, while this may make the process slightly less straightforward, this step results to be necessary in order to ensure compliance to existing data protection regulations, a responsibility that, in the case of the NGI Online Community resides within the NGI4All.e project.

The last channel considered refers to the process of subscribing to the NGI Newsletter. No specific accessibility inconveniences were found in this part, since the process and the information required to be inserted is straightforward and limited (just the email address and accepting the terms and conditions) as shown in the figure below.

### SUBSCRIBE TO THE NGI NEWSLETTER

#### DO YOU WANT TO STAY UP-TO-DATE ON OUR NGI RELATED ACTIVITIES?

Do you want to stay up-to-date on our NGI related activities?

Sign up for the NGI Newsletter: a quarterly roundup of all the news and reports, plus our regular NGI Newsflashes: short bursts of recent, relevant news and event reminders.

Use the form here below or [subscribe here](#).

I can unsubscribe at any time. I understand that my personal data may be transferred to another (consortium of) partner(s) as a result of a new funding round in order to ensure the continuity of the NGI initiative and after I have been informed.

I consent to the processing of my personal data in accordance with our [privacy policy](#).



FIGURE 6: SUBSCRIPTION TO THE NGI NEWSLETTER

A separate reflection may be conducted to the actual open calls designed and distributed by the respective RIAs. When considering accessibility of content within this area, potential issues may arise in terms of skills and competencies required to fully understand the scope and the requirements of these calls. However, the key question here revolves around to whom should this content be accessible? NGI Open Calls are directed to an audience of people with an IT background, for the vast majority of cases software developers. The specificities of the RIAs and their open calls are therefore oriented to these cohorts and it is beyond our scope and intentions to ensure that these texts and descriptions are understandable by the general public. Rather, the focus is on ensuring the process of submission is accessible and straightforward and so far no comments or issues were reported in this way by the innovators and applicants approached. One only observation was highlighted with respect to the amount of information applicants need to include in their application. Although this does not necessarily relate to EDI principles (apart from gender information which is tackled separately in the dedicated section below), the submission process to open calls varies across RIAs with respect to the amount of information required, e.g. personal information about background, gender, nationality etc. While, especially for



open source developers and practitioners, there is a will to provide as less information as possible, a trade-off exists with the potential for analysis of effectiveness of communication actions (e.g. in what countries is more or less effective given the number of applications) as well as with respect to the level of diversity achieved in these efforts. From the EDI working group, we advocate for more data to be collected, but we acknowledge this might make the experience of submission more lengthy and may arise issues for some individuals that were reported to ask why certain information is required.

Looking forward, the work involved in this pillar will focus on keeping the accessibility analysis updated with respect to the new contents being published and, as done so far, in alignment with the W3C accessibility guidelines and principles. A key focus of interviews to end-users and RIAs will also be placed in relation to both the NGI Online Community and the Innovators Database, two key online artefacts of the NGI programme as a whole.

## 3.2 NGI INNOVATORS

Within this second pillar, the focus has been established primarily on fostering diversity of NGI Innovators. Deliverable 4.1 proposes several reflections on what diversity variables should be considered as part of this work. Concerning this, we argued that most of the diversity variables initially taken into account from the literature review are either not relevant or not available. For example, religion of applicants, their ethnicity, or sexual orientation are not considered potential sources of underrepresentation among the NGI Innovators, since no potential bias emerged as this information is usually not evident or provided. The diversity variables selected, and validated at the NGI4ALL.E General Assembly, are:

- Country of the team / individual / organisation.
- Gender composition (see dedicated section of this report).
- Focus of the solution.
- Type of end-users to whom the solution is oriented.
- Entity / group funded (public, private, NGO / foundation / association, natural person or group, universities and research centres).

One important challenge while doing this work referred to the difficulty in getting data about innovators. While gender data is generally not available (see dedicated section below), the only information generally provided refers to the country of applicants as well as funded innovators as well as their profile (i.e. whether they are individuals, businesses, universities, NGO, public sector etc.). Relevant (although not complete) data could be found with respect to these elements to allow a meaningful and useful analysis. Also, available data is not provided consistently from the RIAs. A significant effort was undertaken to extract these from the RIAs' webpages, social media accounts, deliverables, and interviews.

In total, we found evidence of 1120 innovators funded<sup>8</sup> across all NGI RIAs so far.

### 3.2.1 Country of NGI Innovators and applicants

From a country perspective, information about funded innovators has been found about all RIAs open calls (apart from the recently completed calls from NGI Search and the second open call of NGI TrustChain). The overall results are presented by country in the following figure.

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<sup>8</sup> It is noted that information about the latest calls of NGI Search, NGI Trustchain and NGI Sargasso are not yet available at the moment of writing this report.

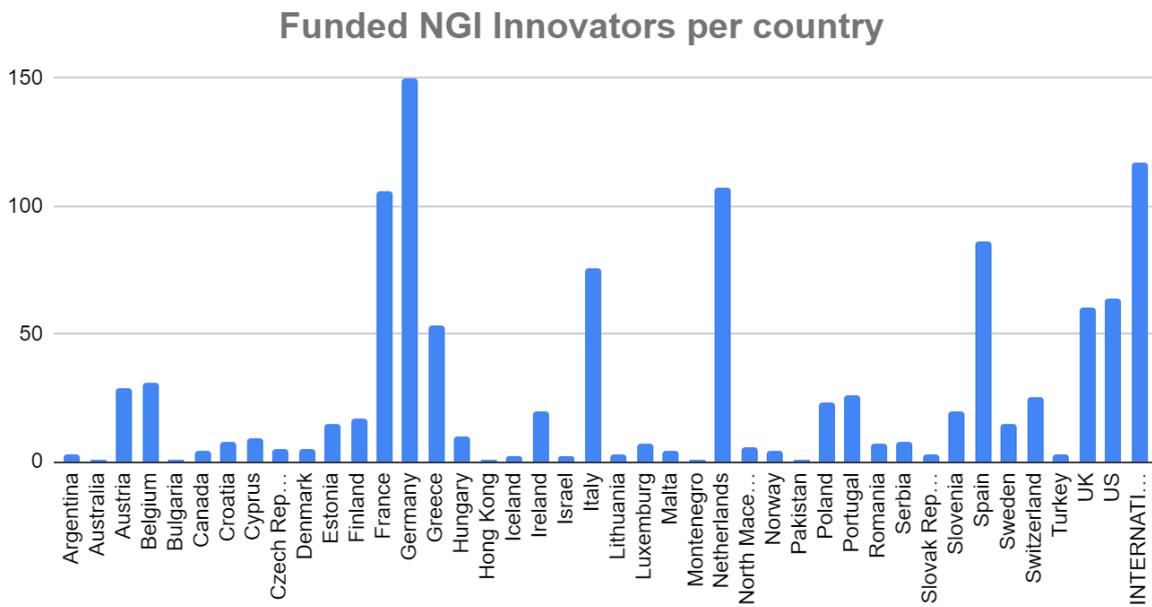


FIGURE 7: DISTRIBUTION OF NGI FUNDED INNOVATORS PER COUNTRY

As shown, innovators collectively come from 42 different countries. Germany, the Netherlands, France, Spain and Italy appear to be the most represented countries with 150, 107, 106, 86, and 76 funded innovators respectively.

In terms of outreach performance, we explored whether there is a correlation between the countries from where partners of a particular RIAs come from and the countries of actual funded innovators. One would expect this, since partners may have mostly relied on existing networks and connections, exploiting synergies with entities and organisations that are in their proximity. However, this was not the case, and no significant correlations have been encountered in this way.

Of all funded innovators, 81.9% come from one of the EU member states, while the remaining 18.1% comes from outside the EU. Regarding the latter, the vast majority of these comes from the US or Canada (almost 40%) and relates to those RIAs, e.g. NGI Atlantic whose scope is indeed to fund teams consisting of US-EU collaborations, or by the UK (32.4% of the international teams). Other countries represented include Argentina (3), Australia (1) Hong Kong (1), Iceland (2), Israel (2), Montenegro (1), North Macedonia (6), Norway (4), Pakistan (1), Serbia (8), Switzerland (25), and Turkey (3). Considering EU member states, all countries appear to be represented apart from Latvia.

### Distribution of NGI funded innovators by EU country

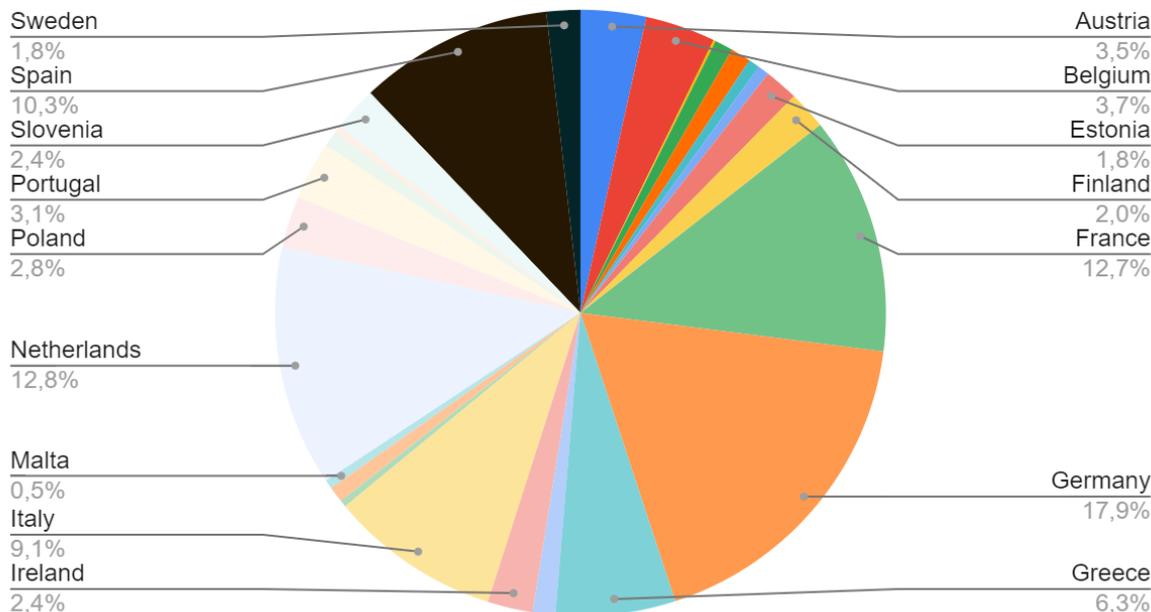


FIGURE 8: DISTRIBUTION OF NGI FUNDED INNOVATORS PER EU COUNTRY

Considering Associated Third Countries, of a total of 16 of these, seven are represented by funded innovators (Turkey, Serbia, Iceland, Israel, Montenegro, North Macedonia, and Norway), four count with some applicants not finally funded (Ukraine, Bosnia Herzegovina, Kosovo, and Moldova), while no participation in the calls was found from Albania, Armenia, Faroe Islands, Georgia, and Tunisia.

Importantly, although with much less data available for a complete assessment, indications should be considered also from the countries where actual applications came from. Indeed, it is possible that underrepresented countries with respect to funded innovators may not be a proxy of the outreach diversity of our efforts. Rather, it could be that participants from certain countries have simply been less successful in their proposals and applications. As mentioned though, data about the country of applicants available is limited. In particular information could be found about a handful of RIAs<sup>9</sup>. In total, country information was found for 3032 applicants to date. Thor distribution by country is shown in the figure below.

<sup>9</sup> Information is fully available only for DAPSI, NGI Pointer, and NGI Search Open Call one, and partially available for NGI Assure, NGI Atlantic, eSSIf-Lab, Ontochain, NGI Ledger, and Fed4Fire+.

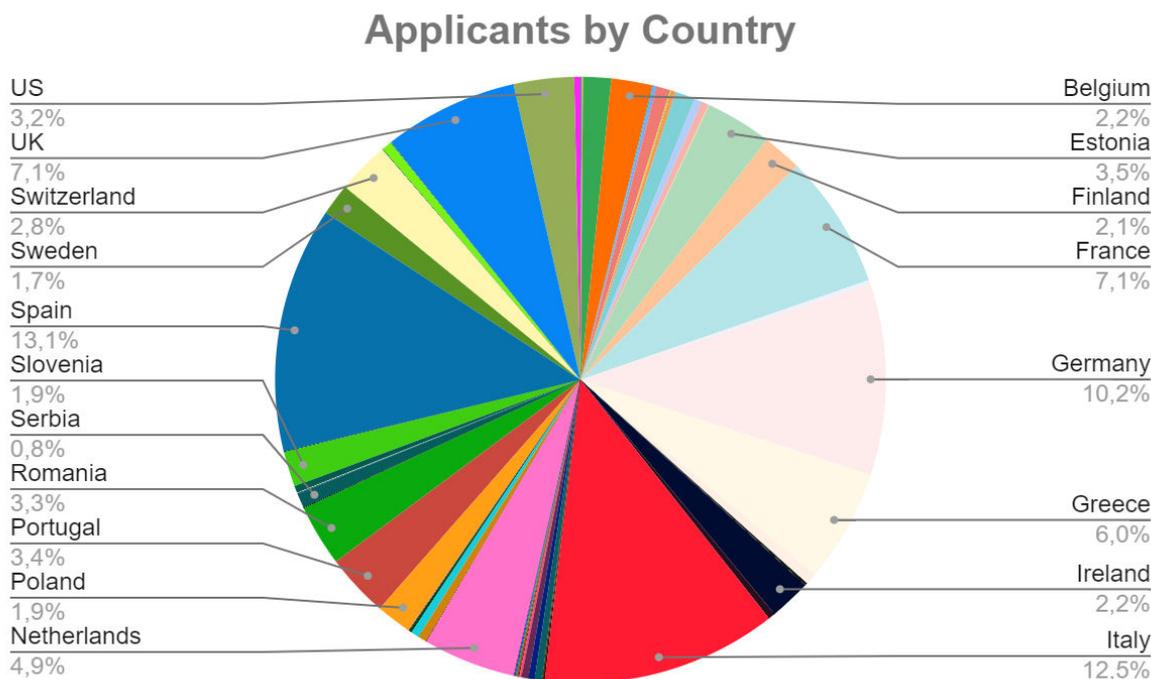


FIGURE 9: DISTRIBUTION OF APPLICANTS BY COUNTRY

Compared to the 42 countries represented within the funded innovators, applications came from a total of (at least) 65 of them. Percentages are somewhat aligned with funded innovators, e.g. the higher number of applications came from Germany, Italy, Spain, France and the Netherlands. In total, 23 countries are represented in this ensemble, but not in the funded innovators one. These include (number of applications encountered are proposed in brackets): Albania (2), Armenia (1), Brazil (2), Bosnia and Herzegovina (5), Colombia (1), United Arab Emirates (1), Georgia (6), India (3), Iran (1), Japan (2), Kosovo (2), Latvia (12), Mexico (1), Moldova (3), Namibia (1), Nepal (2), Nigeria (1), Philippines (1), Rwanda (1), Seychelles (1), Singapore (1), Uganda (1), and Ukraine (10).

In light of this analysis, it becomes clear what countries are still lagging behind in terms of involvement in NGI. These mainly relate to Eastern Countries in the EU, and therefore represent a current key focus for dissemination from this WP. In particular, a database with key contacts, networks and organisations has been gradually built and extended through so-called snowballing techniques. As a starting point, sessions are being organised with those National Contact Points established across these countries. The provenance and, subsequently, the expected contribution from them vary depending on their entity type. For example, National Contact Points are sometimes established within universities and sometimes as part of state and government-related agencies - e.g. Ministry of Education. Referring to the previous example, engagement of one entity or another has implications on what can actually be done and in what format (e.g. event-type of organisation for the former, and more institutional communication for the latter). Overall, the purpose of these actions is for them to become aware of what NGI is and what opportunities it entails, promote the subscription to the NGI Online Community, transfer them the required materials and kits for undertaking communication and dissemination in a more targeted and granular manner in their contexts, and explore how we can further support this process.

When undertaking interviews to the RIAs coordinators, a potential limitation of conducting this work was raised, especially with respect to certain types of innovators. The argument was provided about the meaning of understanding innovators' countries, especially when these are not representatives of legal entities, i.e. are individuals involved in open source

developments. In this case, people would report their nationality, which may tell nothing about where they actually live or work from. In these cases, understanding what country they are from would say little about the performance of NGI4ALL.e. While we do acknowledge this limitation, we still believe that good indications and insights on the effectiveness and penetration of the actual overall communication and outreach undertaken. Also, it should be reminded that the main scope of this pillar is to foster diversity of innovators in the overall NGI community of participants. The benefits of having a diverse ecosystem were well argued in Deliverable 4.1, and diversity in terms of culture and nationality is a key element to be sought.

### 3.2.2 Entity type of funded NGI Innovators

As originally planned, an assessment of the type of entities funded allows for generating insights about the level of diversity that is currently observed within these cohorts, as well as about thinking who is potentially underrepresented. With respect to the type of funded innovators, information is available about 820 of them (i.e. 73.2% of the total). Since different RIAs use different terminology, we clustered funded innovators entities across five categories: (1) SME and Private Companies; (2) Natural people or spontaneous groups of individuals; (3) Higher education institutions - e.g. universities - and research centres; (4) public sector entities and agencies; and (5) other NGOs or not-for-profit organisations and networks. A distribution of innovators based on these categories is provided in the figure below.

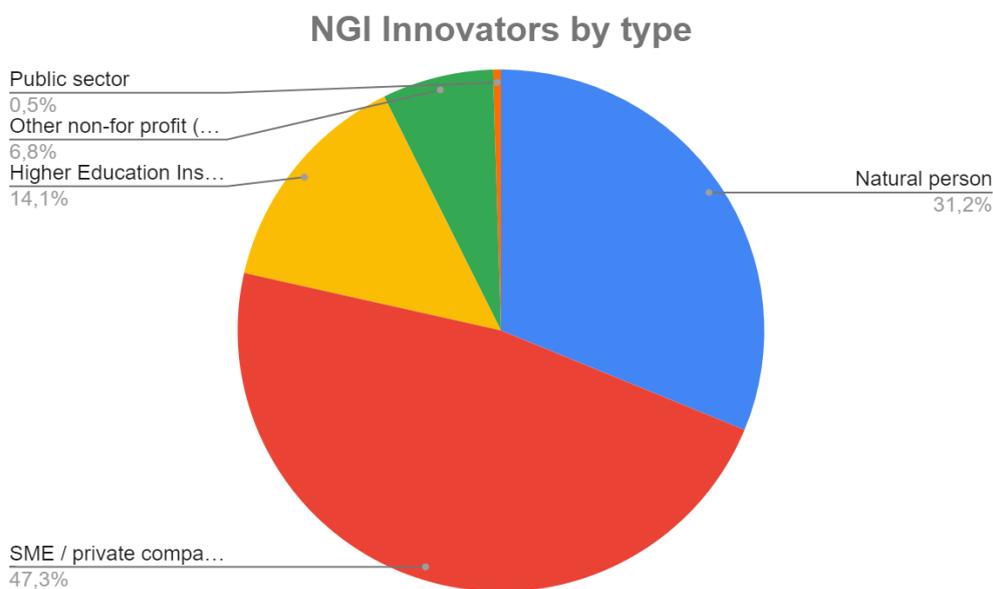


FIGURE 10: DISTRIBUTION OF NGI FUNDED INNOVATORS BY TYPE

From this simple analysis, it is evident that the Public Sector is widely underrepresented among NGI Innovators. At the same time, both the RIAs coordinators and the innovators approached so far agree on the fact that the public sector is seen as one of the most important end-users of NGI solutions. This cohort therefore represents a key target for interviews (as an underrepresented group) and subsequent engagement. In general, the research conducted in this direction is revolving around three aspects:

- (1) Investigate the reasons why public sector agencies are underrepresented among NGI Innovators.
- (2) Further investigate what is required for public sector agencies to finally adopt NGI solutions in their systems, processes, practices, services, and routines.

- (3) Understand what their potential involvement as end-users in the development of NGI solutions could be.

To do so, we are targeting relevant actors from the EU. So far, beyond questions asked to innovators and RIAs representatives based on their solutions and experiences respectively, two types of actors have been interviewed so far: (1) public sector agencies themselves; and (2) other actors that act as intermediaries between the public sector and the open source software community. While this investigation is ongoing (and more effort is planned for the upcoming months), some preliminary insights can be extracted from the data collected to date. In particular, for each of the three points listed above:

- Investigate the reasons why public sector agencies are underrepresented among NGI Innovators: this element seems to be the most clear of all: typically the public sector does not possess the required skills, knowledge and innovation capability for engaging in forefront innovation within software development. IT in the public sector is still too often considered as a separate unit, sometimes even a separate office managed through Service Level Agreements or even provided in outsourcing models (Maccani et al., 2020)<sup>10</sup>, i.e. far away from a situation where IT is considered strategic and managed accordingly in terms of financial and human resources allocation. One interviewee from a public sector entity tells of experiences whereby public agencies buy *“technologies without having an idea and what they imply. Sometimes they buy technology without having the expertise to actually adopt and use it”*.
- Further investigate what is required for public sector agencies to finally adopt NGI solutions in their processes, practices, services, and routines. One interviewee from the public sector stated: *“There is a big gap between the code being available on GitHub and the PA adopting a system supported by that code”*. In line, according to a representative of Open Source Politics<sup>11</sup> interviewed *“frequently there is an intention to utilise open-source software, but this intention often goes unrealized”*. Beyond the well known lack of investments and expertise, a key inhibitor is acknowledged to be related to the actual maintenance of a specific open source solution. This concept shed light on two important factors: (1) while open source software is free of charge, it entails a total cost of ownership, including aspects such as adapting the general code to the specific contexts and use scenarios, updating the system(s), feature management etc.; and (2) as a consequence of the previous, adopting open source solutions may require large organisational change, including hiring new workforce. Literature on the difficulty of the public sector to change is plentiful. A suitable solution was studied from the instance of Open Source Politics. Their success model (i.e. ensuring meaningful and effective adoption of open source within the public sector) is based on a solid public-private business model, whereby the company provides consultancy and IT services to public agencies before, during and after adopting open source solutions. They provide the required skills, experience, and capabilities. Still, while they provide a key role in shaping and adapting solutions to the need and constraints of the specific contexts (a work that currently represents a serious bottleneck for innovation), wider efforts for maintaining, updating, and sustaining the general solution (e.g. the code behind the open source solution itself) are required. With respect to what NGI can specifically do in the future to foster adoption of open

<sup>10</sup> Maccani, G., Connolly, N., McLoughlin, S., Puvvala, A., Karimikia, H. and Donnellan, B., 2020. An emerging typology of IT governance structural mechanisms in smart cities. *Government Information Quarterly*, 37(4), p.101499.

<sup>11</sup> <https://opensourcepolitics.eu/>: Open Source Politics is a private company which have been active in acting as intermediary between open source solutions and the public sector, with a specific focus on helping public sector agencies to adopt and routinise the open source deliberative democracy platform DECIDIM.



source solutions, reflections from the specific case of DECIDIM<sup>12</sup> are proposed within chapter 5, where preliminary aspects of the future NGI agenda are presented.

- Understand what their potential involvement as end-users in the development of an NGI solution could be. From the interviews it emerges that, when it comes to IT, the public sector is “coming from a culture: the private sector gives you what you need”. At the moment, it seems that public sector agencies (or at least the ones we have approached) are not aware of NGI. A common suggestion made by several interviewees is to actively involve them during the development of NGI solutions, somehow enforcing innovators to collaborate with end-users. This is believed not only to enable solutions that in the future will be fit for purpose, but also in terms of helping shape a solution that is scalable by design, i.e. that can be adapted to each local need, priority, and existing context. Ultimately, in chapter 5, we present an additional proposal emerging from these interactions, i.e. the development of purchasing criteria to foster the diffusion of open source solutions and assist public sector agencies in these complex purchasing processes.

At the time of writing this document (i.e. November-December 2023), the plan is being made to extend interviews to underrepresented groups focusing on public sector agencies to uncover other potential issues and opportunities as well as to further validate this preliminary insights extracted.

Beyond specific actions through tailored engagement, more general initiatives are also being carried out to spread awareness about NGI, its opportunities and principles among wider groups currently not involved. These include actions carried out for the general public and for specific cohorts. For example, two specific sessions have been organised in Barcelona for the general public. The scope of these (see picture below as an example) has been identical for both and it involved providing a general overview of the NGI programme, as well as of the channels to engage with it and become aware of the solutions developed.



FIGURE 11: PUBLIC SESSION ON NGI

<sup>12</sup> Available at: <https://decidim.org/>

Other actions were undertaken through participating in existing events and promoting NGI across different, more focused, groups. This for instance was the case of the Dutch Design Week<sup>13</sup> held in October 2023 in Eindhoven, Netherlands. Here, NGI has been presented at a workshop with multi-sectoral enterprises and businesses as both a source of funding for those interested in developing new open source solutions for the future internet and a source of solutions to be adopted as well. Particular focus has been placed on the NGI Innovators Database as the one-stop-shop for accessing the NGI products and solutions.

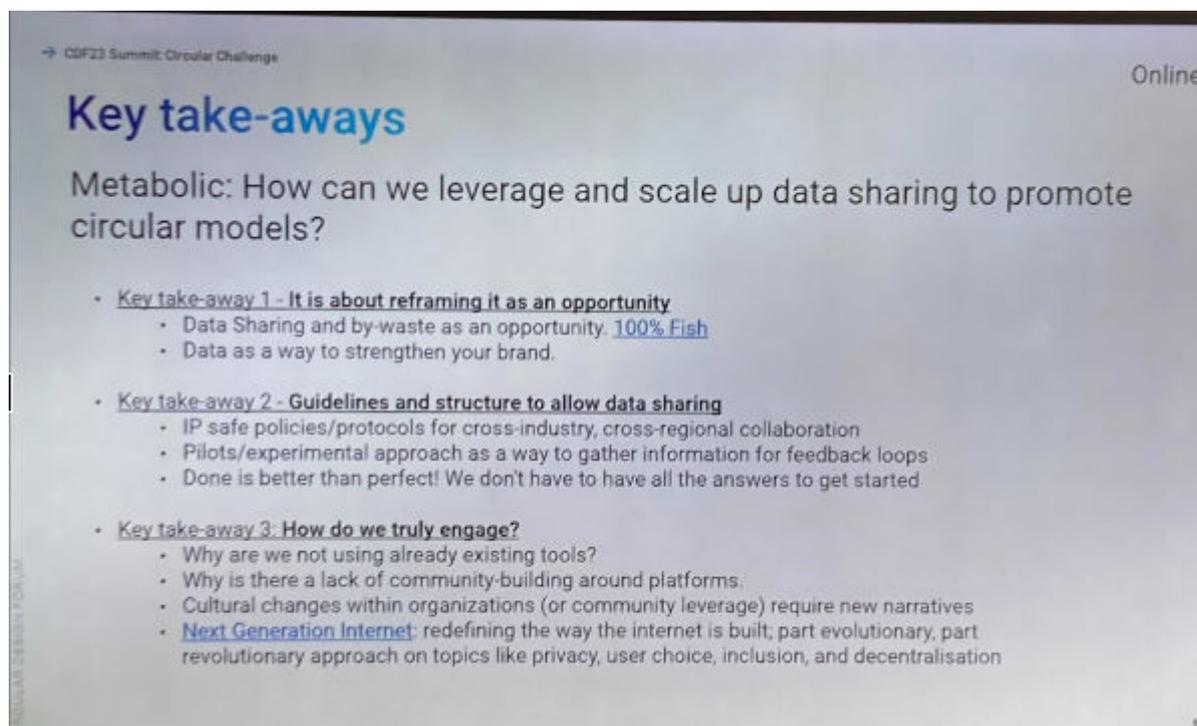


FIGURE 12: EXTRACT FROM PRESENTATION AT THE DUTCH DESIGN WEEK

In addition, also contributing to Task 4.3, interviews have been undertaken with the representatives of Impact Stories at the NGI Forum 2023, in November. The scope of these can be seen as twofold: (1) foster dissemination and promotion of NGI solutions beyond existing channels, by, e.g., focusing on the emerging needs from underrepresented groups; and (2) communicate and disseminate NGI solutions in accessible language, focusing on their use and relevance, in addition to the, usually more complex to grasp, technical descriptions.

### 3.2.3 Type of solution and end users

Besides diversity of the teams of innovators, information about the diversity of solutions can be found in the innovators database. As shown in the figure below, NGI solutions are clustered across ten categories, depending on the key nature of their solutions. However, the room for action in this WP is limited since this very much depends on the specific topics of the open calls. For example, eSSIf-Lab has been a project entirely dedicated to Self Sovereign Identity standards, and other RIAs such as Ontochain and NGI TrustChain are focused primarily on Blockchain and Distributed Ledger Technologies - enabled solutions. As a consequence, we encounter a higher number of NGI innovations pertaining to these themes if compared to other relevant aspects that are not explicitly covered by any RIA (e.g. Green IT). Reflections and insights on specific topics to be covered within the future NGI Agenda are provided through the work from task 4.3, presented in chapter 5 of this report.

<sup>13</sup> <https://www.dezeen.com/tag/dutch-design-week/>

## Discover NGI Solutions

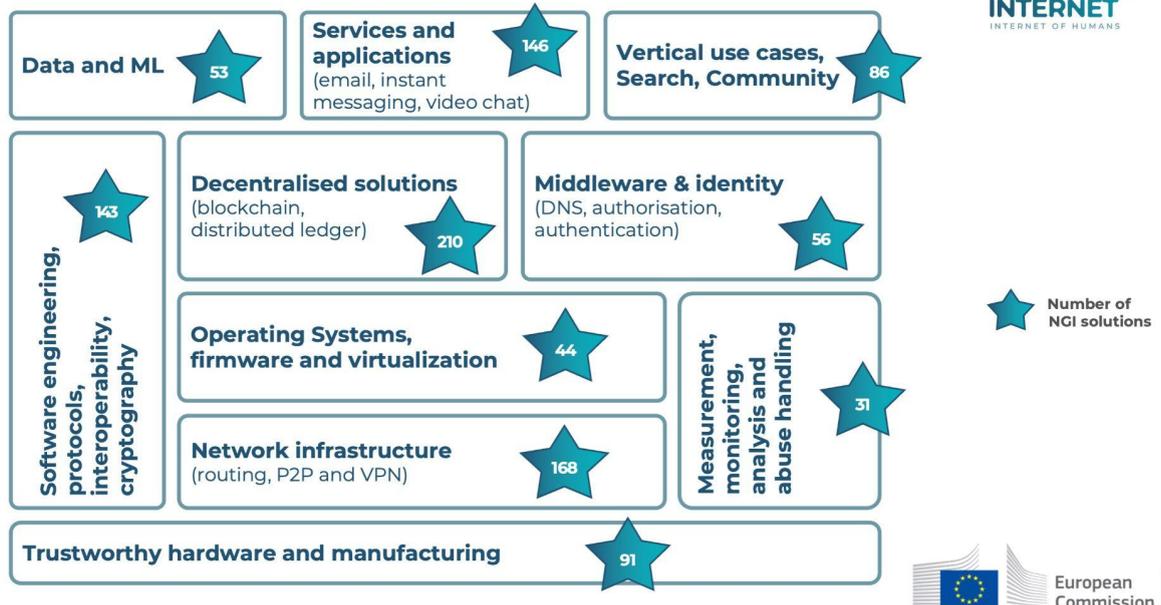


FIGURE 13: OVERVIEW OF CATEGORIES OF NGI SOLUTIONS FROM THE NGI INNOVATORS DATABASE

### 3.3 NGI ONLINE COMMUNITY

NGI Online Community members refer to all those individuals who are part of the NGI Online Community Platform. The justification for relevancy is similar to the one provided for innovators, i.e. the goal for this group to be as diverse and representative as possible. As a consequence, like in the case of innovators, the work within this WP aims at understanding and subsequently increasing diversity in the NGI Online Community.

Consistent with the EDI Work Plan presented in Deliverable 4.1, the scope is to understand the level of diversity that currently characterises the NGI Online Community, and plan to address the absence of underrepresented groups accordingly. As for the innovators, the quality of this research is directly dependent on the availability of data. At the moment the information available includes the following details about the 1,374 members currently included in the database:

- The manifested interest of each member (multiple choices), considering that 84 appear as either “null” or “undefined” and 100 reported “other” without expressing what this entails.
- The organisation type across: SME / Startup; Entrepreneur; NGO, Accelerator / Incubator; Developer; Corporate; Investor; Research Organization; University; Public Organization; and Other.
- Whether the member: authorised data privacy conditions; agrees to appear on the NGI Map; and agrees for being periodically sent the NGI Newsletter.
- All first names of members. According to the feedback received both from some RIAs and the EC, gender information is not asked and therefore not available for analysis.

In light of the data available, our analysis was centred in three aspects:

1. Understand the level of diversity of interests within the community;
2. Understand who is involved in the community, in terms on what people represent (i.e. Entrepreneurs, Developers, Accelerators/Incubators, Corporate, Investor, NGO, Public Organisation, Research Organisation, SME / startup, University, other).
3. Further investigate the perceptions around the NGI Online Community from the experience and feedback received by the NGI innovators and partners, especially the coordinators of the RIAs.

With respect to the former, as shown in the graphic below, interests of members of the NGI Online Community are varied and somewhat well distributed across the options provided (it is noted that multiple choice was possible). What seems to be prominent among the options available are interests around a specific set of technologies, as opposed to practices or principles. AI, IoT, and Blockchain / Distributed Ledger Technologies (DLT) are the most chosen. On the other hand, aspects such as Openness (at the core of NGI and its community), Transparency, Inclusiveness appear to be areas where less interest is observed among members.

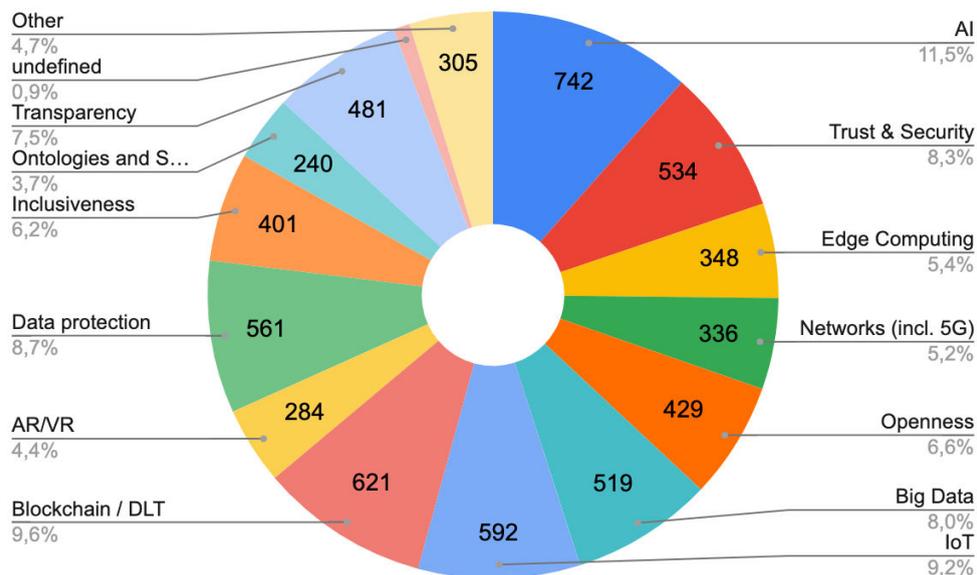


FIGURE 14: INTERESTS' DISTRIBUTION AMONG NGI ONLINE COMMUNITY MEMBERS

While these results allow claiming that a diverse set of interests is observed in the community, these can also be leveraged to plan for additional features to be added and profiles to be targeted. For example, if in the future the decision will be made to extend this space to investors as well, knowing what type of profiles (e.g. those interested in funding AI or DLT-related projects) should be targeted for example via a more segmented sign-up form and regular questionnaires.

With respect to the second point above, the results show that, in alignment with the analysis conducted for innovators, the majority of participants refer to individuals (either developers or entrepreneurs more generally) and private companies (SMEs and startups, and corporate) accounting for 62.3% of the total members. The presence of both investors (2.7%) and accelerators and incubators (4.2%) demonstrates the extended scope of the community, beyond being a place where current information about the NGI Programme and ways to participate can be obtained. Interestingly, the participation of public sector organisations, while being still low, is greater if compared with the innovators, i.e in a general context of low engagement with NGI, they tend to participate more in the Online Community than as actual innovators.

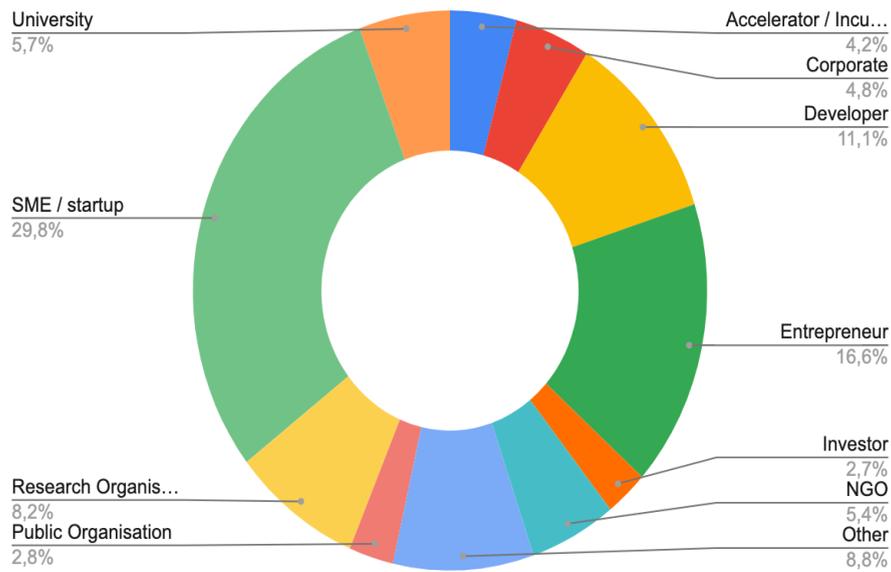


FIGURE 15: DISTRIBUTION OF NGI ONLINE COMMUNITY MEMBERS BY TYPE

From the previous survey (see NGI communications audit report within Deliverable 1.1) as well as from the interviews conducted with both the RIAs and the participants in NGI, some important insights about the NGI Online Community can be made, reiterating the arguments made in section 3.1:

- The main purpose of seeking interaction within the NGI Online Community seems to be to gather specific information about open calls, the procedures and other open questions potential applicants may have. The FAQs section of the resource seems to be the most visited and where most interactions emerge among members, and between NGI partners and members. Reactions to posts are limited too.
- In terms of interactions with their peers (i.e. other open source developers), the majority of NGI Innovators already have their own online communities, following their, sometimes peculiar, values and rules.

With respect to the latter aspect, what became clear is that the main audience for the community are NGI Innovators, of which the majority are open source developers. The latter tend to prefer online community and interactions systems that are self-organised than those hosted by for profit companies or governmental-related entities (like in the case of the NGI). This thought emerged across several interviews. For example, according to one RIA coordinator: *“their community is GitHub, the Linux Community, the one specifically related to a niche e.g. a programming language like OCaml. There is no extra energy to follow up on relationships”*. Enforcing the use of this resource is not an option, nor is the objective of the NGI Online Community Platform. In addition, the NGI Community hosted by FundingBox is developed with the only purpose of serving the NGI ecosystem, without any lucrative goal. It is also noted that GitHub is a centralised, for profit, repository and community, which partially contradicts the specific example provided by the interviewee.

To be able to plan for future work in this direction, we held a participatory workshop among the partners of the NGI4ALL.e project and representatives of the relevant department of DG CONNECT, within the European Commission. We believe that, if we want to extend and enrich participation and interaction in the NGI Community, it would need to be better positioned within the overall open source software landscape and ensure presence among those networks, communities and channels where these profiles tend to meet and interact (e.g. GitHub, Reddit, and other more specific ones). Taking decisions on whether to scope the community further, and what type of interactions are actually sought to be fostered (e.g.

matchmaking between funded innovators from NGI and investors, fostering topic specific collaborations beyond the funded period, connecting innovators and end users), would inform what underrepresented groups could be targeted and what features could be added to this online space. Feedback from these interactions is pending to date, and according actions will be planned once received accordingly.

In terms of other actions, every single event, presentation, and participation in other initiatives entailed a promotion of the NGI Online Community. Since the community survey is periodic and not continuous, it becomes hard to keep track of the effectiveness of these actions (e.g. number of new members after a specific effort or event). Still, promoting the community as the online space where to meet people from NGI and to be up to date with its events, and opportunities, is a central part of every effort made.



## 4. TASK 4.2 WOMEN INNOVATOR ENGAGEMENT

### 4.1 WOMEN IN NGI

At the beginning of this task, the first effort undertaken referred to exploring the presence of women among current NGI Innovators. Unfortunately, also consistent with the feedback received by RIAs, gender information about both applicants and funded innovators is often not available simply because this information is not asked. At the time of writing this report, gender information about funded NGI innovators is fully available from: NGI Dapsi, NGI Trublo, Ontochain, NGI Atlantic, NGI TrustChain (Open Call 1), and NGI Enrichers (Open Call 1). Incomplete information is available from NGI Pointer, NGI Ledger, and NGI Trust. All in all, gender data is provided for a total of 225 teams of innovators (i.e. 20% of all teams). Across these teams, gender data was available for 988 individuals. In particular (see figures below) it appears that:

- In total, 86.2% (i.e. 852 of the 988 innovators analysed) identify themselves as males, while 13.8% as females across all teams.
- Women are present in 46.7% of the NGI innovators teams, while 53.3% count with the participation of males only.

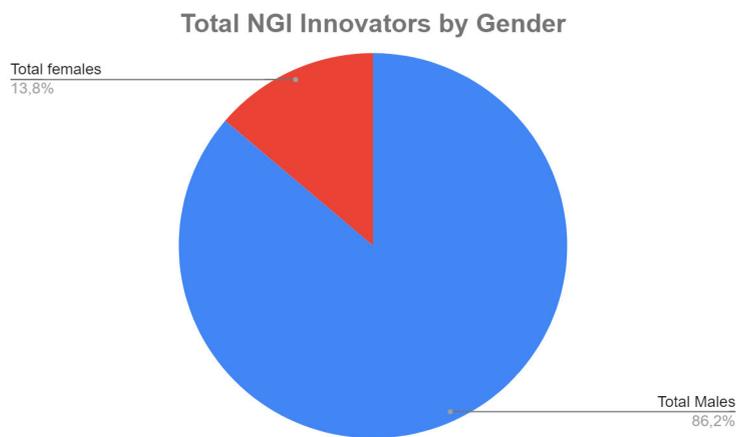


FIGURE 16: TOTAL DISTRIBUTION OF INNOVATORS BY GENDER

**Presence of Women in NGI Innovators Teams**

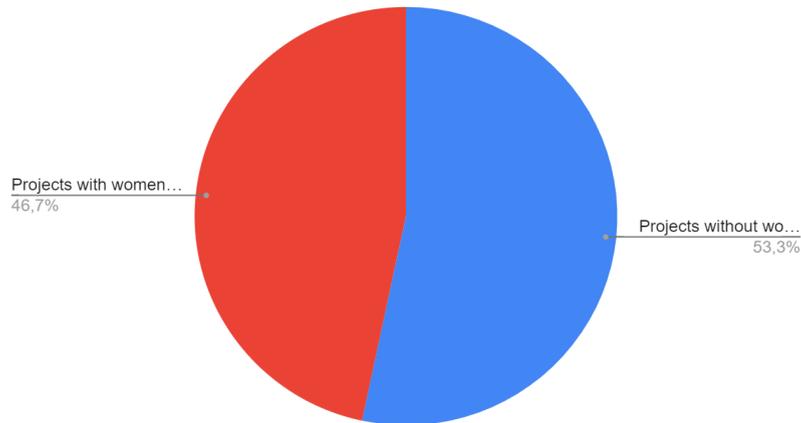


FIGURE 17: PRESENCE OF WOMEN IN NGI INNOVATORS TEAMS

One of the main comments emerging from the interviews referred to the need of exploring the actual role of women in these projects. One of the main interpretations from the interviewees would be that, since gender information was asked at the time of submitting an application, teams felt somewhat obliged to include women representatives in their teams, as this was perceived as bringing an additional value and increasing the chances of being funded.

However, it's imperative to note that this distribution doesn't translate into leadership roles assumed by women in NGI. Accordingly, the next step involved going deeper and understanding how many teams are actually led by women. What appeared is that of a total of 105 (out of the 225 analysed) NGI teams that have women in the team, 17 are indeed led by women (i.e. 7.6% of the total).

**NGI Innovators Leads by Gender**

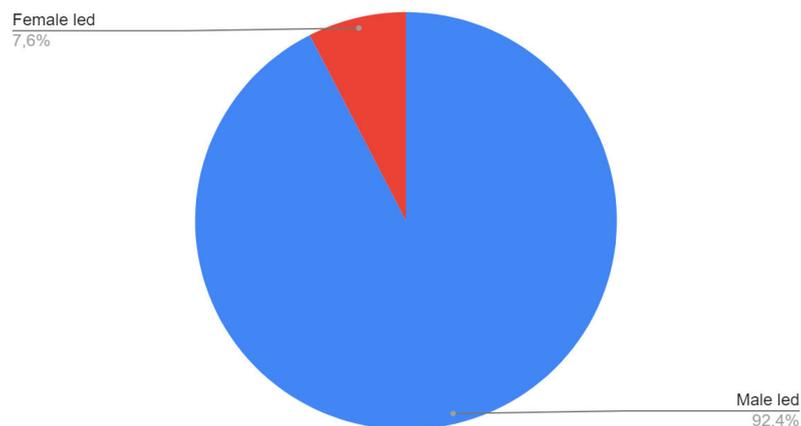


FIGURE 18: NGI INNOVATORS TEAMS' LEADS BY GENDER

We argue that merely having women in teams does not adequately address the overarching challenge of underrepresentation of women in technology roles, and, subsequently, as innovators within the NGI program. Of all teams where women are included, very often they are assigned with roles that are not central to the work conducted by the teams (typically phrased as “communication assistant” or “research support”). This aspect was confirmed

from the interviews with the RIAs. However, women participation in the NOO activities seems to be relatively high. For example, 65% of respondents to the Communication Training Satisfaction Survey (2023) identify themselves as women.

Based on the information available, it appears that these 17 women-led NGI teams come from a total of seven countries, i.e.: Italy (5), Germany (4), Spain (3), France (2), Austria (1), Ireland (1), and Sweden (1).

When examining women's presence and roles in the NGI innovators ecosystem, it's evident that there's a noticeable lack of female participation in projects. However, since there is a well acknowledged issue of women representation in the software development industry, and in STEM (Science, Technology, Engineering, and Maths) disciplines, it is important to position these numbers in the wider context. To do so, we look at gender statistics and information from the broader academic and grey literature concerned specifically with the open source software development world. In summary, we found that:

- Women make up only 2.3% of contributors to the Linux kernel (Linux Foundation Report 2020)<sup>14</sup>.
- Only 4% of open source contributors identify as women (GitHub survey, 2021)<sup>15</sup>.
- Women represent only 5.2% of the contributors in Apache Software Foundation (Trinkenreich et al., 2022)<sup>16</sup>.
- Women in OSS globally: only about 5% of projects were reported to have women as core developers, and women authored less than 5% of pull-requests, but had similar or even higher rates of pull-request acceptances than men (Trinkenreich et al., 2022).

Considering these findings, we observe that female participation in NGI is higher compared to the wider open source software ecosystem. Still, we argue that this is not enough to consider the ecosystem of NGI fully inclusive and diverse from a gender perspective.

## 4.2 ACTIVITIES AND ACTIONS

The objective of this task is therefore to foster and increase women participation in NGI. To do so, also according to the original proposal, this task includes the following activities and actions, in addition to a continuous and concurrent effort dedicated to desk research:

1. Understand and explore, and continuously monitor (to the extent possible, depending on availability of gender data), female participation in NGI (see section 4.1 above).
2. Mapping Women in Technology Initiatives, Organizations and networks (see section 4.3.1 below), as a source of specific targets when communicating and disseminating NGI outputs and opportunities to participate.
3. Liaise with as many organisations and initiatives as possible from those identified in the mapping exercise, and leverage these as communication hubs to disseminate NGI outputs and opportunities to participate among women in their networks.
4. Select 10 representatives from these networks and conduct semi-structured interviews to explore what are the existing barriers and challenges for women to

<sup>14</sup> <https://www.linuxfoundation.org/resources/publications/linux-foundation-annual-report-2020>

<sup>15</sup> <https://octoverse.github.com/2021/>

<sup>16</sup> Trinkenreich, B., Wiese, I., Sarma, A., Gerosa, M. and Steinmacher, I., 2022. Women's participation in open source software: A survey of the literature. ACM Transactions on Software Engineering and Methodology (TOSEM), 31(4), pp.1-37.



participate and have an inclusive experience in technology-related environments, projects and initiatives (so far six have been carried out and four remain to be conducted) and, from these, reflect on what actions we can take as part of NGI.

5. Include specific questions on women participation within the interviews to NGI RIAs coordinators and representatives.
6. Conduct 6 Women in Tech Mentoring Sessions. So far, four of these have been undertaken (see next section).

#### 4.2.1. Women in tech mentoring sessions

As mentioned above, so far four NGI Women in Tech Mentoring Sessions have been undertaken. These are briefly described separately below.

##### **a. STEM Woman Conference Barcelona 2022**

An interactive presentation was made at the annual STEM Woman Conference Barcelona 2022<sup>17</sup> celebrated in November 2022, under the topic of “Science with Purpose”. 400 people participated in the Congress in person at the CosmoCaixa Barcelona and 700 people participated online.

The session presented the NGI project and the role of Ideas for Change in analysing the existing reality in terms of diversity, equity and inclusion of the program, with special focus on the presence of women in the NGI innovative ecosystem. The opportunities of the program were presented, and all attendees were invited to take part in the program and follow the possibilities of being involved via the NGI newsletter and the different communication channels.

##### **b. 22@ Webinar: How can we build the Internet of the Future with gender equality?**

A 1h session to reflect on the future of the Internet in terms of gender equality was delivered with support of the 22@ network and their Women in STEAM community, an initiative that puts together more than 250 institutions in Spain related to technology and innovation. The session reflected on the scarce presence of women in the technology and innovation spaces, introducing the full NGI program as an opportunity to advance and improve the women in STEAM environment with the full program of funding calls, mentoring sessions and visibility opportunities at an international level. At the end, participants were invited to join the NGI channels.

##### **c. III Jornades Data Feminism at La Ciba**

Another example of Women in Tech Mentoring session refers to an event delivered as part of La Ciba<sup>18</sup> in April 2023. The objective and format of the event was similar, i.e. a comprehensive presentation of the NGI Programme, its scope and the various opportunities to engage with it. Reflections with other guests and speakers were made in a panel format, offering assistance for women entrepreneurs and potential innovators to foster their participation.

The focus of the III Jornada Data Feminism was to reflect, disseminate and promote data technologies for women's rights and the main challenges of the feminist agenda around the evolution of data technologies.

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<sup>17</sup> <https://stemwomen.eu/edicion-2022/>

<sup>18</sup> Related news on the NGI Website available at:

<https://www.ngi.eu/news/2023/04/17/increased-participation-of-women-and-girls-in-ict-innovation-is-crucial-for-the-european-economy/>

For this purpose, the attendees of the session were invited to make some reflections. The first revolved around democratisation of the data environment. In this way, there is a level that needs to be considered, i.e. ensuring an effort to diversify the profiles represented for any decision process based on data. In this sense, it was emphasised that starting from the perspective of citizen science, it is not only important to link people in data collection campaigns, but also to ensure that the participating groups represent the maximum number of different realities in terms of gender, age, culture, origin, socioeconomic reality, etc.

At another level of discussion, although there are no determinant studies remarking the effect of the lack of gender diversity in the environment of the development of digital applications, an invitation was also extended to reflect on this matter. What effect does it have on the new generation of digital applications and solutions that the representation of the realities that design and develop them is predominantly male-driven? How can we encourage a greater number of women and diverse genders than the dominant one? In this sense, the NGI initiative was introduced, explaining that it distributes funds that help develop applications to improve the Internet towards a more fair and human-centred space. It was emphasised that the opportunity is relevant for all those women innovators who want to participate in this space, thereby improving the shortage of female developer profiles, especially when occupying a leadership role.



FIGURE 19: NGI WOMEN IN TECH MENTORING SESSION AT LA CIBA

#### d. Code Women Meetup in Barcelona

Ideas for Change hosted one of the periodic calls that the CodeWomen group<sup>19</sup> (organised by Open Cultural Center) held in Barcelona, as an opportunity to publicise the NGI initiative among potential female entrepreneurs and innovators. The CodeWomen program offers training and digital training spaces for women, the vast majority of whom are of migrant origin and in situations of risk of exclusion. During the session organised in June 2022, the Ideas for Change team presented NGI and its funding and support program for innovators, as a

<sup>19</sup> <https://migraocode.org/es/codewomen/>

possibility of giving shape to initiatives arising from the CodeWomen ecosystem, which on this occasion brought together 24 women.

### 4.2.3. Interviews Women in STEM

Consistent with the objectives of Task 4.2 *Women Innovator Engagement*, an integral component of our work has been to undertake a series of interviews with women immersed in the technology sector. The primary objectives of these interviews were:

- Identification of key barriers and opportunities encountered by women in the technology industry.
- Explore strategies to enhance the involvement of women in the NGI ecosystem, creating an inclusive environment in the NGI experience

Six semi-structured interviews have been carried out so far (see table below), providing valuable insights. These findings are presented in section 4.3 below.

Women in tech	Link	Main topics covered
Gataca representative	<a href="https://gataca.io/">https://gataca.io/</a>	Experience in NGI from a Woman Innovator (team leader).
Algorights	<a href="https://algorights.org/">https://algorights.org/</a>	Gender gaps in education and STEM careers, highlighting challenges such as lack of references and trust. It discusses biases in coding perception, absence of women in decision-making, and the barrier of work-life balance. Algorights advocates for changes in tech modelling, NGI strategies, and holistic societal solutions.
World Pulse	<a href="https://www.worldpulse.org/">https://www.worldpulse.org/</a>	Global community of women, with a specific focus on developing countries. Reflection on barriers for women to participate in STEM careers and jobs.
Dyne Org	<a href="https://dyne.org/">https://dyne.org/</a>	Challenges as a female project coordinator, barriers in coding, and proposals for open-source alternatives were discussed. Key points included addressing gender bias in data, promoting well-being, and the importance of accessible technology. Practical considerations for women in NGI were discussed.
CNRS	<a href="https://www.cnrs.fr/fr">https://www.cnrs.fr/fr</a>	Gender diversity in NGI was discussed, with a focus on interdisciplinary collaboration, as the STEM woman interviewed shared experiences of exclusion primarily based on her discipline.
Wikiesfera	<a href="https://www.wikiesfera.org/">https://www.wikiesfera.org/</a>	The Wikiesfera team are spearheading efforts to transform the knowledge within Wikipedia into a more inclusive experience by actively combating gender bias during the “Editatonas” journeys. They address both technical and self-trust issues faced by women in this area.

TABLE 2 : SEMI STRUCTURED INTERVIEWS TO WOMEN IN TECH CARRIED OUT TO DATE



## 4.3 FINDINGS

### 4.3.1 Mapping

Throughout history, women have faced barriers entering Science, Technology, Engineering, and Mathematics (STEM), often due to traditional views on societal roles. Factors like ethnicity, origin, beliefs, disabilities, social and financial backgrounds, and gender (how it's perceived and identified) can pose obstacles in pursuing a STEM path for people.

Diversity, once overlooked, is now gaining importance. Recent stats from the OHCHR-UN Guide for Minorities<sup>20</sup> highlight that diversity is now a central theme globally and in policies. Recognizing this shift, efforts are needed to create an inclusive environment where everyone, regardless of their background, can contribute to STEM careers.

It therefore becomes crucial to break down biases and promote diversity for a fairer, more innovative future. Embracing diversity is not just the right thing to do, it's essential for unlocking the full potential of tech and building a society that benefits from the varied strengths of its members. In tackling diversity challenges within the tech sector and projects like NGI, a comprehensive strategy involves leveraging a worldwide network of NGOs, non-profits, projects, and diverse organisations committed to empowering women in tech careers. At the moment of writing this deliverable, Ideas For Change has mapped out a total of 38 women organisations (NGO's, non-profit associations, for profit organisations and networks) actively engaged in addressing these concerns across Europe and globally. These organisations serve as digital and physical hubs fostering inclusivity and equity, working collectively to dismantle barriers and foster an environment where women can thrive and contribute significantly to the tech landscape. Their collective efforts contribute not only to individual empowerment but also to the broader objective of cultivating a diverse ecosystem within tech fields. While its development is ongoing within this task of NGI, we envision the final mapping to become a useful, living resource for others to connect and improve outreach to women in tech - oriented communities and organisations in Europe and beyond.

The mapping achieved to date is available in Annex 1. Here, 38 instances are presented. Their focus and issues covered have been clustered through an inductive exercise and collectively include: Skills building, Network, Literacy, Leadership, Funding, Career Support, Policy, Strategic Advocacy, and Tools Development.

### 4.3.2 Interviews analysis & insights

In this chapter, we delve into the barriers and opportunities for women's participation in tech fields, drawing insights from the interviews undertaken with women in tech, the learning from the ongoing mapping exercise, and complemented by targeted desk research. Based on the information gathered, we will explore measures that can be implemented within the NGI landscape to create a more inclusive environment for women to apply and participate in the Open Calls, training and other programme-related opportunities.

#### 4.3.2.1. Barriers

As of the completion of this deliverable, it can be concluded that the primary barriers identified include but are not limited to:

#### Gender Bias

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<sup>20</sup> United Nations Guide for Minorities:  
<https://www.ohchr.org/en/minorities/united-nations-guide-minorities>



From a young age, typically around 6 years old<sup>21</sup> women face the first barrier that can have a significant impact on their future careers in tech-related disciplines. This barrier is generally known and described as gender bias, and it is often present in both scholar and family contexts. Gender bias refers to: “prejudiced actions or thoughts based on the gender-based perception that women are not equal to men in rights and dignity.”<sup>22</sup>

According to the experience of the interviewees, this issue typically causes women to put in doubt their abilities to perform the same tasks as men, inducing them to believe that certain tasks are more suitable for men than women. Gender bias can be evident in various contexts, including the workplace, where it may lead to preferential treatment based on gender, creating an environment that perpetuates inequality.

In the insights derived from interviews, we gathered testimonials from women holding managing roles within the NGI ecosystem. These accounts confirm up to a certain degree that they felt undervalued based on their gender, experiencing a lack of consideration in some of the steps undertaken to get to the current role. Additionally, they exerted extra effort to ensure appropriate attention of and consideration from their male colleagues when performing collaborative tasks.

### **Self-Trust and Self-Demanding characters**

A further consequence identified within the desk research and in the interviews, refers to the fact that gender bias often manifests in females developing self-demanding tendencies and trends to a lack of trust in themselves. This behaviour contributes to the reluctance of women to consider applying for leadership roles, driven by the conviction: "Who am I to take on this role?".<sup>23</sup>

As a practical example, one interview gave us the opportunity to explore barriers for women to contribute to the Wikipedia platform. Two main ones emerged as:

1. **Technical Barrier:** As a result of the often identified lack of digital skills in society, women sometimes can behave apprehensive about their ability to contribute effectively to Wikipedia. They may feel they don't possess the necessary technical expertise, discouraging their participation in editing.
2. **Self-Trust:** A second challenge is the very oftenly identified issue of self-trust. The historical gap in female-leading roles may lead women to question their capability when provisioning content on Wikipedia, thinking, "Who am I to provide this knowledge?" This self-doubt can lead to women being overly critical of themselves and doubting the validity of their contributions, especially when compared with the vast predominant contributions already made by men. At the time of writing this report, the estimated contribution of women on Wikipedia is 15% compared to men.

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<sup>21</sup> Gender stereotypes about intellectual ability emerge early and influence children's interests. (Science, 2017): <https://www.science.org/doi/10.1126/science.aah6524>

<sup>22</sup>Meaning Gender Bias (Eige Europa, 2010): [https://eige.europa.eu/publications-resources/thesaurus/terms/1320?language\\_content\\_entity=en](https://eige.europa.eu/publications-resources/thesaurus/terms/1320?language_content_entity=en)

<sup>23</sup> Research conducted by Paola Zanchetta in 2023 for the Round Table about: Barriers and Opportunities of women in STEM, organized by Wikifactory and the EU project Critical Making: <https://sedate-garment-a9b.notion.site/Women-in-STEM-Research-Wikifactory-Critical-Making-23th-M-arch-Roundtable-a6c156be8e724e10972c2be577f66e93>



## Lack of women role models

As also identified in the Women and Minority students in STEM fields<sup>24</sup>, when asked, many women in tech fields point towards the importance of having role models who inspired their career paths, roles often assumed by males. Given the historical underrepresentation of women in tech, this lack of visibility can create barriers for women to be inspired and feel that they are capable of following and pursuing tech paths as part of their careers.

All the testimonies of women interviewed confirmed that to educate and inspire other women, a task typically within their remit in these communities, sharing their experiences and becoming role models for them is crucial. The next generations of women in tech need references to look at and learn from, and so they gain the confidence to contribute to these in an active manner.

## Human-centric vs Profit-centric system

Existing literature suggests that gender differences in interests are influenced by a combination of biological, social, and cultural factors.<sup>25</sup> While it's essential to avoid overgeneralizations, studies indicate that on average, women identify more with social value creation than with economic goals, whereas men are more strongly motivated by economic-related objectives.<sup>26</sup> Needless to say that the difference is not absolute and varies among individuals. Biological factors, such as hormonal influences, are considered alongside societal expectations and cultural norms that shape gender roles.

As part of the insights emerging from the interviews, in the context of Open Source Software project development, there is no discernible difference in the code produced by women and men<sup>27</sup>. But it is interesting to notice that, in the GitHub environment, women's pull requests tend to be accepted more often than men's, yet women's acceptance rates are higher only when they are not identifiable as women. In the context of existing theories of gender in the workplace, plausible explanations include the presence of gender bias in open source, survivorship and self-selection bias, and women being held to higher performance standards.

While acknowledging that there is no inherent difference in code written by individuals of different genders, the studies mentioned earlier suggest that projects developed by women may place more emphasis on the social aspects and related impact of the project itself. According to the women's voices in the conducted interviews, an additional obstacle

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<sup>24</sup> Factors Contributing to the Underrepresentation of Women and Minority Students in STEM Fields. Sage Science Review of Educational Technology (SSRET) 2023  
<https://journals.sagescience.org/index.php/ssret/article/view/58>

<sup>25</sup> Gender differences in social interactions. (Science Direct, 2021)  
<https://www.sciencedirect.com/science/article/pii/S0167268121001104>

<sup>26</sup> Gender differences in Social Entrepreneurship: Evidence from Spain  
https (Women's Studies International Forum, 2023):  
<https://www.sciencedirect.com/science/article/pii/S0277539522001042#bb0205>

<sup>27</sup> Gender differences and bias in open source: pull request acceptance of women versus men (PeerJ, 2017):  
[https://peerj.com/articles/cs-111/?init=15&utm\\_term=%7Bpubfeed%7D&utm\\_source=MKT-LIN1\\_%7Bpubfeed%7D\\_%7Bsubid%7D&utm\\_medium=cpc&utm\\_campaign=MKT-LIN1-US-T1&\\_hstc=95181763\\_c4a577029c49e44b73bd3bee6fa38565.1615766400102.1615766400103.1615766400104.1&\\_hssc=95181763.1.1615766400105&\\_hsfp=3316299562](https://peerj.com/articles/cs-111/?init=15&utm_term=%7Bpubfeed%7D&utm_source=MKT-LIN1_%7Bpubfeed%7D_%7Bsubid%7D&utm_medium=cpc&utm_campaign=MKT-LIN1-US-T1&_hstc=95181763_c4a577029c49e44b73bd3bee6fa38565.1615766400102.1615766400103.1615766400104.1&_hssc=95181763.1.1615766400105&_hsfp=3316299562)

hindering women's participation in tech careers is therefore the necessity for a more human-centric approach to project development. While the NGI program is driven to foster a human-centric vision for the internet of the future, there is still room to stress the visibility of this approach and the positive impact of the NGI solutions to make it more enticing for women to engage with.

### **Work-Life balance**

Understanding the intricacies of work-life balance is crucial in the context of the NGI project. For women, time constraints pose a significant obstacle to participation in leadership roles.<sup>28</sup>

The historical disparity in the family sector (such as maternity and elder care) is still very much relevant today. This means that women face significant obstacles in building stable careers across all fields of work, including technical ones. As a general statistic, as of 2023, women hold 26.7% of technology jobs.<sup>29</sup>

This still represents a notable barrier preventing women from attaining leadership roles, also in fields related to the NGI ecosystem. However, addressing this issue proves challenging and elusive for the NGI program, as it necessitates broader societal changes through public policies to be addressed. In essence, it is an inherent problem affecting all sectors, requiring comprehensive policy interventions that extend beyond the scope of the NGI program.

#### **4.3.2.2 Opportunities**

In light of the challenges and barriers emerged so far, it can be outlined that the primary opportunities to foster participation of women in tech and, more specifically, in the NGI program are:

### **Visualizing Women's words and work**

A powerful tool when tackling gender bias is putting a strategic focus on showcasing the accomplishments and voices of women in the tech field, thus ensuring the results of their work are properly depicted and placed in the public sphere. This increased visibility is expected to trigger new inspiration for women to pursue tech careers, contributing as well in the counterbalance of the lacking female role models in the tech and innovation environment more broadly.

It is though essential to recognize that women seek acknowledgment for their contributions, not for their gender. As catalysts for change, keeping on actively amplifying women's voices in the NGI arena is necessary, acknowledging the urgency for transformation.

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<sup>28</sup> Work-Life balance for women STEM leadership (Krystal L. Brue, Ph.D. Cameron University, 2019): [https://journalofleadershiped.org/wp-content/uploads/2019/04/18\\_2\\_brue.pdf](https://journalofleadershiped.org/wp-content/uploads/2019/04/18_2_brue.pdf)

<sup>29</sup>70+ Women In Technology Statistics (2024): <https://explodingtopics.com/blog/women-in-tech>

## **Empower the presence of Academic and Recently Graduated Women in Mentoring programs**

To prioritise the engagement of women in academia and recent graduates, means acknowledging the pivotal role the younger generation plays in driving transformative change. Recognizing and encouraging their participation is essential, as they hold the potential to create impactful shifts in the landscape. The need to increase the number of women in tech careers, is linked to a need for transformation in the mentorship dynamics, diversifying the sources of inspiration for the younger generation and increasing the likelihood of women pursuing tech related endeavours. This change in the model would not only shape perceptions, but actively contribute to forging a more inclusive and diverse future in the tech industry.

In the context of the NGI program, there is room for improvement. For instance, one way could be to put in place mechanisms to involve young academic women in its innovation ecosystem. This could be achieved by providing mentorship opportunities and additional incentives. For example, they could be considered for employment in newly selected NGI projects, and at the same time ensuring that mentorship programs equip them with the necessary skills for effective participation in these teams.

### **Collaboration Over Isolation**

Advancing towards a more equitable and inclusive future for women in tech necessitates a community-driven strategy. Recognizing that women alone cannot achieve this, it is crucial to garner the support of male communities. The movement should be a collaborative effort to ensure a shared success, as opposed to individually-oriented actions.

Rather than establishing new communities, emphasis should be placed on fostering intrinsic and organic collaboration between genders. The goal is not to create separate spheres but to identify and fortify existing women's communities, and encourage their active participation. Unity becomes essential in this shared endeavour, emphasising the importance of collective action to break down barriers and create a tech landscape that is inclusive and supportive for all.

Considering this opportunity, the NGI ecosystem has the potential to develop programs aimed at establishing a collaborative platform for various communities to interact and mutually learn. Creating scenarios for sharing knowledge that can propose innovative solutions to overcome the barriers encountered by women in tech careers could be a significant accomplishment for the NGI program to pursue. The ongoing mapping exercise presented above can be an effective starting point to support these efforts.

### **Accessibility: Improving Women's Lives in the Digital World**

Based on the findings emerging both from the literature and the interviews, it appears that a key factor in enhancing women's involvement in NGI and other tech careers is ensuring widespread access and presence on the internet. While effecting real-world change may be gradual, the digital sphere provides a unique avenue for enhancing women's lives and combating the gender bias gap.

In recent times, a multitude of organisations dedicated to establishing digital communities for women have emerged. These platforms empower women to showcase their work, inspire others within the network, and receive support and mentorship when needed. Moreover, these initiatives focus on equipping women with the skills and funding required to thrive in their projects.

To foster women's success in tech careers, it is mandatory to guarantee open and secure internet access in Europe, and to avoid Internet shutdowns.<sup>30</sup> Ensuring such access ensures to provide women with the means to overcome barriers and take opportunities in their tech careers.

### **Women personality appreciation in leadership and non-leadership roles**

Considering the results of the innovators ecosystem analysis that underlined a predominant male leadership in the current NGI program, thriving a future scenario led by women presents an interesting opportunity. On the task of deploying part of the potential for a more inclusive and attractive human-centric Internet of the future, it is crucial to create a better landscape for women to participate.

However, challenges arise when coordinating efforts to facilitate this landscape, as personal experiences (as previously described) reveal that women innovators may face greater barriers to develop the next generation of Internet applications. Overcoming these challenges requires a shift in perceptions, recognizing the importance of women's contributions and affording them the same level of respect and acknowledgment given to their male counterparts.

This consideration is an opportunity for fostering an equitable and supportive environment where women can confidently lead and contribute to the innovative future of NGI.

#### **4.3.3 What can we do in NGI**

Building on the insights gathered from the comprehensive analysis conducted in Task 4.2, this chapter unfolds with a collection of actionable ideas aimed at fostering increased participation of women in the NGI innovators ecosystem. The gathered insights form the principles of these proposed strategies, align with the overarching goal of cultivating a more equitable, inclusive and diverse NGI ecosystem.

Each idea is crafted with a consideration of the challenges of the NGI program, ensuring that the proposed strategies are not only effective but also tailored to the specific organisation capabilities of the current consortiums underpinning the program.

- Ensure a balanced participation of women in an effort to ensure diverse genders in the evaluation jury for NGI Open-Calls. The RIAs' teams should spearhead this change.

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<sup>30</sup> Why internet shutdowns are even worse for women (Access Now, 2023): <https://www.accessnow.org/internet-shutdowns-international-womens-day/>

- Foster the participation of women leading the mentoring programs for innovators in NGI. Relevant partners could take charge of this initiative, with the backing of both the consortium and the European Commission.
- Continue with a prominent visibility of projects led by women within NGI to serve as inspiration for others, thus creating the strongly advocated role models from the NGI program. While the NGI program already incorporates this work, there is room for further advancement. One idea is to formulate a communication strategy aimed at enhancing the attractiveness of impact stories for a more diverse audience, with a special care for the presence of women.
- Keep fostering the organisation of specific sessions to encourage women's involvement in NGI programs, showcasing accomplished NGI projects where women had a leading presence, to inspire others in the tech field. This initiative is already being undertaken as part of the Women in Tech Mentoring sessions described above.
- Enable the implementation of specific funding mechanisms to promote the presence of women innovators in tech companies participating in selected open calls. This could involve implementing better incentives, such as offering additional benefits for hiring women in the innovator teams.
- Create specific categories within NGI Open-Calls that prioritise addressing the issue of gender bias present on the internet. Streamline data management processes to foster a more inclusive, equitable, and sustainable future for the internet.
- Create Open-Calls within NGI that prioritise ensuring that the internet is Open and Accessible in Europe and beyond.
- Create Open-Calls within NGI to create a meeting point platform for women knowledge sharing playgrounds.
- Facilitation of conciliation mechanisms for family and eldercare members when attending local or international NGI events or mentoring sessions.
- Liaise with technological universities to participate in mentoring sessions, aiming to engage young female academic audiences with the program.
- Collaborate with women-led tech organisations and networks to reach a broader audience of potential applicants. This work is already being conducted through leveraging those identified in the mapping (see section 4.3.1).
- Stress the visibility of the human-centric approach of NGI for project development to make it more interesting for women and all potential members focused on social impact to participate.
- Establishing support initiatives for women, offering practical guidance on key considerations when applying for NGI open calls.

The suggested ideas represent additional inputs about potential initiatives that can be undertaken as part of Task 4.2 to catalyse research on the subject of Women Innovator Engagement and ultimately foster an increased women's participation within the program, through a collective effort across consortia within NGI.



## 5. TASK 4.3 END USERS' AND GRASSROOT COMMUNITIES INVOLVEMENT

The last pillar upon which the EDI work in NGI4ALL.e is conducted relates to the engagement of both end users and grassroots communities. According to the EDI Work Plan outlined in Deliverable 4.1, this effort is underpinned by two distinct objectives.

1. Raise awareness of NGI solutions and showcase their value for end users;
2. Include citizens' and grassroots communities' voices in the NGI evolution.

The former, i.e. the most immediate, is about communicating solutions developed by the NGI Innovators in a way that is accessible and understandable by anyone, i.e. not only assuming an IT-savvy audience. Using more accessible language and co-creating dissemination and promotional material (e.g. the videos) with end-users and active communities is set to contribute towards equity, and particularly towards decreasing the barriers for engaging with NGI-related content. So far, such content is designed primarily for individuals and organisations with significant IT knowledge and experience. To this purpose, the NGI Forum 2023 served as a unique opportunity to start generating audiovisual content together with innovators. Several of these have been video-interviewed, and were asked to explain their work and NGI in simple terms, from a perspective of a general user of the internet, as opposed to using more technical language and terminology. The editing and production is currently ongoing at the time of writing this report.



FIGURE 20: INTERVIEW TO NGI INNOVATOR AT THE NGI FORUM 2023

According to Deliverable 4.1, Task 4.3 contributes to diversity, inclusion, and equity elements of the programme. First, diversity will be fostered towards the active inclusion of end-users and communities in NGI, both as part of NGI events and as part of the NGI Influencer programme. As an example of dedicated events, on January 25th 2024 a specific NGI online panel will be carried out with existing communities working on digital rights and the key pillars

underpinning the overall NGI programme, i.e.: human-centric internet, that is safe, secure, inclusive and sustainable for all. This has been recently launched at the NGI Forum 2023 (see figure below). This event will serve as an additional step towards extending NGI to those societal actors that are currently contributing to a more human centric, safe, inclusive, and sustainable internet of the future, the same principles underpinning the NGI programme as a whole.



FIGURE 21: ONLINE PANEL ON COMMUNITIES, NGI AND DIGITAL RIGHTS

The second overarching objective presented above represents the main and most substantial focus of this task. The first steps were about identifying and mapping existing communities either directly working on digital rights or interested / active / curious about aspects related to the internet and its future evolution. Most of these define themselves as representatives of end-users and society, i.e. fully aligned with the overarching objective of this task. From this mapping exercise, we are targeting and engaging communities and end-users in NGI.

The final goal is to generate a taxonomy of topics for future NGI calls, aligned with the societal desires and demands for a better future internet. The taxonomy is being generated from engagement with these communities and specifically from investigating together with them what are their needs, desires, and values and how can these be aligned with the EU agenda towards NGI. With respect to the process, two sources of data are being leveraged for generating this taxonomy. First, 20 representatives of the communities mapped are being interviewed. These are selected from the ongoing mapping exercise based on relevance to NGI and diversity among them. The interviews are semi-structured and designed for each community taking into account their peculiar scope and practices within the complex landscape of digital rights. Their continuous analysis allows for the emergence of desires, needs and topics to be included in the future NGI agenda. Second, the taxonomy will be refined and validated through 5 participatory workshops where topics will be extended to actual scenarios. The methodology followed for building this taxonomy adheres to Nickerson et al. (2013)<sup>31</sup> process, and specifically its empirical-to-conceptual approach (i.e. an inductive effort to generate the taxonomy from the bottom up considerations collected through engaging with the communities). The final result will then be the aforementioned taxonomy which represents the input enabling the inclusion of the societal view into the development of the internet of the future. The following paragraphs of this deliverable

<sup>31</sup> Nickerson, R.C., Varshney, U. and Muntermann, J., 2013. A method for taxonomy development and its application in information systems. *European Journal of Information Systems*, 22(3), pp.336-359.

primarily focus on this latter objective and the emerging taxonomy. This is structured as follows: section 5.1 presents the mapping exercise to date; section 5.2 outlines the preliminary findings emerging from 13 interviews carried out to instances of these communities so far; finally, section 5.3 provides information about the third element of this task, i.e. the organisation of participatory workshops with groups of end users to enrich and extend the taxonomy being generated with the grassroots communities.

At the time of writing this report, in terms of KPIs for this Task: the ongoing mapping exercise currently identifies 30 instances of communities relevant to the NGI, primarily those concerned on preserving human rights in the digital world; 13 of the 20 planned semi-structured interviews have been conducted (see table below) (preliminary results are presented in section 5.2); one participatory workshop has been carried out with a community of blind people (see section 5.3), and four additional are to be conducted (two of which with schools) before the end of the project. Audiovisual material is being edited for the production of videos to communicate selected NGI solutions and values to the general public.

Community / network	Link	Main topics covered
DigitalRightsCommunity	<a href="https://www.digitalrightscommunity/">https://www.digitalrightscommunity/</a>	From issues of surveillance, censorship and disinformation, elaborate their call for action in the landscape of VPN solutions and open source. Reflection on the need of open source to tap into the complex world of DNS.
We, the Internet	<a href="https://weinternet.org/">https://weinternet.org/</a>	How <i>We, the Internet</i> tackles the need of societal participation in AI development.
Algorights	<a href="https://algorights.org/">https://algorights.org/</a>	AI and Fairness - elaboration of key pillars for a criteria for assessing fitness of AI solutions and, by doing so, help the public sector in adopting solutions that are consistent with EU value and rights.
EDRi	<a href="https://edri.org/">https://edri.org/</a>	EDRi approach to information democracy and privacy protection through mechanisms that move away from centralisation of power (i.e. to platform and big tech corporations).
Open Source Politics	<a href="https://opensourcepolitics.eu/en/">https://opensourcepolitics.eu/en/</a>	Experience in helping public sector in adopting and routinizing open source solutions: the case of DECIDIM (OS platform for participatory democracy)
Women who code	<a href="https://www.womenwhocode.com/">https://www.womenwhocode.com/</a>	How the community fosters women participation in technology development and related careers.
Liberties	<a href="https://www.liberties.eu/en">https://www.liberties.eu/en</a>	Tackling disinformation through advocacy and policy - focus on the “European Media Freedom Act”
Access Now	<a href="https://www.accessnow.org/">https://www.accessnow.org/</a>	The need to protect human rights in the digital world. Focus on: freedom of expression vs. disinformation;

	<a href="http://ow.org/">ow.org/</a>	right to self determination (including digital identity).
Algorithm Watch	<a href="https://algorithmwatch.org/en/">https://algorithmwatch.org/en/</a>	How AlgorithmWatch is tackling the need for transparency to solve current issues around fairness in AI, thus reducing potential discrimination when used in public services.
Dyne	<a href="https://dyne.org/">https://dyne.org/</a>	Ideas and actions to take open source out of existing repositories for the benefit of end users and society.
Digital Grassroots	<a href="https://digitalgrassroots.org/index.html">https://digitalgrassroots.org/index.html</a>	Digital citizenship and internet governance.
IGF French Chapter	<a href="https://www.intgovforum.org/en/content/france-igf-0">https://www.intgovforum.org/en/content/france-igf-0</a>	Priorities for future internet governance and overview of the actions undertaken by the working group.
Real Eyes Sport <sup>32</sup>	<a href="https://sportrealeyes.it/">https://sportrealeyes.it/</a>	Priorities for blind people

TABLE 3 : SEMI STRUCTURED INTERVIEWS TO COMMUNITIES CARRIED OUT TO DATE

All in all, approximately 16 hours of recorded material has been collected from these interviews. These have been transcribed and analysed through qualitative data analysis techniques following an inductive approach (Miles and Huberman, 1994)<sup>33</sup>. First, an open coding exercise is being conducted, followed by specific axial coding techniques to add richness to the initial codes (Patton, 1990)<sup>34</sup>. Codes in this analysis are framed based on the outputs sought from this study, i.e. recommendations about the scope of future NGI agenda and open calls.

## 5.1 MAPPING OF GRASSROOT COMMUNITIES AND DIGITAL RIGHTS

As described above, the first step (which is and will be actually ongoing throughout the duration of the project) carried out in this task involved researching, mapping and categorising potential targets for this effort, i.e. bodies, entities, and communities representing society and its needs and challenges in the context of today’s and tomorrow’s internet. Typically, if we had to define an overarching umbrella, these describe themselves as efforts to preserve human fundamental rights in the digital world.

Similarly to the exercise of mapping women in tech networks, communities and organisations, this mapping effort aims at providing a living resource for identifying and targeting end users representatives communities as well as to follow up and monitor the

<sup>32</sup> This interview with one representative, evolved into an actual workshop with several participants from the community. Specific findings are tackled in section 5.3 below.

<sup>33</sup> Miles, M.B. and Huberman, A.M., 1994. Qualitative data analysis: An expanded sourcebook. Sage.

<sup>34</sup> Patton, M.Q., 1990. Qualitative evaluation and research methods . SAGE Publications, inc.



evolution of the societal demand for the future of the internet. A table is provided in Annex 2 of this document, including those identified and selected as relevant to-date.

The scope of these entities and communities span across six general clusters of action, including: Literacy, Strategic Advocacy, Policy, Technology development, Grassroots activism, Network. This was found to be a useful way to categorise them further (see Annex 2). So far, this mapping served also the purpose of identifying and targeting representatives for the semi-structured interviews introduced above. Preliminary findings from these are presented next. Looking forward, we will continue this effort through further research and snowballing techniques.

## 5.2 EMERGING FINDINGS: KEY INPUTS TO NGI

This section of the report provides the preliminary findings from the interviews undertaken to date. It is noted that quotations from the interviews are proposed in italic, within quotation marks. Also, this section outlines preliminary areas of insights extracted to date. These and those coming from future interactions and workshops will be then compared more in depth with existing focuses of the current NGI programme and the final taxonomy of future topics for NGI will be derived and outlined. The preliminary results presented here are organised as follows: first, we present some general findings and insights for NGI from the need for communities to think beyond software development, towards considering new open source solutions more holistically, including also reflection on fostering their adoption and routinization in existing or new platforms and services used by society. Second, we propose an interesting reflection shared by the vast majority of interviewees and communities, i.e. about the need to address current network effects, monopolies, and more generally, the polarisation of power towards few IT corporations. Third, we reflect on some specific topics that emerged to date as inputs for the future of NGI, including reflections on: AI and ethics, right to self-determination in the digital world, the landscape of Virtual Private Networks (commonly known as VPNs), disinformation and fact checking, and people empowerment through new data governance mechanisms and related solutions.

### 5.2.1 The need to foster adoption of NGI solutions: extend focus, collaboration, and participation

One key input for the future of NGI obtained from the interactions so far, refers to the need to dedicate more efforts in actually fostering adoption of NGI solutions. They consider that a substantial gap still exists between the open source solutions developed in NGI, and their adoption, routinizations and sustained use in society and related services.

In this context, the public sector is considered to play a pivotal role in the adoption of NGI solutions (also according to the analysis from other pillars presented in the previous chapters of this document), i.e. through their integration in public service deliveries. This document already touched upon some reasons and causes for the current lack of adoption of open source solutions (i.e. lack of digital literacy, lack of investment in innovation, lack of ability to change), but another fundamental problem exists. This relates to the fact that NGI products are typically building blocks for wider systems, which generally need to be adapted to become integral parts of solutions to end users (*“it is not just about plugging it in, and it works”*). As presented above, public-private partnerships-based business models can be seen as part of the solution. An example comes from Open Source Politics, and their work in assisting public sector agencies in adopting DECIDIM, a famous open source-based platform for deliberative democracy, by offering it in a SaaS (i.e. Software as a Service) model. The need for this partnership, importantly, is not only when assisting entities in adopting open source solutions, but also in ensuring sustained adoption and use over time. To do so, the

open source ecosystem needs help, structure and funding to continuously update and monitor adopted solutions. In the case of DECIDIM, the platform should be kept up to date with new functionalities currently available for other, commercial, systems, or to improve existing ones. Examples mentioned specifically for DECIDIM include: collaborative maps, where proposals are placed and categorised on a city map; open APIs to allow broader (open source) communities to contribute to the platform's development; features to include non-textual interactions with individuals; and exploring solutions to integrate AI in the platform.

Another call made for NGI and similar EU initiatives revolves around the development of validated criteria to be followed when public sector agencies buy IT products. In turn, if these criteria are developed from the key values and principles underpinning preserving human rights in the digital world, adoption of open source solutions and digital common would be fostered as a result. According to the experiences of the interviewees involved in this space, public sector organisations do not have the required knowledge to make appropriate decisions when it comes to choosing the IT system, software, or infrastructure that is being purchased. The main drivers for making purchasing decisions tend to be around efficiency and optimization. In this direction, the role of open source is seen as a contributor towards *“the creation of certain standards to be adopted in these technologies”*.

All in all, in addition to the considerations proposed here, consensus is observed among communities regarding three main aspects that should be reflected upon, and integrated with the scope of NGI.

First, and probably the most mentioned desire extracted, refers to **the need for NGI to extend and widen collaboration and participation**, beyond the developers themselves. The need for extending participation and collaboration is advocated for prior and during the software development process, and not only after a solution is designed and made publicly available. The main argument revolves around the need for:

- **Engaging society in the development of solutions**, so that those that one day will be affected by their adoption can also have a voice in its development as well as gain awareness about what services they (will) use in their everyday lives. The effort advocated here is twofold. First, identifying who these communities could be, which may not be an easy task. Second, find innovative ways to empower them to have a voice in these processes. The communities being mapped in this deliverable (see section 5.1) can be seen as targets in this future effort, i.e. as representatives of the public interest. It is noted however, that this alone does not represent a full solution to the problem. Some communities shared with us experiences whereby they attempted to involve society in mapping concerns about future AI-enabled services. In this landscape, societal effects are largely unknown and the people engaged did not possess the knowledge or information to provide valuable input. The focus should therefore be in enabling debates and dialogues, where future scenarios are explored (not explained and reflected upon subsequently) with as many stakeholders as possible.
- **Engage end-users from the conceptualization phase** to ensure that solutions are: (a) understood; (b) fit for purpose; and (c) consistent with legacy systems and thus easier to adopt.
- **Engage domain experts**, i.e. people and institutions with experience and knowledge about the main issues addressed (e.g. democracy, sustainability, mobility). In general, there is an acknowledgment that *“knowing a problem does not mean understanding the problem”*. This lack of knowledge is believed to have serious repercussions on the technical elements as well.

The second aspect most commonly mentioned is somewhat related to the previous and advocates for **thinking about the use of the digital common or open source code**,



**beyond thinking at the solution itself** only. The suggestion would be to organise a staged program, where the first step should not be about technologies, but about user research and why solutions are needed for society, not just in technical terms. Some believe that the open source software community fails in this and trace the reasons back to the lack of diversity in this ecosystem, and particularly to the fact that an attitude like *“I have an idea and I will do it”* is currently dominant in this world. *“There are no attempts to understand or engage with the social side of technology”*, some interviewees argue. Some see opportunities for NGI funded individuals in which NGI should contribute to training them about how to conduct co-design and co-creation and give them opportunities and room to do so.

The third most common element refers to desires from these communities that the NGI effort could **embed discussions and solutions about policies and data**, to complement the work being undertaken with open source code. In other words, *“NGI open calls should not be only about seeking new code but also include complementary solutions that can’t be thought of separately, namely: data; policies (i.e. covering themes like facial recognition, justice, welfare, assign resources, assign risks profiles in relation to public safety); and education”*.

### 5.2.2 The threat is not necessarily the private code, but monopolies and polarisation of power

In general, as expected, all communities and organisations approached to date agree and align with the values underpinning the scope of NGI, and see open source software and digital commons as a cornerstone for addressing the needs and challenges for a future human-centric internet. However, the main threats are not identified (only) with current software solutions that are not open source. Rather, the biggest threat is seen in terms of **polarisation and centralization of power mechanisms**. This leads to situations where influences and decisions are more and more in the hands of major IT corporations. Business motivations often do not resonate with public needs in this context. Companies are argued to look for public money justified by claims such as giving the internet to all, but hidden behind vested, economic, interests. The majority of communities encountered fight for these entities to be more public or, at least, underpinned by other independent trusted actors.

This is seen as being somewhat independent from open source, since, as argued by one interviewee, *“these corporations leverage open source themselves, and even though the open source communities have ethical conducts and often focus on preserving human rights, accessibility, and trust (through transparency), this is not enough”*. Open source software is for everyone, including IT corporations. The focus should shift towards helping public sector bodies and other trusted entities to appropriate and leverage them. The main foundational issues to be addressed are seen as revolving around privacy protection and information democracy.

To this purpose, there is an acknowledgement of the substantial contributions from the EC, especially from a policy perspective. For instance, directives such as the Digital Market Act<sup>35</sup>, the Digital Services Act<sup>36</sup>, and the GDPR, are seen as *“good steps”*, but again not enough. Enforcement of these acts is argued to be still problematic. Regarding GDPR, for example, *“enforcement here is an issue at the moment; it is much easier for a big tech company to comply than for a small organisation”*, one interviewee argues. This in turn would contribute to a more and more polarised power from one perspective.

When asked about general solutions, many agree on interoperability, especially in the context of digital identities and identification systems. In general terms, one interviewee explained this envisioned world as follows: *“you will not have a Facebook account, but you will be accessing Facebook with a non Facebook account - the resulting ecosystem will be*

<sup>35</sup> [https://digital-markets-act.ec.europa.eu/index\\_en](https://digital-markets-act.ec.europa.eu/index_en)

<sup>36</sup> <https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package>

*more fair. A world where we can use other services without necessarily losing the history and connections from the previous*". Open Source Software can give alternatives, like OpenStreetMap<sup>37</sup> is the alternative of proprietary services. These alternatives require, though, (public) funding and NGI is seen as a key vehicle for this transition. To achieve this, both policy-related and technical elements have to be accomplished and the reflection should go hand in hand between these two efforts (i.e. software development and surrounding policies).

According to some, this issue covers both software and hardware elements, and the debate should be intertwined. By hardware, we mean principally the physical IT infrastructure, and specifically the "cables' networks". The worry is that existing IT corporations are currently developing their own : "there is not enough public funding and we may end up in a sort of [IT\_Corporation]net".

### 5.2.3 Specific Topics

#### AI and Ethics

One prominent topic emerged from the discussions is about Artificial Intelligence (AI) and ethics. The following quote from one interview summarises this topic: "We ensure that the use of algorithmic systems benefits the many, not the few. We advocate for algorithmic systems that protect democracy and the rule of law instead of authoritarianism, freedom instead of surveillance, human rights instead of dehumanisation, autonomy instead of power asymmetries, justice and equality instead of favouritism and discrimination, and a sustainable instead of an exploitative way of living". The focus is therefore not necessarily on the algorithms and AI themselves, but in how these impact society as a whole.

This is the key focus of communities like Algorights<sup>38</sup>, an open community aiming to include civil society in the development and understanding of AI where human rights are affected. AI often categorises people, assuming everyone behaves in the same way. The problem occurs when these enter the sphere of public services: "governments invest heavily in these technologies, which is why they are hesitant to abandon them, despite their shortcomings". The focus is therefore mostly on those AI(-enabled) solutions used by governments for public services and on the growing evidence of how these solutions affect potential discriminatory practices. Dedicated groups are emerging focusing on these potential discriminations specifically (e.g. AlgoRace in Spain<sup>39</sup> - focused on racial discrimination from AI-enabled solutions and decision making). The overarching issue of existing biases and discrimination in society is seen as being amplified by current and future AI-based solutions, as "discrimination is perpetuated by these technologies, as they amplify biases already present in society". The fact that algorithms are deeply ingrained in our culture, especially on social media platforms, is well known. The current development practices make it challenging to understand how these algorithms function. Transparency is crucial in this way and, as argued by one interviewee: "we need to find ways to demystify these algorithms so we can advocate for changes effectively".

It is noted that some interviews have been carried out prior to the recent release of the AI Act<sup>40</sup>. One of its main elements relevant for this discussion was about banning facial recognition-related algorithms in public spaces and for public services, one key element of advocacy ingrained in most communities tackling this field of AI in public services.

<sup>37</sup> <https://www.openstreetmap.org/#map=6/40.007/-2.488>

<sup>38</sup> <https://algorights.org/>

<sup>39</sup> <https://www.algorace.org/>

<sup>40</sup> <https://artificialintelligenceact.eu/the-act/>



The solutions proposed and upon which these communities are currently working on refer to at least three main set of actions and priorities:

- Extend collaboration and participation in the development, use, and monitoring of AI solutions to ensure that the needs and perspective of societal actors and other affected stakeholders are taken into account besides the technical development elements of these systems.
- Extend the scope of AI development to also include reflections on data sets leveraged to train these systems, i.e. beyond the code itself, plan and organise data that feeds into the systems developed.
- Focus on solutions that enable transparency and explicability of these algorithms.

Regarding the latter, key emphasis is placed beyond the more common focus on transparency. This is mainly because some may interpret transparency being addressed by open source software alone, i.e. by the fact that the code is available for scrutiny by anyone. However, seeing the code does not necessarily mean transparency for all, as software codes are not accessible to everyone beyond the community of developers and some IT savvy individuals. Instead of transparency, the focus should be on wider concepts of “*explainability*” of these algorithms and how automated processes are carried out, and how automated decisions are taken and why. An example of these solutions can be encountered in *Vía Libre*<sup>41</sup>, an Argentinian foundation devoted to developing an integrated tool that allows everyone to discover and work on biases in natural language models, a key element of today's AI-based solutions. As an example, we often rely on “*autofill*” functions of search engines, often based on stereotypes or biases that are widespread in society, found by the surrounding AI algorithms when crawling the web.

The context of AI and ethics emerges to also cover aspects of inclusivity. For example, there are still several groups in society that can't access certain AI-enabled services. This is the case of people with certain disabilities for instance, and the current lack of standards and format that are accessible by all. Also, communities argue that the different levels of digital literacy do not allow for inclusion in this ecosystem. From a technical perspective, solutions should enable ease of use and understand and accessible content (for different types of disabilities).

More generally, the growing interests in concepts like AI and Metaverse are seen as the main door for other, more specific, topics and issues, such as identity, privacy, data governance, and accessibility.

### ***Right to Self-Determination in the Digital World***

In the context of freedom, human rights, and privacy, working on the right of self-determination of individuals appears to be an additional cornerstone of the work conducted by these communities and organisations. Digital self-determination is argued to include all tools and possibilities for people to define and position their identities in the digital world. This should entail people's freedom when it comes to decide how they are identified online in a way that preserves their privacy and dignity. This goes aligned with the concept of digital identity rights. Specifically, the latter relates to the current landscape where our digital identities are often based on data that we provide “*both consciously and unconsciously*”. In this way, identification and identity should be tackled as distinct concepts and areas of work. Communities argue that so far the digital identity discourse has been shaped around “*reducing this complex, personal, phenomenon in a merely digital expression*”. In the context of self-determination, threats are seen when data about people is used in a non legitimised

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<sup>41</sup> <https://www.vialibre.org.ar/>



way, and is then shared with third parties who create a new identification of individuals, based e.g. on content consumption patterns, online content visited etc. All in all, this once again relates primarily to privacy aspects, personal data protection, and being subjects of decisions to which consent has not been given in an informed manner.

In this frame, several communities work specifically on protecting migrants rights, a cohort that is seen as being significantly affected in the digital world of today. The focus here is more on non EU citizens and countries and revolves mainly around protecting biometric data and smart borders.

### **Virtual Private Networks (VPNs)**

One set of technologies that emerged to be critical for communities and is currently not explicitly tackled within NGI refers to the world of Virtual Private Networks (VPNs). While these issues are seen as more relevant in the Global South and in developing countries, VPNs are seen as one way to address problems related to surveillance and censorship. All argue that these issues are more and more complex and sophisticated over time: *“It is an ever growing problem, getting more sophisticated from a technical, legal, and social point of view”*.

While VPNs are seen as a technological building block to address some of these issues, the VPN ecosystem is argued to be far too chaotic, characterised by a serious lack of standards. This sector is the *“wild west”*, one interviewee states. As a consequence, communities argue that there is no way nowadays to know if VPN services are trustworthy or entail any form of risk for the user. Several key questions remain unanswered when navigating these products, e.g.: Are they protecting users’ activities online? From the legal perspective, are they sharing data with governments? Is it truly encrypted? All in all, because it is an emerging industry, it is hard for a user to choose the best product. Also, the fact that so far this industry is dominated by *“for-profit”* entities leads to situations whereby each player wants to superimpose their technologies and standards, as opposed to a more inclusive and interoperable ecosystem.

Importantly, the concept of VPNs and why these are used is generally not common sense: *“there is a cultural and educational issue in which people do not understand them [i.e. VPNs]. They do not know what they should use VPNs for”*. The need for public funding for these endeavours is seen as crucial. To support this process, organisations such as DigitalRights.Community<sup>42</sup> are acting to join together tools providers from both the public/civil society and the private sector and create a meeting point where new standards can be developed, thus improving the industry as a whole. What emerges from this work is that *“the industry is currently a mess”*. They see those aligned with open source principles as those that put in the most effort, but they also acknowledge that this is not enough. Another community we have interviewed, i.e. Access Now<sup>43</sup>, offer themselves VPN solutions in those countries where censorship practices are diffused<sup>44</sup>. Still, they argue that programmes such as NGI should address these technological developments too, to fully meet their goals and mission.

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<sup>42</sup> <https://www.digitalrights.community/>

<sup>43</sup> <https://www.accessnow.org/>

<sup>44</sup> See their full report on internet shutdowns here: <https://www.accessnow.org/campaign/keepiton/>

The problem of surveillance and censorship is still much wider to be entirely solved through VPNs. For instance, in certain countries, it becomes very difficult to use VPNs safely as companies are mandated by law to provide the state with data. Other places criminalise freedom of expression. Other governments are hiring companies to hack people's computers. This is to show that these phenomena are due to an entire range of issues, where VPNs can be only one part of the solutions.

When talking about censorship and surveillance, political influence on the population is argued to be an adjacent topic. However, this relates more to disinformation and manipulation, which is tackled next.

### ***Fact Checking Open Source Systems***

The following topic covered by several communities interviewed revolves around disinformation. In general, these advocate for novel fact checking open source systems to address these issues. While this is a key objective of NGI as a whole, reflections emerging from the interviews can be useful in shaping the future agenda in this direction more in detail. All agree on the fact that disinformation has a long history. The risk today is the scalability of disinformation provided by the connected world we live in and the prominence of social media in our daily lives. Foreseen, unwanted, scenarios are argued to include polarisation of thoughts, intolerance towards political differences and debates, and difficulty to achieve transparency of information and knowledge more generally. Micro-segmented propaganda is now invisible, but also an issue diffused globally. Communities advocate for instruments, possibly open source, to once again increase transparency behind algorithms (why am I shown what I am shown).

Fact checking systems are seen as part of the solution. We mention “part of the solution”, since broader debates should be undertaken in parallel, both from a policy perspective (e.g. in the context of political manipulation, the budget allocated to propaganda should be more open and accessible together with who is conducting these processes, where, and how), as well as from a philosophical one (e.g. what is the definition of truth? Do fact checking systems affect freedom of expression? If so, how?).

Aligned with this concept, some communities focus their work in this direction from the perspective of existing directives and legislations, such as the European Media Freedom Act<sup>45</sup> (EMFA). The main purpose of the directive is to preserve free press, as opposed to specifically fighting disinformation. However, it also aims at protecting journalists from political pressure and other attacks and fostering a diverse media landscape. In some places, there is a very low diversity of media outlets and therefore contents and opinions. So the result is in one way or another addressing disinformation, or at least some of its root causes. Going back to the EMFA, some articles are still seen as problematic with respect to fostering truthful, fact checking based information. For example, Article 17 of the Act states that certain privileges are foreseen for certain media companies that self-declare themselves as media service providers, in alignment with the EMFA. The idea pushed by the EMFA is that the self-declaration should label a given media provider as a factual based information provider. However, the process is not clear, and the potential spread of disinformation can be amplified instead of minimised. Another issue they are pushing for is to promote ownership of media

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<sup>45</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_5504](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_5504)



platforms that are more transparent also from a structural perspective. This is believed to be important for users to know who is shaping the public discourse.

It is also noted that fighting disinformation is not only seen as reducing those that intentionally spread false information, but also act on the consequences that disinformation creates.

### ***People empowerment to become aware of what data they share, and for what purposes***

As expected, one of the main issues encountered to date refers to data privacy and specifically to those, unwanted, consequences we face from that data that companies, institutions and other actors extract from users and their activities when online. The following quote from one interviewee summarises well the position of most communities we engaged with: *“Big tech companies get to know everything about us and can draft profiles that are sufficiently accurate to craft very much personalised messages. More than recommending actual products, the concern is about influencing opinions and behaviours. This impact is pervasive across domains. Our vision is for people to become more empowered in deciding what happens with their data”*.

Looking at how these problems should be addressed, many see a key role played by existing and future policies in this domain, mainly revolving around a situation where users opt-out by default to data sharing requests and mechanisms embedded in today’s online websites and applications. While the GDPR somewhat addresses this element, there is still a widely spread “knowing-doing gap”, whereby individuals are more and more aware of data privacy issues coming from their digital footprints, but still do not take action to preserve their privacy. This is often interpreted to be closely related to the “*social media addiction*” of today’s internet’s users.

The common request or expectation from the open source community translates into solutions that empower people to make conscious decisions when allowing companies to collect and process their data. The consequences are well known, and are not only about privacy and security, but can also affect foundational democratic principles. This is the case of certain targeted campaigns, where based on tracking data, companies and institutions can target different, very specifically defined groups with tailored messages to ultimately influence their beliefs and decisions. New solutions are advocated in terms of also empowering people to understand, in a fully transparent manner, why users are shown what they are shown, and where the profiling informing this targeted content is coming from.

This section outlined the preliminary findings extracted from the interviews carried out so far. Looking forward, the next steps will involve completing the interviews and the mapping analysis and developing the final taxonomy, as the main output of this task.

## **5.3 PARTICIPATORY WORKSHOPS**

The last objective included in this Task is established with respect to conducting five participatory workshops to further explore future topics for the NGI programme, as well as to contribute to bridging the current gap between NGI Innovators and their solution, and the

complex world of end users. As shown in the overall KPI table in the introductory chapter of this document, so far one workshop has been undertaken, while four are planned for the upcoming months (two of which in schools).

So far, the participatory workshop carried out was organised in February 2023 with a community of blind people from the organisation Real Eyes Sport<sup>46</sup>, in Italy. As mentioned in section 3.1 above, this section was also leveraged to review accessibility of the NGI website to this group. The workshop was held online and was kept deliberately open, under the following key questions: what are the main challenges that you face when using the internet? What are the solutions that you advocate for in order to achieve an inclusive digital online environment?

In terms of the dynamic of this interaction, each participant (there were seven in total) openly shared her or his experience and what she or he considered to be the key priorities. Through a group discussion, consensus was finally achieved around three priorities specifically: (1) open source screen readers; (2) voice-based captcha code; (3) dynamic banners on websites.

Before diving briefly into each of these outputs, one consideration should be made. In general, participants in this workshop explained to us that there have been two philosophies in making digital technologies accessible to them. One revolves around the need to create specific alternatives to existing solutions and services that are created for blind people specifically. The second revolves around making accessible to blind people, the solutions and services that are currently available across markets and in society. While the former may seem more appropriate, participants unanimously reported to prefer the latter option. According to their experience, alternatives developed for blind people only often lack the security, navigability, and general quality and completeness compared to the original ones. Also, these solutions often lag behind because of not frequent updates and improvements that companies and public agencies dedicate to these endeavours.

Going back to the actual findings from this workshop, the first element refers to the need of blind people to have at their disposal effective and accessible screen reader systems. So far, open source solutions exist in this space. NVDA (Non-Visual Desktop Access)<sup>47</sup>, specifically designed for Windows, seems to be among the most popular ones. However, according to the participants at the workshop, blind people tend to consume online content and access digital services primarily from their smartphones. One problem of existing solutions revolves around interoperability of these. So far, according to their experience, only those that use iOS-based smartphones can access effective solutions. Some argue that this is due to the fact that the current market of blind consumers is not big enough to justify companies to undertake investments to make their online content accessible to these cohorts, also given their low purchasing power. This leads to considering the creation of accessible, interoperable, and open source screen readers as a key priority for the open source community for the upcoming wave of software innovation.

Second, one serious bottleneck for blind people during their experiences online refers to Captcha Codes. The reasons why these are insurmountable obstacles for this community are

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<sup>46</sup> <https://sportrealeyes.it/>

<sup>47</sup> <https://nvda.es/>



quite obvious, as they often rely on people identifying certain objects in their screens. Alternative, voice-based Captcha Codes are being advocated.

Finally, the third and last insight upon which consensus has been achieved refers to the obstacles that dynamic banners (see also section 3.1) within websites pose on their experience when consuming content. Screen readers work by reading the text that is presented in a web page. When these banners are embedded in the website, these readers enter a loop, where every time this shifts to the next banner, they start again reading the text in these cells.



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## ● 6. CONCLUSIONS

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Equity, Diversity and Inclusion (EDI)-focused and dedicated activities have become an integral part of the work and approach followed and promoted by the NGI Outreach Office. This deliverable reports on the actions, reflections, and emerging findings within the work of fostering principles of equity, diversity and inclusion across several elements of the NGI programme. This work is led by WP4, but has been closely synchronised with the rest of the activities across all other work packages.

First, this report provides a recap of the overall strategy and the work plan presented in Deliverable 4.1. Second, the actions and interactions undertaken so far are presented across five pillars of action. These include the NGI Resources and Tools (to promote equity), the NGI Innovators, the NGI Online Community (to promote diversity and inclusiveness), and the specific efforts on Women in NGI and on engaging grassroots communities and end-users respectively (both addressing diversity and inclusiveness). For each of these pillars, this document presented the results of the analysis conducted based on the as is situation of the NGI Initiative. Also, the actions carried out as well as those planned for the future to improve EDI principles across these pillars are presented.

Importantly, the work being carried out is very much dependent on the availability of data and level of responsiveness/collaboration of the various NGI stakeholders, including the NGI RIAs (or intermediaries), the NGI innovators, as well as the EC and other organisations that will be consulted/involved - including media players.

Concluding, the effort in this WP is aligned with and being informed by other relevant actions across other WPs within NGI4ALL.E. Specific attention is being given to the ongoing overall communication and outreach strategy (WP3).

As a result of this work, we foresee NGI as a more accessible, inclusive, and societally relevant programme and ecosystem.

## ANNEX 1: MAPPING OF WOMEN IN TECH INITIATIVES (WIP)

Full Name and link	Country	Focus	Approach
<a href="#">Women Who Code</a>	Worldwide	Women Who Code (WWCode) is a global non-profit organisation dedicated to inspiring women to excel in technology careers. With a mission to close the gender gap in the tech industry, WWCode provides a supportive community, resources, and opportunities for women in programming and related fields. The organisation empowers members through skill-building initiatives, mentorship programs, and networking events, fostering a sense of belonging in a traditionally male-dominated industry.	Skills building, Network, Literacy, Leadership, Funding
<a href="#">Czechitas</a>	Czech Republic	Czechitas is a non-profit organisation based in the Czech Republic, dedicated to fostering diversity and inclusion in the field of technology. With a passion for empowering individuals, particularly women and underrepresented groups, Czechitas focuses on providing accessible education in digital skills. Through workshops, training programs, and community events, the organisation equips participants with coding, data analysis, and digital marketing skills. Czechitas innovative approach centres on creating a supportive environment that encourages learning and collaboration.	Skills building, Network, Literacy, Leadership, Career support
<a href="#">Superrr</a>	Germany	Superrr is a laboratory for digital feminist futures. Advocating for feminist values like equity, diversity, creativity, and curiosity, SUPERRR Lab stands as an independent non-profit, challenging the power and purpose of technology in society by incorporating diverse perspectives and stakeholders in its discussions, collaborating with civil society, political decision-makers, and the tech industry.	Network, Literacy, Policy, Strategic advocacy
<a href="#">Femmes &amp; Sciences</a>	France	Femmes et Sciences, is an organisation dedicated to breaking gender barriers in the field of sciences. The purpose of Femmes et Sciences is to dismantle stereotypes and promote equal opportunities, fostering an environment where women thrive in scientific pursuits. Through mentorship programs, educational initiatives, and advocacy, the organisation propels women into prominent roles in science.	Skills building, Network, Literacy, Strategic advocacy



<p><a href="#"><u>STEM Women</u></a></p>	<p>UK</p>	<p>STEM Women is an organisation driving gender equity in STEM fields. Stemming from a deep understanding of the challenges women face in these industries, STEM Women actively promotes inclusivity, providing a platform for networking, mentorship, and career development. Through a range of initiatives, including events, webinars, and resources, STEM Women empowers women to thrive in traditionally male-dominated fields.</p>	<p>Skills building, Network, Leadership, Career support</p>
<p><a href="#"><u>DigitalFems</u></a></p>	<p>Spain</p>	<p>Digital Fems, is a non-profit association dedicated to advancing women's roles and influence in the technology sector. Founded with a commitment to dismantling gender barriers, Digital Fems envisions a future where women are not only present but thrive in tech spaces. They achieve this through mentorship programs, skill-building initiatives, and fostering networks that amplify women's voices. Their approach is characterised by innovation, inclusivity, and a resolute commitment to reshaping the narrative of women in the digital world.</p>	<p>Skills building, Network, Leadership, Career support, Funding</p>
<p><a href="#"><u>FrenBloc</u></a></p>	<p>Spain</p>	<p>FemBloc is a non-profit association that aims to develop a model for addressing digital sexist violence through a digital hotline and support and a series of associated actions and tools. It is done with a feminist and intersectional perspective and in the Catalan area.</p>	<p>Literacy, Network, Leadership, Tools development</p>
<p><a href="#"><u>Donestech</u></a></p>	<p>Spain</p>	<p>Donestech is a collective focused on the intersection between feminism, technology and digital sovereignty. Their focus is on researching and intervening on the relationship between gender and ICT and for the empowerment of women and LGBTIQ people in the digital world. Recently Donestech has focused on digital security from a cyberfeminist perspective, developing research, training and dissemination materials to raise awareness of this issue, and promoting international and local alliances.</p>	<p>Literacy, Network</p>
<p><a href="#"><u>Dutch Women in Technology</u></a></p>	<p>Holland</p>	<p>Digital Women in Tech is an organisation on a mission to redefine the landscape of technology by empowering women in the IT industry. The organisation's approach combines skill-building, mentorship, and networking to create a robust support system for women in IT.</p>	<p>Network, Skills building, Leadership, Career support</p>

<p><a href="#"><u>European Center for Women and Technology</u></a></p>	<p>EU</p>	<p>The European Centre for Women and Technology (ECWT) is a European multi-stakeholder partnership of more than 130 organisations from all around Europe and not only. ECWT serves as a European single point of contact for information, collection and analysis of data, research, and the development of appropriate methodological tools to attract more girls to Science, Technology, Engineering and Mathematics (STEM), for nurturing and retaining women in the knowledge economy through industry and entrepreneurial careers.</p>	<p>Network, Leadership, Skills building, Literacy, Tools development, Strategic advocacy</p>
<p><a href="#"><u>VHTO</u></a></p>	<p>Holland</p>	<p>VHTO, the Dutch national expert organisation on gender diversity in technology and STEM professions, is dedicated to breaking gender stereotypes and fostering inclusivity in technology. The organisation's approach involves impactful programs, outreach, and partnerships to create a supportive ecosystem for women in technology. By providing mentorship, educational resources, and advocating for gender equality.</p>	<p>Skills building, Leadership, Strategic advocacy, Tools development</p>
<p><a href="#"><u>Techionista</u></a></p>	<p>Holland</p>	<p>Techionista is an organisation dedicated to empowering individuals through technology. Their mission is to bridge the gender gap and cultivate a more diverse, equitable, and inclusive job market, fostering increased participation of women in IT and technology. Techionista inspires, educates, and coaches individuals toward future-proof careers. While their academy is inclusive for everyone, their primary focus is on empowering women to excel in technology.</p>	<p>Skills building, Leadership, Strategic advocacy, Tools development</p>
<p><a href="#"><u>Female Tech Heroes</u></a></p>	<p>Holland</p>	<p>Female Tech Heroes is a community whose goal is to raise awareness about gender equality and diversity challenges in the tech industry. FTH mission is to promote gender equality and diversity in tech organisations by highlighting role models, organising community-connecting events such as conferences, mentoring sessions, workshops and dinners and encouraging tech organisations to embrace diversity to realise a more sustainable future.</p>	<p>Skills building, Network, Leadership</p>
<p><a href="#"><u>SHE Matters</u></a></p>	<p>Holland</p>	<p>She Matters is a social enterprise recruitment agency helping to build diverse, future-proof teams for the changing world. They achieve this by connecting migrant women who are professionals in their field with multinational companies seeking diverse talent. Their goal is not just to help women find employment, but to empower them along the way.</p>	<p>Skills building, Network, Leadership, Career support</p>



<p><a href="#"><u>Women in AI</u></a></p>	<p>Holland</p>	<p>Women in AI is committed to creating an inclusive space where women thrive, connect, and excel in the dynamic field of artificial intelligence. They achieve this by facilitating connections among women with shared interests, fostering mutual inspiration and support. Additionally, they provide acceleration programs to empower and advance women's careers in AI. Through network events, they celebrate the achievements and collaboration within their community.</p>	<p>Skills building, Network, Leadership, Career support</p>
<p><a href="#"><u>Mujeres Tech</u></a></p>	<p>Spain</p>	<p>Mujeres Tech is a non-profit association aiming to give visibility to women in the digital sector, promoting scientific-technological vocations among the youngest, and serving as a platform to establish a network between professional women in the sector. They are a network of people with similar initiatives, promoting actions and projects to change the world.</p>	<p>Network, Leadership, Skills building</p>
<p><a href="#"><u>CodeOp</u></a></p>	<p>Spain</p>	<p>CodeOp is dedicated to bridging the gender gap in technology by empowering women and gender-diverse individuals. The organisation achieves this through tech courses on coding, and data science. They are driven to educate and promote a community well-equipped to thrive in the ever-evolving landscape of technology.</p>	<p>Network, Leadership, Skills building, Career support</p>
<p><a href="#"><u>Ellas Vueltan Alto</u></a></p>	<p>Spain</p>	<p>Ellas Vueltan Alto is an organisation with a mission to create a consolidation of the visibility of women in the aerospace sector in Spain, covering the political, university, business and Administration spheres.</p>	<p>Network, Leadership, Career support</p>
<p><a href="#"><u>Asociación de Mujeres Investigadoras y Tecnólogas</u></a></p>	<p>Spain</p>	<p>Association that was established to defend the interests and equal rights and opportunities of Spanish researchers and technologists.</p>	<p>Network, Career Support</p>
<p><a href="#"><u>STEM Women Congress</u></a></p>	<p>Spain</p>	<p>The Association for STEM Data Collection stands as a beacon in promoting Science, Technology, Engineering, and Mathematics (STEM) careers. Their mission focuses on analysing the correlation between STEM enrollments and initiatives of women. Annually, they host the STEM Women Congress, a convergence point for companies and institutions to spotlight and foster female talent. Serving as a visibility platform, they have created the STEM Women Directory, easing access to female role models. They also have a Women Network, backed by a mobile app, which connects users in this virtual network. Furthermore, they encourage companies and institutions to host Events, with a special</p>	<p>Network, Leadership, Career support, Strategic Advocacy, Tools development</p>

		emphasis on promoting female talent.	
<a href="#">Women4cyber</a>	Belgium	Women4Cyber is a non-profit organisation dedicated to shaping the future of cybersecurity by championing gender diversity and inclusivity. Through strategic initiatives, mentorship programs, and collaborative partnerships, the organisation empowers women to thrive in cybersecurity careers. Women4Cyber fosters a supportive community that celebrates achievements, shares knowledge, and encourages networking within the industry.	Network, Leadership, Skills building, Career support, Policy, Strategic Advocacy, Tools development
<a href="#">WomANDigital</a>	Spain	WomANDigital.es is a space for exchange, reflection and virtual, open and collaborative meeting, in which contributions can be made on topics related to greater participation and equal opportunities for women in the TIC Sector. To do this, it offers resources and information, and at the same time facilitates the contact of movements, networks, people and entities interested in participating.	Network, Leadership, Policy, Strategic Advocacy, Tools development
<a href="#">All Women</a>	Spain	AllWomen is a female community focused on empowering other women to thrive in the tech industry. They do so by creating a full-rounded learning experience that provides a safe and supportive environment for women to connect with fellow women, share their thoughts and advice, and evolve as a successful woman in tech.	Network, Leadership, Skills building, Career support, Tools development
<a href="#">W Startup C</a>	Spain	W Startup Community Forum (WSC) aims to create the next generation of startup women leaders in tech. By developing the entrepreneurial and innovative capacity to its maximum potential, particularly in its technological-digital aspect, structuring the diverse agents and its ecosystem in an open, impartial and transparent manner, and placing particular emphasis on those aspects related to the development of Equal Opportunities Policies.	Network, Funding, Leadership, Skills building, Career support, Tools development
<a href="#">Girls in tech</a>	Worldwide	Girls in Tech is a non-profit organisation dedicated to eliminating the gender gap in tech. They are committed to building the diverse and inclusive tech workforce the world needs, and aim to see every person accepted, confident and valued in tech.	Network, Funding, Leadership, Skills building, Career support, Tools development
<a href="#">Girls Who Code</a>	Worldwide	Girls Who Code is on a mission to close the gender gap in technology and to change the image of what a programmer looks like and does.	Network, Leadership, Skills building, Career support, Tools development



<p><a href="#">Women in Tech</a></p>	<p>UK</p>	<p>WomenInTech.co.uk is a platform committed to promoting and supporting women in the technology sector. The website serves as a hub for information, resources, and opportunities aimed at fostering diversity and inclusion within the tech industry. With a focus on empowering women professionals, the site provides insights into industry trends, profiles of successful women in tech, and a range of resources to help women navigate and thrive in the rapidly evolving tech landscape.</p>	<p>Network, Funding, Leadership, Skills building, Career support, Tools development, Strategic advocacy</p>
<p><a href="#">Geekettes</a></p>	<p>Worldwide</p>	<p>Geekettes is a global community of women dedicated to helping aspiring and established women in tech. Geekettes believes that the more women get involved with tech, product, design, development, and leadership, the more successful companies and products will be in the future. They do so by organising inspiring talks to motivate women, workshops to teach and refine skills, and hackathons to bring women together to create new products.</p>	<p>Network, Leadership, Skills building, Career support</p>
<p><a href="#">Rails Girls</a></p>	<p>Finland</p>	<p>Rails Girls is a non-profit organisation that aims to give tools and a community for women to understand technology and to build their ideas. They do this by providing experience on building things and by making technology more approachable.</p>	<p>Network, Skills building, Career support</p>
<p><a href="#">Code First Girls</a></p>	<p>UK</p>	<p>Code First Girls is an organisation striving for global tech education, delivering free coding courses for women. Committed to closing the gender gap, they provide pathways to tech employment, partnering with global companies to enhance diversity and social mobility.</p>	<p>Network, Leadership, Skills building, Career support, Tools development</p>
<p><a href="#">Women in Data</a></p>	<p>Europe</p>	<p>Women in Data is a global community where data enthusiasts from diverse backgrounds unite, thrive, and lead collectively. Committed to fostering diversity in data-centric professions, their mission revolves around dismantling gender barriers and empowering women and girls in the data domain. As champions of gender equality, they acknowledge the persistent global disparities, be it the unequal distribution of unpaid work or the systemic denial of opportunities to women. Women in Data believes that diverse voices in data and technology are imperative for crafting inclusive solutions that benefit society as a whole.</p>	<p>Network, Leadership, Skills building, Career support, Tools development</p>

<a href="#"><u>Women in Tech - Sweden</u></a>	<p>Sweden</p>	<p>Women in Tech Sweden is a non-profit organisation, with the aim to inspire more women to choose and stay in tech, working for a new era of diversity, equity and inclusion. With a strong community, Women In Tech offers networks, role models, inspiration and experience from the corporate, entrepreneurial, academic and scientific worlds.</p>	<p>Network, Leadership, Skills building, Career support, Tools development</p>
<a href="#"><u>Women in Tech - Finland</u></a>	<p>Finland</p>	<p>Women in Tech Finland is a non-profit organisation, with the aim to inspire more women to choose and stay in tech, working for a new era of diversity, equity and inclusion. With a strong community, Women In Tech offers networks, role models, inspiration and experience from the corporate, entrepreneurial, academic and scientific worlds.</p>	<p>Network, Leadership, Skills building, Career support, Tools development</p>
<a href="#"><u>Women in Tech - Switzerland</u></a>	<p>Switzerland</p>	<p>Women in Tech Switzerland is a non-profit organisation, with the aim to inspire more women to choose and stay in tech, working for a new era of diversity, equity and inclusion. With a strong community, Women In Tech offers networks, role models, inspiration and experience from the corporate, entrepreneurial, academic and scientific worlds.</p>	<p>Network, Leadership, Skills building, Career support, Tools development</p>
<a href="#"><u>Stemettes</u></a>	<p>UK &amp; Ireland</p>	<p>Stemettes is an award-winning social enterprise working to inspire and support girls, young women and non-binary young people into Science, Technology, Engineering, Arts and Maths careers (STEAM).</p>	<p>Network, Leadership, Skills building, Career support</p>
<a href="#"><u>Girls Got IT</u></a>	<p>Romania</p>	<p>Girls Got IT is dedicated to dismantling cultural stereotypes surrounding women in STEM fields. By providing young females with essential technology skills and exposing them to inspiring role models, the initiative aims to empower them and promote diversity in the technology startup ecosystem in Lebanon. Through immersive workshops covering areas like web development, 3D printing, and robotics, Girls Got IT encourages over 400 high school girls to explore STEAM subjects. The initiative not only strives to bridge the gender gap but also fosters a sense of civic engagement, aiming to create positive contributors to society.</p>	<p>Skills building, Career support</p>

<p><a href="#">Django Girls</a></p>	<p>EU</p>	<p>Django Girls is a non-profit organisation and a community that empowers and helps women to organise free, one-day programming workshops by providing tools, resources and support. They are a volunteer run organisation with hundreds of people contributing to bring more amazing women into the world of technology. They are making technology more approachable by creating resources designed with empathy.</p>	<p>Network, Leadership, Skills building, Career support</p>
<p><a href="#">World Pulse</a></p>	<p>Worldwide</p>	<p>World Pulse is an online community with the visionary goal of connecting women worldwide and amplifying their voices for transformative change. This digital platform empowers women to share their stories, ideas, and solutions to critical global issues. World Pulse provides a space for women to access resources, collaborate on initiatives, and catalyse social impact.</p>	<p>Network, Leadership, Career support</p>



## ANNEX 2: MAPPING OF GRASSROOTS COMMUNITIES IN DIGITAL RIGHTS (WIP)

Full Name and link	Country	Focus	Approach
<a href="#">European Digital Rights</a>	Europe	EDRi is the largest European network (NGOs, experts, advocates, and academics) defending rights and freedoms online. With a vision for a world where individuals experience dignity and vitality in the digital age, EDRi is dedicated to creating a fair and open digital environment that fosters the flourishing of everyone's potential. The organisation's mission involves challenging both private and state actors who misuse their power to control or manipulate the public. EDRi achieves this by advocating for enforced laws, mobilising and informing the public, fostering a healthy and accountable technology market, and building a broad movement of organisations and individuals committed to upholding digital rights and freedoms in an interconnected world.	Network, Strategic advocacy, Literacy, Technology development, Grassroots activism
<a href="#">Access Now</a>	Worldwide	Access Now, is a global non-profit organisation committed to safeguarding and expanding the digital rights of people and communities at risk. Bringing together activists, technologists, policymakers, business leaders, journalists, philanthropists, and researchers, Access Now advocates for digital freedom and privacy. The organisation has developed toolkits to facilitate a human rights approach to digital identity issues, emphasising inclusivity and protection. Through a multi-stakeholder approach, Access Now works towards creating a secure and open digital environment for all.	Technology development, Literacy, Strategic advocacy, Grassroots activism, Network
<a href="#">Electronic Frontiers Italy</a>	Italy	ALCEI, is a non-profit organisation established to support digital rights in Italy. Founded with the mission of safeguarding individuals' electronic freedoms, ALCEI focuses on fostering awareness and advocating for policies that protect online privacy, free expression, and the open internet. The organisation employs a multi-faceted approach, engaging in legal advocacy, policy analysis, and public education to address emerging challenges in the digital realm. ALCEI actively collaborates with a diverse community of activists, legal experts, and technologists to ensure a comprehensive and informed response to the evolving landscape of digital rights in Italy.	Literacy, Strategic Advocacy, Policy



<p><a href="#"><u>Alternatif Bilisim</u></a></p>	<p>Turkey</p>	<p>Alternatif Bilişim, is an NGO at the forefront of promoting digital rights and innovation in Turkey. With a commitment to fostering an open and accessible digital environment, the organisation focuses on advocating for privacy, digital freedom, and ethical technology practices. Alternatif Bilişim actively engages in the development of alternative technological solutions that prioritise user autonomy and ethical principles. Their approach involves collaboration with diverse stakeholders, including activists, technologists, and policymakers, to shape a more inclusive and responsible digital future in Turkey. Through a combination of advocacy and hands-on initiatives, Alternatif Bilişim plays a role in steering the Turkish digital landscape towards greater transparency, inclusivity, and ethical use of technology.</p>	<p>Network, Strategic advocacy, Literacy, Technology development, Grassroots activism</p>
<p><a href="#"><u>Amnesty International</u></a></p>	<p>Worldwide</p>	<p>Amnesty International, stands at the forefront of advocating for human rights in the realm of technology. With a global movement of 10 million people, the organisation is committed to ensuring technology prioritises people and human rights. Amnesty actively engages in plugging hackers, campaigning, and investigating to address the challenges posed by technology to human rights. Their purpose is to change policies, emphasising the need for ethical and responsible technology practices.</p>	<p>Network, Education, Policy, Grassroots activism</p>
<p><a href="#"><u>Association for Technology and Internet</u></a></p>	<p>Romania</p>	<p>ApTI is a non-governmental organisation in Romania, whose aim is to support and promote a free and open Internet where human rights are guaranteed and protected. Committed to privacy, Intellectual property rights and internet governance, ApTI project focus is on digital civil rights, privacy advocacy, spam prevention, domain name regulation, and Internet education. ApTI's belief in government-respected anonymity, protected rights, and minimal regulation underscores its commitment to preserving a secure online environment.</p>	<p>Policy, Strategic Advocacy, Literacy</p>
<p><a href="#"><u>Article 19</u></a></p>	<p>Worldwide</p>	<p>Article 19 is an international non-governmental organisation that defends freedom of expression and access, delivering change through both local and international influence. It achieves this by spearheading advocacy in cities and leveraging thematic experts to drive policy.</p>	<p>Policy, Strategic Advocacy, Literacy</p>



<p><a href="#"><u>Bits of Freedom</u></a></p>	<p>Netherlands Belgium</p>	<p>Bits of Freedom is an independent Dutch digital rights foundation committed to safeguarding digital civil liberties. Focused on privacy and freedom of communication, their mission revolves around influencing legislation and policy.</p> <p>Bits of Freedom engages in research to address emerging challenges in the digital age, emphasising the protection of citizens' rights against perceived privacy threats. By advocating for these rights locally and globally, the organisation plays a fundamental role in shaping the legal landscape and ensuring that individuals can freely navigate the digital realm without compromising their fundamental freedoms.</p>	<p>Policy, Strategic Advocacy, Literacy</p>
<p><a href="#"><u>Centrum Cyfrowe</u></a></p>	<p>Poland</p>	<p>Centrum Cyfrowe champions openness, inclusiveness and engagement in the digital world. Specialising in media literacy and digital education, it supports social aspects of technology. The organisation collaborates with experts to create spaces for new ideas and methodologies, emphasising team integration, inspiration, and showcasing diverse possibilities in the digital landscape.</p>	<p>Literacy, Strategic Advocacy, Policy</p>
<p><a href="#"><u>Chaos Computer Club</u></a></p>	<p>Germany</p>	<p>The CCC is a German organisation at the forefront of digital activism and hacker culture. CCC has a history of advocating for digital rights, privacy, and freedom of information. CCC's purpose lies in challenging technological norms, fostering critical discourse, and empowering individuals to navigate the digital realm responsibly. The organisation actively engages in cybersecurity research, organises events, and provides a platform for enthusiasts and experts to collaborate.</p>	<p>Network, Technology development, Grassroots activism</p>
<p><a href="#"><u>Coalition for Civil Liberties and Rights</u></a></p>	<p>Italy</p>	<p>The CILD is dedicated to fostering digital citizenship in the ever-evolving landscape of technology. With a mission to bridge the gap between innovation and responsible digital engagement, CILD strives to equip individuals with the skills and knowledge needed to thrive in the digital era. The organisation pioneers initiatives that promote ethical technology use, digital literacy, and inclusivity. CILD's approach combines cutting-edge research with practical solutions, making it a key player in shaping a society where technology aligns with democratic values.</p>	<p>Literacy, Skills Building, Strategic Advocacy</p>



<p><a href="#"><u>Direitos Digitais</u></a></p>	<p>Portugal</p>	<p>D3, is a non-profit organisation at the forefront of defending digital rights in Portugal. Established with the mission to safeguard online freedoms, privacy, and digital access, D3 employs a multifaceted approach. Through advocacy and education, the organisation strives to empower individuals to navigate the digital landscape securely.</p>	<p>Literacy, Strategic Advocacy, Policy</p>
<p><a href="#"><u>Dataskydd</u></a></p>	<p>Sweden</p>	<p>Dataskydd is a non-profit association whose purpose is to work for informed decisions about legislation and technology in accordance with the fundamental rights to data protection and personal privacy, based in Sweden.</p>	<p>Literacy</p>
<p><a href="#"><u>Deutschen Vereinigung für Datenschutz</u></a></p>	<p>Germany</p>	<p>DVD is a non-profit civil rights association, based in Germany, committed to ensuring that modern data processing by authorities, companies and organisations does not endanger fundamental rights.</p>	<p>Network, Literacy, Strategic Advocacy</p>
<p><a href="#"><u>The Association for Digital Freedom and Rights</u></a></p>	<p>Sweden</p>	<p>DFRI is a non-profit association that works for the promotion of digital freedoms and rights. They want a society where people can live without being monitored, tracked or eavesdropped.</p>	<p>Literacy, Strategic Advocacy, Policy</p>
<p><a href="#"><u>Digital Republic</u></a></p>	<p>Bulgaria</p>	<p>Digital Republic is a non-profit association of internet users, authors, computer specialists, entrepreneurs and lawyers. Their mission is to advocate for the rights of Internet users and to defend free access to information. The purpose of the association is to ask questions, discover challenges and seek answers, support the development of technologies for the benefit of knowledge and participate in these processes for the benefit of the largest possible part of society.</p>	<p>Literacy, Strategic Advocacy, Policy, Technology development</p>
<p><a href="#"><u>Digital Rights Ireland</u></a></p>	<p>Ireland</p>	<p>Digital Rights Ireland is a non-profit association which advocates for the protection of digital rights in the modern age. Established with the mission to safeguard individual privacy, free expression, and access to information, the organisation adopts a multifaceted approach. Digital Rights Ireland engages in legal advocacy, policy analysis, and public awareness campaigns to address emerging challenges in the digital landscape.</p>	<p>Literacy, Strategic Advocacy, Policy</p>



<p><a href="#"><u>Digital Courage</u></a></p>	<p>Germany</p>	<p>Digitalcourage is a non-profit association which advocates for fundamental rights, privacy and protecting personal data. They are a group of people from a variety of backgrounds who explore technology and politics with a critical mindset, and who want to shape both with a focus on human dignity. Digitalcourage informs through publicity, speeches, events and congenial interventions.</p>	<p>Network, Literacy, Grassroots activism, Technology development</p>
<p><a href="#"><u>Digitale Gesellschaft</u></a></p>	<p>Berlin, Germany</p>	<p>Digitale Gesellschaft is a non-profit association, based in Germany, that has been committed to fundamental rights and consumer protection in the digital space. Founded with the vision of fostering a free and open digital society, the organisation actively engages in advocacy, policy analysis, and public awareness initiatives. Digitale Gesellschaft aims to address emerging challenges in the digital landscape, emphasising the importance of privacy, free expression, and the responsible use of technology.</p>	<p>Literacy, Strategic Advocacy, Policy</p>
<p><a href="#"><u>Citizen D</u></a></p>	<p>Lithuanian</p>	<p>Državljan D is a Slovenian NGO committed to empowering citizens and fostering active civic engagement. The organisation's purpose revolves around enhancing the participation of Slovenian citizens in the democratic process, emphasising the importance of informed decision-making and civic responsibility. Državljan D employs a multifaceted approach, utilising educational initiatives, advocacy efforts, and technological solutions to bridge the gap between citizens and their government.</p>	<p>Literacy, Strategic advocacy, Technology development</p>
<p><a href="#"><u>Electronic Frontier Foundation</u></a></p>	<p>Worldwide</p>	<p>The EFF is a non-profit organisation defending civil liberties in the digital world. EFF champions user privacy, free expression, and innovation through impact litigation, policy analysis, grassroots activism, and technology development. EFF's mission is to ensure that technology supports freedom, justice, and innovation for all people of the world.</p>	<p>Literacy, Strategic advocacy, Policy, Grassroots activism, Technology development</p>
<p><a href="#"><u>Epicenter Works</u></a></p>	<p>Austria</p>	<p>Epicenter.works is a non-profit association at the forefront of digital rights advocacy. With a mission to safeguard privacy, free expression, and internet freedom, the organisation employs a multifaceted approach. By actively engaging in legal advocacy, policy analysis, and public awareness campaigns, epicenter.works strives to protect individuals in the digital landscape.</p>	<p>Literacy, Strategic advocacy, Policy</p>



<p><a href="#"><u>Federation of Associative Internet Access Providers</u></a></p>	<p>France</p>	<p>The FDN is dedicated to championing a free and open internet for all. With a mission to preserve digital rights and foster community networks, FFDN stands as a collaborative force of independent French internet service providers. The organisation's approach combines advocacy for privacy, net neutrality, and digital freedoms with the establishment of decentralised and community-driven internet infrastructures. By promoting transparency and user empowerment, FFDN actively works to ensure that the internet remains a democratic space, free from centralised control.</p>	<p>Network, Strategic advocacy, Policy, Literacy, Technology development</p>
<p><a href="#"><u>Digital Grassroots</u></a></p>	<p>Worldwide</p>	<p>Digital Grassroots is a non-profit association dedicated to empowering youth as digital leaders in the online landscape, with a commitment to fostering digital literacy, online safety, and inclusivity. The organisation adopts a multifaceted approach, utilising workshops, mentorship programs, and community-building initiatives to equip the next generation with the skills and knowledge necessary for responsible digital citizenship. By emphasising the importance of diverse voices and perspectives in the digital realm, Digital Grassroots strives to create a more inclusive internet.</p>	<p>Network, Literacy, Skills building, Grassroots activism, Funding</p>
<p><a href="#"><u>Digital Rights Community</u></a></p>	<p>Worldwide</p>	<p>Digital Rights Community is a non-profit association committed to safeguarding digital rights in the online sphere. With a mission to foster a free and open internet, the organisation actively engages in advocacy, education, and policy initiatives. DRC aims to empower individuals with the knowledge and tools needed to navigate the digital landscape while fostering privacy, freedom of expression, and equitable access. By adopting a collaborative approach, Digital Rights Community brings together diverse voices, including activists, policymakers, and technologists, to shape policies that uphold digital rights globally.</p>	<p>Strategic advocacy, Policy, Literacy, Network, Grassroots activism, Funding</p>



<p><a href="#">We, the Internet</a></p>	<p>Worldwide</p>	<p>We The Internet is a non-profit association dedicated to fostering digital literacy and civic engagement in the online realm. With a mission to empower individuals to navigate the complexities of the internet responsibly, WTI combines education, advocacy, and community building. The organisation seeks to bridge the digital divide by providing accessible resources that enhance users' understanding of online dynamics, privacy, and responsible digital citizenship. By adopting an inclusive and collaborative approach, We The Internet actively engages with diverse communities, policymakers, and educators to shape a digital landscape that prioritises informed decision-making, digital rights, and ethical online practices.</p>	<p>Literacy, Policy, Strategic advocacy, Network</p>
<p><a href="#">Algorights</a></p>	<p>Spain</p>	<p>Algorights is a community committed to advocating for ethical and human-centric algorithmic practices. With a mission to ensure that algorithms prioritise fairness, transparency, and accountability, Algorights actively engages in research, education, and advocacy initiatives. The organisation promotes the development and deployment of algorithms that respect fundamental rights, mitigating biases, and fostering inclusivity.</p>	<p>Literacy, Policy, Strategic advocacy, Network</p>
<p><a href="#">Liberties</a></p>	<p>Europe</p>	<p>Liberties is a non-profit association dedicated to safeguarding human rights across Europe, with a resolute commitment to justice, freedom, and equality. Through strategic advocacy, legal expertise, and public engagement, the organisation tackles a diverse array of human rights issues, including civil liberties, privacy, and social justice. Liberties serves as a beacon for those seeking redress against infringements on their fundamental rights, fostering a collaborative network of activists, legal professionals, and citizens.</p>	<p>Literacy, Strategic Advocacy, Policy, Technology development, Grassroots activism</p>
<p><a href="#">Algorithm Watch</a></p>	<p>Worldwide</p>	<p>AlgorithmWatch, a Berlin-based human rights organisation, advocates for a world where algorithms and Artificial Intelligence (AI) operate with utmost transparency and accountability. Founded with the vision of safeguarding democratic control over automated decision-making, the organisation delves into the social impact of algorithms and AI-based systems. Through research, advocacy, and active participation in public and political debates, AlgorithmWatch aims to showcase the implications of automated decision-making in areas such as predictive policing, profiling, and credit scoring.</p>	<p>Literacy, Strategic advocacy, Technology development, Grassroots activism</p>



<p><a href="#">Dyne</a></p>	<p>Europe</p>	<p>Dyne.org is a digital community and free software foundry, dedicated to empowering artists, creatives, and citizens. Rooted in a profound commitment to open-source principles, Dyne.org fosters a collaborative space where tools, practices, and narratives are shared to harness the transformative potential of technology for the social good. Functioning as both a think tank and a hands-on research organisation, Dyne.org merges socio-political analysis with the development of technical solutions. With a decade-long commitment to sustainable and community-driven technology development, Dyne.org envisions a world where access to knowledge and digital empowerment is freely available to all, embodying an ecosystem where creativity flourishes through open collaboration.</p>	<p>Technology development, Grassroots activism</p>
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