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D3.2– SPEAKNGI.EU STAKEHOLDER INPUT TO RESEARCH AGENDA

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Table of Contents

Executive Summary	4
1 Introduction	8
1.1 Purpose and Scope	8
1.2 Structure of the document	8
1.3 Relationship to other project deliverables	8
2 Summary of Consultation Platform Results	9
2.1 Work Programme 2019 – An Open Internet Initiative.....	9
2.2 Internet Resilience	9
2.3 Responsible Artificial Intelligence	9
2.4 Privacy and Trustworthiness	10
2.5 Decentralised Data Governance	10
2.6 Socio-economic and Legal Considerations for NGI	10
3 Summary of Engineroom Workshop Report	11
3.1 Activity 1 – What should the future internet look like	11
3.2 Activity 2 - A vision for the future internet: which challenges ahead?	12
3.3 Activity 3 - Prioritising the key challenges and topics for the future internet	18
4 Analysis and Alignment of the Workshop Results with the Consultation Platform	19
4.1 Overview	19
4.2 Next Steps	23
5 Conclusions	25

List of Tables

Table 1: Resulting actions coming from the analysis of the Engineroom workshop report	6
Table 2: How each of the six groups prioritised the umbrella topics	18
Table 3: Engineroom workshop outputs compared with SpeakNGI.eu consultation platform.....	19
Table 4: Next steps resulting from the analysis	23

List of Figures

Figure 1: Aggregation of values identified by participants in the workshop	11
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Executive Summary

The SpeakNGI.eu Consultation Platform offers an opportunity to the users from all walks of life to join the NGI community, participate, share and discuss ideas with each other. The challenges and opportunities for a human-centric internet are becoming more visible through this ongoing process enabling content curation, and open discussions in various available channels from the community, further supported by on-line surveys.

There are currently 17 discussion channels on the consultation platform with 93 open discussions from around 250 registered users, out of which greater than 95% users are from EU countries. The discussions span a wide range of NGI related topics.

Content on the Consultation Platform is generated through a top-down approach via community engagement. SpeakNGI.eu's peer project, Engineroom adopts a bottom-up approach as exemplified by the inputs into the workshop it ran on March 21st 2018 in London¹. This expert workshop in London supported the establishment of a research agenda for the Next Generation Internet. There were 54 participants in the workshop from a wide-ranging background representing a rich mix of stakeholders.

The workshop was presented in three distinct sessions. The first session concentrated on the future of the internet in broad terms, asking how we can reimagine the internet in support of the human value proposition of the NGI. The second session was a set of more focused and practical discussions identifying the key supporting technologies and the social issues that underpin this vision of the future internet. These discussions centred around nine "umbrella" topics which emerged from Engineroom's topic identification process. The third session had the goal of prioritising the topics discussed in the second session.

A report of the findings of the workshop has been produced and a public version of that report will be published on the www.ngi.eu website; a short summary of the main take-aways can be found already in the news section of the NGI.eu site.

The discussions that were part of the second session of the workshop around the umbrella topics were arranged into four areas: 1) General Thoughts, 2) Challenges, 3) Opportunities and 4) Examples.

Here is a brief summary of those discussions:

A Sustainable Internet

Described as: *The energy consumption and environmental impact of the core internet infrastructure and emerging technologies.*

The general introductory discussion concerned the regulatory role of Europe and the limit to which Europe can influence the global efforts. Also, that sustainability should be a design issue and that we should focus on specific barriers. Among the challenges mentioned were the cost of sustainability for start-ups, a lack of data to make sensible decisions, a gap between perceptions and attitudes, and the lobbying power of the large corporations. Opportunities exist in website optimisation, Eastern Europe being potentially more open, improving reuse of digital products and the falling costs of renewable energy. Some examples given were Hydro 66, Bulb and Furtherfield.

Decentralising Power

Described as: *Sustainable business model without monopolies, democratising internet governance and creating a level playing field.*

The general discussion centred around breaking the current power paradigm, alternative business models, regulation or economics as a driver, incentives for ethical design, platform cooperativism, and data portability and interoperability. The challenges discussed were the lack of regulation, difficulty in funding alternative solutions, how to give citizens a voice, and educate about the current dangers and the complication of enforcement in decentralisation. Opportunities exist in leveraging the EU regulatory power, platform cooperativism, strengthening the branding of ethical technologies. Some examples given were Finance Innovation Lab, the DECODE project, Hoe Street Central Bank and Furtherfield.

¹ <https://www.ngi.eu/news/2018/04/26/reimagining-the-internet-an-event-recap/>

Internet and Data Sovereignty

Described as: *Currently a lack of control over personal data. Decentralised data governance. New standards around data portability and interoperability.*

In this topic, the general discussion was about the ambiguity around the term “sovereignty”, inclusion at a collective level, remembering that control brings responsibility and consent and traceability need to be addressed. Among the identified challenges were making data understandable, a lack data portability, a lack of plurality, economic inequality, the difficulty in executing data boxes securely and efficiently as well as the challenge of building trust in leveraging data for social good. Among the opportunities discussed were common data models allowing for a more pluriform landscape, transparent and accessible interaction and the promotion of free and open source models at a EU level. Examples cited included Indigenous communities in South Africa and Australia, The DECODE project, BBC Databox, MyData conference.

Ethical AI and ML

Described as: *Embedding European values in AI development. Transparency and algorithmic accountability. Standards. Resilient and safe AI tools.*

General thoughts included identifying the universal values, embedding in the design stage, going beyond western thinking, responsible research and innovation and the need for ethical venture capital. Among the challenges mentioned were the need to ensure diversity in the topic, mitigating against talent drain, larger companies having an advantage and the need to raise public awareness. The opportunities discussed were leveraging the General Data Protection Regulation, public willingness for raising awareness, leveraging EU regulatory power, encouraging education in training and attracting talent to this space. Examples identified were Fairness, Accountability and Transparency conference, Public Service Databank, DeepMind.

A Safe, Accessible and Diverse Internet

Described as: *A safe internet for vulnerable groups and individuals with diverse voices and tools that promote civil discourse. Access for all and accessibility by design.*

The opening discussion was about defining the meaning of safe and unsafe, the ubiquity of vulnerability, whose morality defines the values, representing different identities and a lack of transparency around diversity statistics among the large players. Challenges discussed included protecting groups without being patronising, changing the narrative, rethinking TCP/IP and making an internet that supports different identities. The opportunities included educating young people in safe internet use, the public interest already exists, providing more direct routes into the technology industry and the opportunity of including social scientists in the process. Some examples discussed were The dark web, Polls, Citizen Advice live dashboard, BeApplied, Monzo, DotEveryone.

Trustworthy Online Media and Information Ecosystems

Described as: *Pluralistic and sustainable media ecosystems. Ameliorating the weaponisation of information. Alternative community-owned social media networks. Maintaining a representative online collective memory.*

In general, there is a need to empower communities and remember that is not only a technical problem but above all a social problem. The challenges included the need to address “fake news”, the need for divergent incentives, the cost of quality journalism and how to rebuild trust. Among the opportunities were the application of blockchain, the use of reputation systems and leveraging education. Examples cited were Wikitrune and Gobo.

Online Identities and Trust

Described as: *There is a need for secure online identity verification and management system that can replace the trustless system with trust-enhancing solutions, which would be alternatives to codifying trust through reputation systems.*

The opening discussion included the need for federated identities, new identity formations and e-Estonia as a great example and important source of inspiration. The challenges included the complexity of convenience, verifiability in decentralised identity systems and the need to Europe to look for an alternative, realistic and optimistic vision around trustworthy identity systems. There exists an opportunity in learning from the Estonia model and the opportunity for a Europe-wide identity system to create a frictionless single market. Some examples identified by the participants were Alice and Yoti.

The Right to Opt out and Self-Govern

Described as: *Each individual has the right to opt-out and right to tinker. Self-governing models for online ownership are needed for individuals and communities.*

The general discussion for this topic focussed about the need to not only focus on individual rights but also focus on collective data use. What does gathering data empower us to do as a community? The identified challenges included the recognition that informed consent needs to be more complex, the need for data literacy, the existence of structural inequalities of power, the need to move from individual rights to more collective approach and the need for fair-use approach for Europe. Opportunities recognised were that reimagining currently available tools towards more public ownership models. Pay-as-you-go models can be built for internet services. Some examples included the Finsbury Park wind-powered blockchain, BBC's Databox and DuckDuckGo.

Cyber-security and Resilience

Described as: *There is a need for secure internet infrastructure and protocols which are resilient against cyber-physical attacks with future-proof encryption.*

The opening discussion recognised that the incentives of actors in cyber security need to be re aligned and that there exists a trade-off between resilience and efficiency. Among the challenges identified were that cheap technologies are often not secure, the perception of complexity in cyber-security, a lack of accountability and regulation, the need for new business models where security and resilience is incentivised. Opportunities that emerged were that Europe should promote security-by-design, bringing hardware production back to Europe and setting global standards in Europe and the opportunity for European start-ups to fill the market gaps. Some examples identified were Equifax and bitcoin mining in browsers without user consent (how not to do it) and Shopify who work with small retailers to build safer systems.

For this deliverable, we performed a comparison of these discussions with an analysis of the current content in the SpeakNGI.eu Consultation Platform and Knowledge Base. This resulted in a set of concrete actions, as described in Table 1, that will be undertaken based on the results of this analysis.

Table 1: Resulting actions coming from the analysis of the Engineroom workshop report

Engineroom Workshop Report Topic	SpeakNGI.eu Action
A Sustainable Internet	The outcomes of the workshop related to this topic results in the generation of a new discussion channel in the consultation platform that would offer an opportunity to the participants to discuss sustainability of the internet with respect to energy consumption and carbon emission.
Decentralising Power	There are two discussion channels in the consultation platform that have the mandate to discuss the power dissipation from top to bottom level so as to empower citizens from all walks of life, to fully take part in the digital single market. At least one of the channels can be renamed to fully align with the workshop report topic.
Internet and Data Sovereignty	There are two discussion channels in the consultation platform that have the mandate to discuss this topic. Both discussion channels have mutually exclusive objectives and, therefore, no action is needed.
Ethical AI and ML	Responsible AI is the discussion channel that offers the discussions about this topic. This is one of the most popular channels on the consultation platform. No further action is needed.
A Safe, Accessible and Diverse Internet	There is a need to open new discussions in the relevant discussion channel on the consultation platform that talks about accessibility and diversity of Internet.

Engineroom Workshop Report Topic	SpeakNGI.eu Action
Trustworthy Online Media and Information Ecosystems	Hyper-connected Sociality is the relevant discussion channel that talks about the same issues and challenges; as this topic is very important for the future human-centric internet and can affect several human values therefore more and more community involvement is solicited.
Online Identities and Trust	Although very important, this topic to date has gained very little attention of the participants in the consultation platform. There is need to involve more technical and social community in this discussion.
The Right to Opt out and Self- Govern	There is no discussion channel that exactly matches with this topic. A new discussion channel will be opened to discuss the issue of self-governance, informed consent, right to opt-out and right to tinker.
Cyber-security and Resilience	This issue is widely discussed by the participants of the consultation platform and holds a good match with the recommendations and challenges discussed by the workshop participants. No further action is required.

1 Introduction

1.1 Purpose and Scope

The SpeakNGI.eu Consultation Platform takes a top-down approach to eliciting knowledge and requirements concerning the Next Generation Internet in the short, medium and long term through a user generated content approach. The Engineroom project starts with a bottom-up approach through data analysis to discover the broader topics that are of main concern to researcher, policy makers and citizens. These broad topics are called “umbrella topics”. To get more fine-grained discussions around these topics, Engineroom organised a workshop in March 2018 with a broad representative set of stakeholders with the goal to further discuss and prioritise these topics. The outcome of this workshop was a report that provides an analysis of the workshops discussions; a short report of take-aways can be found on the NGI.eu web site (in the news section) and a public version of the report will be available at a later date on the NGI.eu web site. This current deliverable carries out an overarching analysis between the contents of the SpeakNGI.eu project (summarised in D2.2, First Consultation Process Report) and the Engineroom report of their event.

1.2 Structure of the document

The document is organized as follows:

- Section 2 provides a brief overview of the current contents of the SpeakNGI.eu Consultation Platform. There is a more detailed discussion of this in D2.2, First Consultation Process Report, and also through the weekly Summary Reports available from the website.
- Section 3 gives a short analysis of the Engineroom workshop report. Three activities were undertaken during the workshop and each is described here. The main focus, however, is where each of the umbrella topics were discussed as general thoughts, challenges, opportunities and examples.
- Section 4 compares the workshop outputs with the current content on the consultation platform and the expected knowledge that the workshop results can be used to augment the Consultation Platform and its Knowledge Base.

1.3 Relationship to other project deliverables

This deliverable builds on D2.2, First Consultation Process Report, as it compares the result of that deliverable with the Engineroom results to date. The outputs of this document feed into the Consultation Platform and as such will influence the outputs of D2.3, Intermediate Consultation Process report. A revised version of this deliverable will be completed in month 16 as D3.6.

2 Summary of Consultation Platform Results

The NGI Consultation Platform offers an opportunity to the users from all walks of life to join the NGI community, participate, share and discuss ideas with each other. It is an ongoing process and with the help of surveys, content curation, and open discussions in various available channels from the community, the challenges and opportunities for a human-centric internet are becoming more visible.

There are 17 discussion channels on the consultation platform with 93 open discussions from around 250 registered users, of which more than 95% users are from EU countries. The discussions span a wider range of most of the NGI related topics.

2.1 Work Programme 2019 – An Open Internet Initiative

The most popular discussion channel is Work Programme 2019 – An Open Internet Initiative that contains 16 open discussions. This channel helps to identify the challenges related to the values and topics of which the users think should be addressed in WP-2019. These discussions also propose potential solutions to address such challenges and also help to identify the gaps that need to be filled by research and innovation projects within this topic area. Following are some of the most popular topics which are part of this discussion channels:

1. Resilient and green Internet.
2. Verification, accountability and automation mechanisms for the NGI.
3. Optimisable, extensible, reusable and reliable open hardware.
4. End-user friendly transparency mechanisms.
5. Service portability and data decoupling.
6. Highly available, resilient and robust internet infrastructure components.
7. User empowerment through freedom of choice
8. Unbiased and privacy-respectful discovery of content and services
9. Improving Maintainability and Deployability.
10. Securing end-user rights, protection and reputation.

In the other discussion channels, Internet resilience, responsible artificial intelligence, trustworthiness and privacy are the most discussed topics. The challenges associated with these topics and research gaps as highlighted by the users of the consultation platform are given below:

2.2 Internet Resilience

There are several potential threats that could challenge the internet operations. These threats are 'Force majeure' (Natural disaster, Man-made disasters, Adversary AI), 'Technological' (Cascade of system failure, Spillover from inadequate isolation/segmentation), and 'Human intent' (Cyber warfare and cyber conflicts, Industrial espionage, Industrial sabotage, Pervasive surveillance and Malicious big data). The internet needs to be highly resilient and should be able to cope with many parts of this modern threat landscape. Whenever a new protocol is developed or existing protocols are modified, threats to their security should be evaluated.

2.3 Responsible Artificial Intelligence

Is AI a real threat to human beings or is it just a myth? Many influential figures have voiced concerns over the potential threats of undisciplined AI, describing AI as an existential threat to human civilisation and calling for its regulation. They believe that AI is far more dangerous than nukes. On the other hand, some say that AI is not really scary. They argue that it is improbable for an AI system to achieve consciousness -- the ability to think about oneself as an object and self-direct action. Machine learning is achieved by training a machine using millions of bits of diagnostic information in order to teach the machine how to do and what to do in a certain situation. The machine can only do what it is programmed for. However, participants in this discussion channel unanimously agreed that

legislation is needed in order to allow automated machines to work in vulnerable environment e.g. driverless vehicles.

2.4 Privacy and Trustworthiness

The next generation internet will be comprised of the billions of sensors and AI based devices, which are going to be incorporated everywhere in our digital environment; therefore it is important to identify the challenges related to privacy and trustworthiness. There is a need to develop robust and easy to use technologies to help users increase trust and achieve greater control when sharing their personal data, attributes and information. People should have the right to know who is collecting and controlling their data.

2.5 Decentralised Data Governance

The focus of discussions is on how disruptive technologies and innovations from small players can be given space, and freedom and exposure to demonstrate their potential. Monopolies from large corporations needs to be addressed and somehow controlled in the NGI. New regulations are needed to promote diversity pluralism and freedom of choice without compromising the services the incumbents provide that are so popular with the general public.

2.6 Socio-economic and Legal Considerations for NGI

Billions of connected devices, ubiquitous connectivity, increased bandwidth and abundance of sensors make it necessary for governments to enhance their industrial policies and consumer protections frameworks. This framework should incorporate the cultural considerations that might impact IoT development. In the future Internet economy, the use of IoT and artificial intelligence will increase the need to be vigilant about transparency and accountability in decision-making and governance. With the increase in the more complicated relationships between public and private sectors, transparency and accountability will also be needed to understand and manage. The participants of the consultation platform continuously emphasise the need for the acceleration of the legislation process in order to keep pace with the technological developments.

3 Summary of Engineroom Workshop Report

On March 21st 2018, the Engineroom project ran an expert workshop in London to support the establishment of a research agenda for the Next Generation Internet. There were 54 participants in the workshop from a wide ranging background representing a full mix of stakeholders.

The workshop was presented in three distinct sessions. The first session concentrated on the future of the internet in broad terms asking how we can reimagine the internet in support of the human value proposition of the NGI. The second session was a set of more focused and practical discussions identifying the key supporting technologies and the social issues that underpin this vision of the future internet. These discussions centred around nine “umbrella” topics which emerged from Engineroom’s topic identification process. The third session had the goal of prioritising the topics discussed in the second session.

A short report of take-aways from the event can be found on the NGI.eu web site (in the news section) and a public report of the event will be available at a later date on the www.ngi.eu website. A brief summary of the outcomes of each of the three sessions held during the event follows.

3.1 Activity 1 – What should the future internet look like

In this opening session, participants were asked to write down values on post-it notes which they felt should be drivers for a human-centric internet. Figure 1 shows an aggregation of all the values expressed by the participants.

Access to personal data	Avoid fake news	Communal	Democratic (2x)	Freedom (x2)	Trust-worthy (x3)
Account-able	Civic and Public	Community power	Distributed	Fun!	Knowable
Adaptable	What it was initially meant to be	Completely open as it first started	Diversity	New standards	Non-tracking
Adjusts to societal changes	Bottom-up	Convenience vs. privacy (x3)	Equality	Gives me knowledge	Nurturing
Agency	Colla-boration	De-centralised (5x)	Dignity for everyone	Human dignity	Off-grid and off-grid networks
Anonymous	People-powere d internet governance	Informed consent	Free (x4)	Inclusive	Open (x3)
Avoid dis-information	Insightful	Internet sovereignty	Inter-operable	Liberty	Maintain-able
Right to Privacy	People-centric (x2)	Privacy (x2)	Secure	Public good	Public-private co-regulation
Balance between centralised and decentralised	Non-advertising business models	Promoting self-agency in the world	Smart shouldn't mean surveillance!	European version of privacy that enables better, fuller life online	Tech solutions (learn from cookie warning disaster!)
Transparency (x4)	Trust (x3)	Value-driven but not free	Arms-length regulatory intervention	Verifiable	Sustainable

Figure 1: Aggregation of values identified by participants in the workshop
(source: Engineroom Deliverable D2.5)

The participants then clustered these identified values into logical groups. These groupings were identified as freedom and openness, equality and inclusiveness, supporting the public good and communities, trust, transparency, ownership and “tinkerability”.

3.2 Activity 2 - A vision for the future internet: which challenges ahead?

Here, we focus on the workshop discussions around the nine umbrella topics identified. Those topics are:

1. A Sustainable Internet.
2. Decentralising Power.
3. Internet and Data Sovereignty.
4. Ethical AI and ML.
5. A Safe, Accessible and Diverse Internet.
6. Trustworthy Online Media and Information Ecosystems.
7. Online Identities and Trust.
8. The Right to Opt out and Self-Govern.
9. Cyber-security and Resilience.

For each of these topics the four distinct areas of discussion were elicited:

1. General thoughts.
2. Challenges.
3. Opportunities.
4. Examples.

Below, we provide a summary of the results of the nine topic discussions. A more detailed discussion can be accessed through the public report.

3.2.1 A Sustainable Internet

Described as: *The energy consumption and environmental impact of the core internet infrastructure and emerging technologies.*

General thoughts

- Should this topic be **framed** around Europe or is this a global effort?
- Are there **limits** as to how Europe can drive this global topic?
- Perhaps the **role of Europe** can be as an influencer and regulator.
- Sustainability should be a **design** concept rather than an afterthought.
- Primary focus should be on **specific technologies** that have high environmental impact (e.g. blockchain).

Challenges

- The **cost of sustainability** is a barrier for start-ups.
- There exists a **lack of data** to make sensible decisions about specific technologies, the value chain and the choices with new deployments.
- There exists a **gap in sustainability perceptions and attitudes**.
- Corporate **lobbying power** makes it difficult to pass legislation.
- There exists a **policy gap** between toolkits and standards.

Opportunities

- **Website optimisation** can reduce energy.
- It was suggested that **Eastern European** countries might be more open to sustainable approaches in the internet.
- There is a scope to increase **skills and knowledge** among citizens.
- Harnessing the **circular economy** to make the internet more sustainable. Improving repair, reuse and recyclability of digital products.
- **Falling costs** in renewable energy.

Examples

- Hydro 66, Bulb, Furtherfield, citizen lobbying

3.2.2 Decentralising Power

Described as: *Sustainable business model without monopolies, democratising internet governance and creating a level playing field.*

General thoughts

- How to break the **current concentration** of power paradigm?
- Finding **alternative business models** and challenging current models is also an **awareness** challenge.
- Is this a challenge of **regulation** or **economics**?
- What incentives for **ethical-by-design**?
- A need to empower **platform cooperativism** and the **FOSS** movement.
- Promotion of standards to challenge lock-in, such as **data portability** and **interoperability**.

Challenges

- **Lack of (fit-for-purpose) regulation.**
- The **speed of regulation** lags behind technology innovation in the internet.
- A difficulty in receiving **funding** for alternative solutions.
- How can we give citizens a **voice** in choosing services?
- How can we **educate** citizens about the dangers of the current models.
- There is a **complication of enforcement** in decentralisation.

Opportunities

- Leveraging the **regulatory power of the EU.**
- In addition to regulation we should remember to **build supporting technology.**
- There is already a strong ecosystem in **platform cooperativism** and this should be supported.
- Can be progressed by **strengthening the branding and identity** around ethical technology.

Examples

- Finance Innovation Lab, the DECODE project, Hoe Street Central Bank, Furtherfield

3.2.3 Internet and Data Sovereignty

Described as: *Currently a lack of control over personal data. Decentralised data governance. New standards around data portability and interoperability.*

General thoughts

- Ambiguity around the term “sovereignty”, maybe we should talk about **agency**.
- Not only focus on empowering individuals but also at a **collective and community level**.
- Be aware that with **control** we also bear **responsibility**.
- Risks and questions about **consent and traceability** need to be addressed.

Challenges

- How to make data **understandable** and attractive for humans.
- **Lack of data portability**
- **Lack of plurality** due to concentration of data.
- As privacy becomes a commodity, there emerges a challenge on **inequality**.
- **Data boxes** giving control back to users are difficult to execute **securely and efficiently**.
- How do we build **trust** in leveraging data sharing for **social good**?

Opportunities

- **Data commons models** empower citizens in controlling their own data.
- Requirement for tools providing **transparent and accessible interaction**.
- Data commons models allow for a more **pluriform** landscape.

- **Free and Open Source models** should be promoted at a European level.

Examples

- Indigenous communities in South Africa and Australia, the DECODE project, BBC Databox, MyData conference.

3.2.4 Ethical AI and ML

Described as: *Embedding European values in AI development. Transparency and algorithmic accountability. Standards. Resilient and safe AI tools.*

General thoughts

- Is there a **universal set of values**?
- These principles need inclusion at design stage, **retrofitting will not work**.
- We need to go beyond **western thinking of ethics**.
- We need **RRI (Responsible Research and Innovation)**, but how can this result in meaningful **design principles**?
- There is a need for **ethical venture capital**.

Challenges

- AI is currently very “male and pale”. How can we ensure **diversity** in the future.
- Due to the limited pool of expertise in this area, we need to mitigate against **talent drain**.
- Larger companies have a distinct advantage in this space. We require **competition policy** to address this challenge.
- There is a need to **raise public awareness** about the risks associated with AI and ML.

Opportunities

- The **GDPR** provides an opportunity to reshape the rules around data gathering by companies.
- Post-Cambridge Analytica, there is an opportunity to **raise awareness** around the dangers to citizens in this space.
- Europe is a leader in **regulation** and this can be leveraged to an advantage.
- By encouraging education in ML we can provide **training and attract talent** to this space.

Examples

- Fairness, Accountability and Transparency conference, Public Service Databank, DeepMind/

3.2.5 A Safe, Accessible and Diverse Internet

Described as: *A safe internet for vulnerable groups and individuals with diverse voices and tools that promote civil discourse. Access for all and accessibility by design.*

General thoughts

- We need a **clarification** of what is meant by safe and unsafe.
- In terms of vulnerable groups, it should be noted that **we are all vulnerable in some way**.
- In terms of values such as diversity, whose **morality** defines these values?
- It is important that **different identities** are represented on the internet.
- There is a **lack of awareness of the real statistics** surrounding diversity in the internet. There is a **lack of transparency** among key agents.

Challenges

- How do we protect groups without being **patronising**?
- Making the tech industry more diverse is also about **changing narratives** as well as training and removing bias
- The existing **TCP/IP** requires rethinking to address identity and online verification.
- How can we make an internet that **supports a lot of different identities**.

Opportunities

- An opportunity is to **educate** young people in using the internet in a safe way.

- There already exists a strong **public interest** in issues around diversity. This is an opportunity to effect real change.
- We need to offer more **direct ways** into the tech industry.
- It is important that we **embed social scientists** into the process.

Examples

- The dark web, Polls, Citizen Advice live dashboard, BeApplied, Monzo, DotEveryone.

3.2.6 Trustworthy Online Media and Information Ecosystems

Described as: *Pluralistic and sustainable media ecosystems. Ameliorating the weaponisation of information. Alternative community-owned social media networks. Maintaining a representative online collective memory.*

General thoughts

- How do we **empower communities** by providing citizen focussed tools to create their own narratives and share information?
- It is more than just a technical problem, it is above all a **social problem**.

Challenges

- To address the issue of “fake news” we require more **traceability** of information.
- There is a need for **divergent incentives** in the public and private sectors.
- Quality journalism is expensive and **sustaining alternatives is difficult**.
- In times of extreme polarisation how do we **rebuild trust**?

Opportunities

- An interesting opportunity in verifying information could be **blockchain**.
- **Reputation management** systems can help rebuild trust in information.
- We can leverage **education** in providing citizens with skills around information verification.

Examples

- Wikitrune, Gobo

3.2.7 Online Identities and Trust

Described as: *There is a need for secure online identity verification and management system that can replace the trustless system with trust-enhancing solutions which would be alternatives to codifying trust through reputation systems.*

General thoughts

- Instead of various identities for each individual issued by various governments, **federated identities** will enhance trust, security and reputation.
- **New identity formations** are in place which contain characteristics from governments, business world and individuals e.g. World Identity Network, ID2020, YouPort etc.
- **E-Estonia** is a great example and an important source of inspiration that makes Estonia as the world's most sophisticated digital government/economy.

Challenges

- Instead of choosing good and favourable processes, we used to select what is more convenient. **Complexity of convenience** is a big challenge against change.
- **Decentralised identity systems** need some sort of verifiability or legitimacy from a wider community.
- Europe needs to look for an **alternative, realistic, and optimistic vision** which should revolve around immutable, and trustworthy identity systems.

Opportunities

- Europe needs to benefit from the world's most sophisticated identity and e-government system (**e-Estonia**) of Estonia and scale it on a European level.

- Europe-wide identity management system makes a more **frictionless single market** and would solve a lot of economic issues.

Examples

- **Alice** is a platform that brings transparency to social funding through blockchain technology.
- **Yoti** is a London-based technology company on a mission to become the world's trusted identity platform.

3.2.8 The Right to Opt out and Self-Govern

Described as: *Each individual has the right to opt-out and right to tinker. Self-governing models for online ownership are needed for individuals and communities.*

General thoughts

- Besides focusing on **individual rights**, there is a need to focus on **collective data use**. What does gathering data empower us to do as a community?

Challenges

- **Informed consent** needs to make more complex through **passive tracking**, for example, using **IoT devices**.
- Without **data literacy** among users and **strong regulatory frameworks, decentralised models** will be incredibly hard to make work.
- **Structural inequalities** of power allow tech companies to gather individual's data without knowledge and consent.
- We need to move from individual rights (to privacy, capacity to consent) towards discussions on data that are more **collective-oriented**.
- **Legal black boxes** around Intellectual Property make it hard to tinker with devices. We need an equivalent "**fair use**" for Europe!

Opportunities

- By using currently available digital tools and **reimage** them, more public ownership models can be built.
- **Decentralised model** need to be explored further
- **Pay-as-you-go models** can be built for using internet services.

Examples

- Community owned **Finsbury Park wind-powered blockchains**, allow deliberative decision-making about future trajectories.
- **BBC's Databox** can be used as model for facilitating and using personal data for collective benefits.
- **DuckDuckGo** is a search engine that does not track its users.

3.2.9 Cyber Security and Resilience

Described as: *There is a need for secure internet infrastructure and protocols which are resilient against cyber-physical attacks with future-proof encryption.*

General thoughts

- The **incentives of actors** in cyber security need to be **realigned**.
- There is a **trade-off** between **resilience** and **efficiency**. Everything is currently optimised for efficiency which is not suitable for cyber security in the long run.

Challenges

- **Cheap technologies** are not necessarily secure because they cost less. For example webcams and other such kind of devices can be turned into nodes in botnets as happened with the **Mirai botnet**.
- **Cybersecurity is seen as very complex**, so people tend to disengage. People need to take this issue very seriously.

- **Lack of accountability and regulation, and insufficient public awareness** leads to higher risk of cyber threats.
- New **business models** are needed which include incentives to put cyber security and resilience at the core of the products.
- Need **new regulation**, for example the EU's upcoming NIS directive, equivalent to the GDPR but for cyber security and CNI.

Opportunities

- European tech should be known to the **secure-by-design**. Europe has a real opportunity and potential in developing secure technology.
- This will also be an opportunity to **bring back hardware production to Europe** and to **set global standards**.
- There is a good opportunity for European start-ups to fill the gap in the market looking at **tamper-proof ledgers**, and other emerging solutions.

Examples

- **Equifax** (example of what not to do!) was a massive data breach caused by shoddy security standards.
- **Bitcoin mining in websites** (new type of crime!) without consent by the user, who inadvertently give up their computing power (through JavaScript scripts).
- **Shopify** has been working closely with small retailers to collaboratively build safer systems.

3.3 Activity 3 - Prioritising the key challenges and topics for the future internet ^[1]_[SEP]

For the third session of the day, each table was asked to prioritise 3 of the umbrella topics discussed in the previous session. There were six groups and each group provided the reasoning behind the decision. The two topics with the most groups prioritising were **Decentralising Power** and **Ethical AI and ML**. How the groups prioritised the topics can be seen in Table 2.

Table 2: How each of the six groups prioritised the umbrella topics

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Total
1 A Sustainable Internet	X			X			2
2 Trustworthy Online Media and Information Ecosystems							
3 Decentralising Power	X	X	X	X	X		5
4 Online Identities and Trust	X					X	2
5 Internet and Data Sovereignty	X			X			2
6 The Right to Opt out and Self-Govern	X						1
7 Ethical AI and ML	X		X	X	X	X	5
8 Cyber-security and Resilience	X	X			X		3
9 A Safe, Accessible and Diverse Internet		X	X			X	3

4 Analysis and Alignment of the Workshop Results with the Consultation Platform

4.1 Overview

Here we provide a comparison between the outputs of the Engineroom workshop and the current content of the SpeakNGI.eu Consultation Platform and Knowledge Base. Table 3 shows the result of this analysis.

Table 3: Engineroom workshop outputs compared with SpeakNGI.eu consultation platform

Engineroom Workshop Report Topic	SpeakNGI.eu Consultation Platform Channel	Comparison between workshop outputs and Consultation Platform and Knowledge Base contents
A Sustainable Internet	There is no dedicated channel in the consultation platform	There is no specific/dedicated channel in the consultation platform that addresses the sustainability of the internet with respect to energy consumption and environment protection. However, within different channels there are a number of discussions which can be related to the energy efficiency, resiliency and sustainability of the internet and associated technologies. The platform participants in such discussions believe that optimal resource consumption and minimisation of carbon emission is a great challenge for the Next Generation Internet. Data centres and networking devices consume significant amount of energy. It is therefore imperative to improve energy efficiency, both locally and at the wider internet level. Research is needed to figure out the alternatives to improving energy efficiency. This will ensure sustainability of the internet and of the economy relying on it.
Decentralising Power	<ul style="list-style-type: none"> • Open Internet Initiative • Inclusive NGI 	<p>This is very important and popular topic among the NGI related community represented on the consultation platform. There are at least 3 discussion channels in the consultation platform which talk about democratising internet governance and net-neutrality. Engineroom and SpeakNGI.eu both have a consensus on the empowerment of every citizen, from all walks of life, to fully take part in the digital single market. The Next Generation Internet will need to empower users, including the most vulnerable or challenged, to have access to the same digital opportunities, in forms that are accessible, perceivable and understandable by everybody.</p> <p>Most of the discussions about decentralised governance in NGI related documents are focused on regulatory and policy perspectives; however it is time to look into ways to engineer new network architectures as a way to re-address the balance of power held by a few global aggregators. Furthermore, governments have to keep up the regulations with the speed of change in the internet space.</p> <p>A human-centric internet is necessary which can support the values of openness, co-operation across</p>

Engineroom Workshop Report Topic	SpeakNGI.eu Consultation Platform Channel	Comparison between workshop outputs and Consultation Platform and Knowledge Base contents
		<p>borders, decentralisation, inclusiveness and protection of privacy. Users need to be given reasons to increase the trust in the internet providing more transparent services, more intelligence, greater involvement and participation, leading towards an internet that is more open, robust, dependable, more interoperable and more supportive of social innovation.</p>
<p>Internet and Data Sovereignty</p>	<ul style="list-style-type: none"> • Decentralised Data Governance • Privacy and Trust Enhancing Technologies 	<p>There is a considerable fear that citizens' privacy is being eroded by the exploitation of citizens' personal data through profiling, and citizens have no control over this. The internet community is concerned that the dominators of the Internet economy; GAF A (Google, Apple, Facebook, Amazon), are using and selling our personal data. There is a strong feeling about the right to know who had collected our personal data and who controls it. As of 25th May, 2018, GDPR is in effect and this is seen as a great opportunity to improve the protection of users' privacy.</p> <p>It is difficult for European start-ups to compete with GAF A incumbents as they are at a dominant position. There is a need to create alternative business models and infrastructure to support alternative solutions to the current centralised service offerings.</p>
<p>Ethical AI and ML</p>	<ul style="list-style-type: none"> • Responsible AI 	<p>This area of discussions concerns applications of AI whose actions need to be explainable and governed from both a legal and ethical standpoint because they are either safety critical or impact the lives of citizens in significant ways.</p> <p>The major concern about AI is whether and how can an AI algorithm be accountable for its actions. The NGI community agrees that there is a responsibility gap for the AI systems and that the algorithms need to be able to explain their decisions. Research and discussion involving multidisciplinary teams from the legal, sociological and technical domains is needed to provide the answers for ethical and legal questions raised in the Engineroom workshop as well as by the NGI community in the consultation platform.</p> <p>Furthermore, it is important to have an ethical framework in place for artificially intelligent and autonomous machines. The technology needs to align with human values, and that ethical dimensions must be prioritised at every stage of the design, development and deployment of AI systems. There is a need for focused research and effective governance structures to make sure AI technologies create opportunities and not harm.</p>
<p>A Safe, Accessible and Diverse Internet</p>	<ul style="list-style-type: none"> • Inclusive NGI • Socio-economic and Legal 	<p>The need for accessibility by design does not just benefit people with disabilities but enables inclusion of other social groups too. The next generation</p>

Engineroom Workshop Report Topic	SpeakNGI.eu Consultation Platform Channel	Comparison between workshop outputs and Consultation Platform and Knowledge Base contents
	<p>Considerations for NGI</p>	<p>internet need to change the nature of education and learning so as to empower the many, not just the few, including the most vulnerable users. We need to teach young people how to use the internet in a safe way, and prepare them for the complexity that comes with their interactions online. Technology development is currently dominated by engineers and computer scientists. If Europe wants to take the lead in developing ethical tech (which also makes sense from an economic perspective), we need to embed social scientists into the process who understand the actual societal impacts and implications of new innovations.</p> <p>The European Next Generation Internet initiative will help unleash these opportunities through the Work Programme ICT-30-2019-2020. It will do this in two ways: through an Innovation Action rolling out a Digital Learning Incubator and a Coordination and Support Action in the area of Digital Learning. Among other things, the Innovation Action will comprise multi-stakeholder alliances that can jointly achieve fast-paced breakthroughs in personalised and inclusive learning online. The Coordination and Support Action will pinpoint emerging research challenges from digital certification of learning outcomes and blockchain technologies and their uptake for a more inclusive and personalised learning experience.</p>
<p>Trustworthy Online Media and Information Ecosystems</p>	<ul style="list-style-type: none"> • Hyper Connected Sociality 	<p>There is a fear that the internet becomes an “echo chamber” where profiling of citizens, “fake news” and citizens’ own preferences and social groups distort the information citizens can see, due to biased opinions or sympathetic views that reinforce entrenched views. Multidisciplinary research is needed in order to answer questions relating to the promotion of information diversity and truth in the Internet.</p> <p>To better understand the “fake news” problem, we need to understand the origin of what we perceive as false or misinformation. We need to be able to identify “patient zero”, which first spread a piece of information- if it was a Twitter bot or known propaganda website, we should evaluate a fact differently than if it comes from a more typically credible source.</p> <p>Blockchain could be an interesting tool for verifying the validity of a news story (or rather, codify which information is trustworthy and “fact-checked”). Using Blockchain, we can also see the original source of a story or piece of information online.</p> <p>Moreover, the abuse of Internet technologies can cause threats to democracy and liberty. The authoritarian governments wish to use the</p>

Engineroom Workshop Report Topic	SpeakNGI.eu Consultation Platform Channel	Comparison between workshop outputs and Consultation Platform and Knowledge Base contents
		<p>capabilities of the internet to exert controls over citizens and keep their data at home to ensure access.</p> <p>Promoting inclusiveness (e.g. broadband for all) and diversity (e.g. heterogeneity and multidisciplinary discourse) is a possible partial solution, but citizens cannot be forced into diversity. All citizens must have equal rights in the digital society. Multidisciplinary research is needed in order to answer questions relating to the state control and liberty.</p> <p>It should be noted that the European Commission is tackling fake news with a multi-stakeholder forum to tackle disinformation, a EU-wide Code of Practice on disinformation to be published in July, 2018, with a view to producing measurable effects by October, 2018, and an independent EU network of fact-checkers, to be followed by a secure European online platform on disinformation, and a study to examine the applicability of EU rules and possible gaps in relation to the identification of online sponsored content with report in December, 2018. This was presented by Ms. Anni Hellman of the Commission at the NEM General Assembly on 30th May, 2018.</p>
Online Identities and Trust	<ul style="list-style-type: none"> Discovery and Identification Technologies 	<p>Global identities which combine the characteristics from governments, the business world and individuals should be the essential part of the trustworthy Next Generation Internet. These identities will replace the multiple identities issued by various governments and businesses and will enhance the level of trust.</p> <p>Europe is stuck between the US (data lakes, big tech) and Chinese (state-governed) internets. Europe needs an alternative, realistic, optimistic vision which should revolve around identity management and creating in a way a walled garden of sorts managed by immutable, trustworthy ID systems. E-Estonia project can be scaled on a European level, building on this expertise to give every European an online equivalent of their passports- creating a safe zone of 500 million. Blockchain could solve a lot of issues that currently exist around identity management, and should be harnessed for this purpose.</p>
The Right to Opt out and Self-Govern	There is no dedicated channel in the consultation platform	<p>Although there is no specific/dedicated channel in the consultation platform that addresses this topic there exists many discussions across the current channels Users have discussed self-governance, decentralised models and right to opt out.</p> <p>Decentralised or self-governance models are solutions that needs to be explored further, particularly if we get public bodies on board to help with shaping and maintaining them. Public education</p>

Engineroom Workshop Report Topic	SpeakNGI.eu Consultation Platform Channel	Comparison between workshop outputs and Consultation Platform and Knowledge Base contents
		programmes need to exist in parallel. Because without strong data literacy among users, these models will be incredibly hard to make work. Focusing on strong regulatory frameworks more focused on collective frame not individual could be a better way forward.
Cyber-security and Resilience	<ul style="list-style-type: none"> Privacy and Trust Enhancing Technologies 	<p>Cybersecurity will be the most pressing challenge of the next decade. Inadequate management of cyber threats will put users increasingly at risk, undermine trust in the Internet and jeopardise its ability to act as a driver for economic and social innovation. Disproportionate government responses will threaten freedom, and contribute to a climate of fear and uncertainty.</p> <p>There is a need for the development of resilient and secure internet infrastructure and protocols which are resilient against cyber-physical attacks. Achieving resiliency would have adverse effects of efficiency. These are opposing goals and therefore research is needed to balance the trade-off between these two.</p> <p>Furthermore, new federated regulations and treaties for information sharing would be required. Because effective action and building network resilience against cyber-threats will only come through information sharing, strategic thinking and collaborative efforts among stakeholders.</p>

4.2 Next Steps

Finally, in Table 4, we outline a set of concrete actions that SpeakNGI.eu will perform as a result of this in-depth analysis and comparison of the Engineroom workshop results with the content of the SpeakNGI.eu Consultation Platform and Knowledge Base. This will ensure better alignment between the findings from Engineroom and a place for enabling discussions in the NGI Consultation platform.

Table 4: Next steps resulting from the analysis

Engineroom Workshop Report Topic	Action
A Sustainable Internet	The outcomes of the workshop related to this topic results in the generation of a new discussion channel in the consultation platform that would offer an opportunity to the participants to discuss sustainability of the internet with respect to energy consumption and carbon emission.
Decentralising Power	There are two discussion channels in the consultation platform that have the mandate to discuss the power dissipation from top to bottom level so as to empower citizens from all walks of life, to fully take part in the digital single market. At least one of the channels can be renamed to fully align with the workshop report topic.
Internet and Data Sovereignty	There are two discussion channels in the consultation platform that have the mandate to discuss this topic. Both discussion channels have mutually exclusive objectives and therefore no action is needed.

Engineroom Workshop Report Topic	Action
Ethical AI and ML	Responsible AI is the discussion channel that offers the discussions about with exactly the same topic. This is one of the most popular channels on the consultation platform. No further action is needed
A Safe, Accessible and Diverse Internet	There is a need to open new discussions in the relevant discussion channel on the consultation platform that talks about accessibility and diversity of Internet
Trustworthy Online Media and Information Ecosystems	Hyper-connected Sociality is the relevant discussion channel that talks about the same issues and challenges. As this topic is very important for the future human-centric internet and can affect several human values therefore more and more community involvement is solicited.
Online Identities and Trust	Although very important, this topic has gained very little attention to date from the participants in the consultation platform. There is need to involve more technical and social community in this discussion.
The Right to Opt out and Self- Govern	There is no discussion channel that exactly matches with this topic. A new discussion channel can be opened to discuss the issue of self-governance, informed consent, right to opt-out and right to tinker.
Cyber-security and Resilience	This issue is widely discussed by the participants of the consultation platform and holds a good match with the recommendations and challenges discussed by the workshop participants. No further action is required.

5 Conclusions

The SpeakNGI.eu Consultation Platform takes a top-down approach to eliciting knowledge and requirements concerning the Next Generation Internet in the short, medium and long term through a user generated content approach. The Engineroom project starts with a bottom-up approach through data analysis to discover the broader topics that are of concern to NGI researchers, policy makers and citizens. To get more fine-grained discussion around these topics, Engineroom organised a workshop in March 2018 with a broad representative set of stakeholders with the goal to further discuss and prioritise these topics.

This report has provided an analysis of the outputs of the Engineroom workshop and compared these outputs with the current content in the Consultation Platform and its Knowledge Base.

The main conclusions of this valuable exercise are:

1. There was no significant divergence of topics under discussion. All of the topics that Engineroom has recommended for further research have also been discussed by the participants of the Consultation Platform either under their own discussions or as part of related discussions.
2. When the workshop participants prioritised the topics under discussion, the two that received the highest votes were Ethical AI & ML and Decentralising Power. This prioritisation concurs with the popularity of these topics on the Consultation Platform.
3. The analysis has provided the Consultation Platform team with some useful points for discussion and these will be added to the appropriate part of the Consultation Platform as the next step.
4. The convergence of topics discovered by different projects and indeed the popularity and prioritisation of topics using different methodologies to garner this knowledge strengthens the case for these topics as these different methodologies are generally arriving at the same conclusions.
5. This exercise has also been valuable to identify best practices that could be showcased through the Early Adopters Club.