

Citizen-driven open consultation on Next Generation Internet

WHITE PAPER THE NEXT GENERATION INTERNET THROUGH THE LENS OF SpeakNGI.eu MULTI-STAKEHOLDERS

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SpeakNGI.eu, Consultation Platform, consultation.ngi.eu
and Discussion Channels, consultation.ngi.eu/channels

NGI European Champions Panel, consultation.ngi.eu/ecp

NGI Early Adopters Club, consultation.ngi.eu/early-adopters-club-list

NGI Knowledge Base, consultation.ngi.eu/knowledge-base

EXECUTIVE SUMMARY

Europe is investing in technologies like 5G, artificial intelligence (AI), blockchain, interactive and immersive technologies and cybersecurity. These investments will help Europe stay at the forefront of game changing developments. Alongside this, we need to prioritise privacy and security by design and protect user privacy, security and control of their own data. Many of the technologies driven by the distribution of computing power are radically redefining business processes, our economy and society.

The overarching goal of the white paper is to show how during the experience of the SpeakNGI.eu project it has been possible to grasp the opportunities to look at emerging and merging technologies through the lens on various stakeholder groups, while keeping a close eye on the various key drivers for the development of a human-centric internet.

This white paper covers NGI-related technologies and human values through the lens of the NGI community, European Champions Panel, Early Adopters Club, and external experts. Each perspective comes from contributions posted in the discussion channels on the NGI Consultation Platform, zooming in on research challenges and priorities, looking also at relevant standardisation efforts. The selected posts aim to reflect the diversity of the viewpoints elicited through online and face-to-face discussions.

Some relevant policy recommendations are provided, on the fundamental role of 'Technology radars', on 'internet policy and civil society', on the need of stronger connections with cybersecurity research and of co-ordinated investments in 5G and AI, as well as on the option of small-scale funding and innovation vouchers to further build the NGI vision, also through positive initiatives such as the Early Adopters Club.

Finally, the Appendix outlines the diverse engagement mechanisms and levers that SpeakNGI.eu has used around its consultation platform, showing the added value of pursuing a multi-stakeholder approach to help realise the ambitious vision for the European Commission's Next Generation Internet.

Welcome to the Next Generation Internet and our kaleidoscope of stakeholder viewpoints.

1. INTRODUCTION

EC funding for the Next Generation Internet (NGI) is a massively important opportunity to re-image the internet driven by human values, one that ensures free societies, media, and a secure and sustainable future. One that enables liberty of identity, control over data and underpinned by ethical technologies.

Funding will support a large-scale cross-disciplinary effort. It will advance and merge key enabling technologies. Investments in NGI open calls are giving opportunities for new entrants, who benefit in two important ways: from simpler funding mechanisms and the chance to work alongside industry and specialised research institutes to develop and roll out new applications, products and services. It is helping small business and others to inspire, push boundaries and respond to challenges.

The NGI narrative is therefore about how we use these technologies to shape a better internet for everyone. This is not just about stakeholder engagement per se but about taking interactions to new levels, looking at the lenses of opportunity these technologies are bringing, also in terms of new funding opportunities as an important motivational mechanism.

It is an opportunity to create and grow new businesses while tackling the most relevant technological challenges so Europe can turn the tide and give control back to ordinary people. It is about enabling the shift from the extreme corporate centralisation of the internet we have today to one that is more open and inclusive, safer, sustainable and trusted.

We are at a tipping-point, where we can only create better solutions to old or emerging problems by working together and including everyone in the discussion. By bringing together diverse stakeholders, we can collectively shape the future internet, from multi-disciplinary researchers, IT operators and service providers, hi-tech start-ups and SMEs, IT clusters, to internet policy makers and activists, national and EU policy makers, civil society and standards organisations.

2. METHODOLOGY

Digital transformation is about applying innovative technologies to radically change processes, customer experience, and value. Digital transformation allows organisations to become Digital Native Enterprises that support innovation and digital disruption rather than simply enhancing existing technologies and models.

The chosen methodology for this white paper is:

- › Using the IDC's definition of innovation accelerators under investigation in the context of 5G¹. According to IDC, the Internet of Things (IoT), artificial intelligence, robotics, 3D printing, augmented reality and virtual reality, next-generation security and blockchain are the six technologies defined as innovation accelerators, with 5G and cloud computing among the most important enablers. When combined with other platform technologies, these six technologies empower businesses and propel them towards digital transformation and growth. These technologies are therefore a central part of an organisation's strategic and tactical elements together to deliver enhanced digital experiences.

Leveraging the NGI Consultation Platform as a key mechanism for connecting innovators, sharing knowledge and promoting funding opportunities in the NGI space. The white paper selects posts in a core set of discussion channels zooming in on research challenges and priorities. Specifically, artificial intelligence, blockchain, trustworthy content and the rise of regional internet blocks. Many of the posts stem from collaborative work on NGI, such as the NGI European Champions Panel (ECP) and Early Adopters Club (EAC). As such, the posts perfectly illustrate the added value of small businesses, large companies and research teams working together to push the boundaries and shape the internet of the future.

- › Defining a core set of motivational mechanisms around NGI as levers for stakeholder engagement. These are:
 - › **Visibility and reputation-driven:** through engagement with the European Champions Panel, a set group of experts on NGI-related technologies and human values, with high visibility on www.ngi.eu and at workshops and webinars. The Early Adopters Club is another example, comprising early movers on NGI topics and technology as small companies and research teams embracing digital transformation.
 - › **Incentive-finance-driven:** through access to funding opportunities, be they large-scale research and innovation actions, or small-scale funding allocated through Open Calls. Workshops with representatives from the European Commission have given unique insights into funding priorities.
 - › **Knowledge-driven:** through insights published on the NGI Consultation Platform and its discussion channels, including content co-creation with members of the ECP and EAC, such as research challenges for trustworthy content.
 - › **Reward-driven:** Members of the Consultation Platform community contributing to the discussion channels are rewarded with badges based on a scoring system. Each post in the discussion channels earns 10 points; comments receive 1 point. Experts,

1 Work on 5G and innovation accelerators related to rollout to markets in sectors such as automotive, energy, health and manufacturing is on-going in Global5G.org, Horizon 2020, Contract N°: 761816.

including the members of the Early Adopters Club and European Champions Panel automatically earn 10 points for each contribution.

- › **Technical Finding-driven:** the NGI Knowledge Base captures curated content with add-ons such as advanced search and links with other European Commission funded initiatives. Members of the NGI community thus benefit from this valuable set of knowledge, including for future proposals under the NGI initiative.

3. ARTIFICIAL INTELLIGENCE

Responsible AI is an umbrella term for investigations into legal, ethical and moral standpoints of autonomous algorithms and applications of artificial intelligence that may be safety-critical or impact the lives of citizens in significant and disruptive ways.

The NGI Coordination and Support Action, HUB4NGI, has collected and analysed inputs into the advisory processes that determine EU support for research into Responsible AI and how innovation using AI takes into account issues of responsibility [1].

Dedicated Discussion Channel on the NGI Consultation Platform: Responsible AI. Most popular posts: *new EU Funding and Coordinated Plan for AI* [2]; *Socio-economic impacts of AI* [3]. Most recent posts: *Industry lens – 3 AI Challenges for future networks* [4].

As a peer Coordination and Support Action, SpeakNGI.eu has also investigated the future trajectory of Artificial Intelligence from diverse perspectives through its Consultation Platform. For example, SpeakNGI.eu has created posts in the Responsible AI Discussion Channel aimed at raising awareness of the new EC guidelines, which are key to addressing how AI and other technologies could influence and change how we work. Such concerns are arising from the impacts it is also having on the workforce and the economy. Other areas for compliance include ensuring all personal data generated remains private and secure.

Another post in the same Consultation Platform Channel provides a **Technology Radar** looking at on-going EU projects on AI. Its main purpose is to guide prospective proposers of research and innovation actions, as well as applicants to small-scale funding through their Open Calls, so they can see how they can help build an ecosystem that is key to overcoming the current disparate network of initiatives. The Coordinated Plan sets out to do just that, with dedicated funds for European start-ups. The SpeakNGI.eu investigation does not stop here. Here we zoom into what AI means for 5G networks and the challenges that need tackling to realise the benefits, other challenges and on-going work on standardisation.

Industry Lens: The 3 AI Challenges for future networks

The era of smart connectivity will combine AI with IoT and 5G, with potentially significant impacts on the production of future intelligent services and products. The convergence of these technologies is expected to transform how industries innovate and operate, including transport systems, smart cities, health monitoring and entertainment. Many AI applications will rely on 5G in the future, from virtual reality (VR) and augmented reality (AR) to autonomous vehicles and robotics.

One of the discussions on the Consultation Platform looks at insights from Yue Wang, Samsung UK, on the barriers to AI adoption across 5G networks. We start with a key takeaway:

When #AI in network becomes large scale, we need to consider not only how to use AI to enhance network efficiency but also how to efficiently use #AI. The reusability of data and AI modules, the synergy among them as well as with the network - scalable and deployable #AI.

Yue Wang on Twitter

In summary, major challenges are:

- › **The data challenge** - lack of relevant and mature data sets for AI in the network. This challenge requires the industry to adopt a unified approach with a common language as key to the correct interpretation of data sets from the large-scale 5G infrastructure.
- › **The reliability challenge** - lack of confidence in the reliability of the AI solution. This challenge needs a benchmark for assessing the various AI solutions, as well as validation and integration across the network end-to-end.
- › **The deployability challenge** - lack of scalability and deployability of existing AI solutions. This challenge needs the validation, integration and network deployment of AI solutions that are scalable and use unified data sets.

The key to the market using AI for 5G and beyond network operation and management is the deployability of the AI solutions IN the network. Because existing solutions are designed for specific parts of the network, problems and applications, they work in isolation and lack scalability. The industry, therefore, needs to work towards a strategy for AI solution development and scalability with unified data sets, validated, integrated and deployed in the network. Such an approach is key to improving both network efficiency and efficiently using AI with re-usable data and AI modules, creating a synergy across them and with the network. This takes us back to the need for uniform data use across the network, the use of common tools and the availability of platforms for validation and integration [5].

Lens on other future research and societal challenges

More research is needed on AI to develop solutions dealing with safety, privacy, security and trustworthiness. Pressing issues within AI include compliance with privacy regulations, tackling bias in algorithms, mitigating risks and threats with suitable techniques and methods.

We also need to tackle the societal challenges that AI poses, including compliance with privacy regulations, bias in AI algorithms, transparency, right of verification, risks and ethical issues, safety, privacy, security and trustworthiness.

In this respect, future research and innovation (R&I) actions need to look at societal readiness levels, and not just technology and market readiness levels. This is a key point also raised in SpeakNGI.eu discussions with European stakeholders working on robotics while also noting the fascination of small children (aged 5-10) on robots during the International Robotics Festival (September 2018, Pisa). In our view, more work is needed to understand the societal readiness levels across age groups, class systems and countries.

Besides this, AI needs industry collaboration across domains for applications in transport, medicine, finance, robotics, manufacturing and others should become a top priority.

Other synergies could come from AI technologies in terms of market segments, and benefits from AI, analytics, big data, the Internet of Things (IoT), among others.

Standards also have a key role to play in tackling these challenges. For example, helping to solve should solve some of the problems of future network deployment and operation with AI.

Standards Lens: Driving Collaboration on AI

- › **ETSI ENI ISG** - The **Experimental Networked Intelligence** group within ETSI is defining a cognitive network management architecture, using AI techniques and context-aware policies to adjust user offered services based on changes in user needs, environmental conditions, and business goals. ENI ISG is developing standards for a cognitive network management system aimed at delivering a metric for the optimisation and adjustment of the operator experience over time by taking advantage of machine learning and reasoning. Using the 'monitor-analyse-plan-execute' control model will enable the system to adjust the offered services based on changing conditions. The group is also considering a gap analysis of work on context-aware and policy-based standards with other Standards Developing Organisations to re-use existing standardised solutions for legacy and evolving network functions wherever possible. Its work plan also includes adding closed-loop AI mechanisms based on context-aware, metadata-driven policies to more quickly recognise and incorporate new and changed knowledge, and hence, make actionable decisions, in day-to-day-operations, as well as security and a closed loop learning policy-model [6]. This work is being monitored in the 5G Infrastructure Association Pre-Standardization Working Group.
- › Work within the **International Electrotechnical Commission (IEC)** and **International Organisation for Standardisation (ISO)** is undertaken in JTC/SC42, which has set up a systems integration committee offering guidance on AI applications to IEC, ISO and JTC1 committee. It draws on the support of committees looking into horizontal and vertical areas. As AI matures, JTC/SC42 is adopting a broad approach looking at the full AI ecosystem and beyond traditional interoperability. On top of this, it is running several projects on big data, foundational AI, AI trustworthiness that also encompasses use cases and AI governance applications [7, 8]. This work is being monitored through the CSA, STANDICT.eu and its External Advisory Board.

4. BLOCKCHAIN

Dedicated channel on the Consultation Platform: Blockchain as an Enabler of NGI.

SpeakNGI.eu has investigated blockchain from several perspectives, such as identity and privacy, as well as civil society. Here, we look at the future trajectory of blockchain with insights from research and standards.

The Researcher's Lens: Blockchain and Sustainable Growth

Blockchain is among the latest waves of digitisation enabled by the worldwide distribution of computing capacity. There are essentially two types of blockchains: permissioned (private) and permissionless (public, e.g. bitcoin). Permissioned distributed ledgers are a better match for business-oriented use cases that are of interest to industry and governmental institutions. A key public aspect of Blockchain is its value as a timestamped and chronologically recorded digital ledger type transaction that allows anyone to download the code and start mining bitcoin or take part in new network ideas built on the Ethereum platform.

Cathy Mulligan, Visiting Researcher at Imperial College Centre for Cryptocurrency Research and Engineering; Member of the **United Nations Secretary-General's High-level Panel on Digital Cooperation**; Expert and Fellow, World Economic Forum Blockchain Council, has shared her insights on blockchain and sustainable growth in the UN Chronicle [9].

- › Blockchain promises to redefine trust, transparency and inclusion across the world. Transparency comes from the participation of huge parts of the public while trust is built from the almost impossibility to record malicious entries or change transactions already processed.
- › It is arguable how well blockchain captures that notion of trust, or whether any technology can ever actually replicate what a human being thinks, feels and acts like when they trust and are trusted. These concepts are deeply human, as are the power structures within which digital solutions are built.
- › It may or may not overcome its technical and environmental challenges, but the concept of citizen-led and citizen-owned solutions to global problems has been unleashed.
- › Blockchain speaks to a deep human need to be able to trust other people, organisations and companies in an increasingly digital world though more work is needed on exactly how we prove this trust-building process.
- › Blockchain can help us organise society differently by enabling new levels of cooperation and new types of partnerships across geographical and sectoral borders. This shows us how important it is to support transparency and inclusion and what they should look like in the digital world.
- › Blockchain's focus on inclusion, trust and multilateralism is expected to continue for many decades but needs the support of governments, civil society, academia and industry.
- › Blockchain is cross-border. As such it requires a unified, multilateral approach to regulation. Civil services need to understand how their regulations may be interpreted

in code, from multi-stakeholder perspectives and thinking about laws in one country may impact people in another country.

- › It is likely that the key legacy of blockchain will be that when computing power is handed to a large part of the population—rather than solely housed in corporations—completely new solutions to old problems will emerge. In the case of blockchain, it began with a desire to see a new form of banking system, one that was truly native to the digital world we are all starting to inhabit.
- › Blockchain is a relatively immature technology, which does not exist in a vacuum. On the negative side, it may potentially create as many problems as it solves. Yet it can yield insights into emerging technologies and how we can face them head on in a rapidly changing world.
- › Blockchain is still new and will evolve many times before it can be fully integrated into society. We should not see it as a fully functional solution but as a lens on the possible. Its possibilities merit the attention of everyone. For example, users on the consultation platform have raised the issue of the Blockchain-GDPR Paradox, whereas storing personal data on a blockchain is not an option according to GDPR, since the data “should be erasable” at any point in time, which wouldn’t be possible if it was in a blockchain transaction.

Civil Society Lens: Leadership on priority issues – Champions perspectives

The International Civil Society Centre has facilitated early thought-leadership discussion amongst blockchain entrepreneurs and leaders who are currently using this technology to create social impact [10]. [Key points emerging from these discussions are:](#)

- › It is key to act now on collaborative blockchain and big data projects in organisations like the International Civil Society Centre to make our voices heard right across the globe.
- › These projects are vital for leading the way and zooming in on priority topics like data privacy and security.
- › New projects include:
 - › **Data-driven advocacy partnerships for sustainable development goals (SDGs)**, developing a data collaboration method focused on the evidence-based advocacy for the leave no one behind agenda. The idea is to use the Centre’s Leave No One Behind project as a case study on how to use big data effectively at different project stages.
 - › **Big data for impact measurement**, using various big data sets to discover new insights, creating an impact measurement tool to improve decision-making.
 - › **Plan Omega**, exploring how to establish a CSO Blockchain to improve efforts to protect and expand the civic space, mapping relevant CSO actors and technology experts to gauge the viability of building the CSO blockchain.
 - › **Cryptocurrency and CSO transaction costs**, exploring the possibilities of using an existing or setting up a new cryptocurrency for the CSO sector exclusively and verifying whether it can reduce transaction costs.

Industry and standards lens

ETSI Industry Specification Group on Permissioned Distributed Ledgers (ETSI ISG PDL; set up in December 2018) lays the foundations for operating permissioned distributed ledgers and deployment across industry and governmental institutions. The group is working towards globally applicable standards by tackling the challenges related to operation, business use cases, functional architecture, operational solutions like interfaces, APIs, protocols and information/data models [11].

5. TRUSTWORTHY CONTENT

SpeakNGI.eu has investigated trustworthy content and related challenges in conjunction with its European Champions Panel and Early Adopters during the NGI Forum 2018 [12, 13]. Here, we present their perspectives.

Champion's Lens on Semantic Data Organisation

Discussion leaders: Alessandro Bassi of ABC France and ECP member with Paul Malone, Waterford Institute of Technology and SpeakNGI.eu.

- › **Framing the issues:** Need for alternative ways of storing, understanding and releasing data based on the semantics of the data itself and the context within which the data exists. With many options available, such as cloud, device, edge etc. and data distribution, should we rely on devices or buy a cloud space somewhere? What about highly sensitive data, such as health records, and their accessibility in emergency situations? It is technologically possible to access health data in real-time and based on a specific context, but which privacy rules should apply? Could a software licence type scheme also be applied for data?
- › **Exploring the issues through a multi-pronged stakeholder discussion:** current means of storing and sharing data lacks insights into the meaning of that data, the context in which it is used, a reliable set of rules governing usage and disclosure, automated mechanisms for enforcing those rules.
 - › **Human values:** privacy; trustworthiness.
 - › **Challenges related to human values:** contextual awareness of data; organising data by meaning; automatic extraction of metadata; cloud versus location assurance; device data versus personal data.
 - › **Potential solutions:** AI to understand context; sticky policies; data licensing; personal data rules.
 - › **Known initiatives:** CocoCloud project; Creative Commons licensing; Picos; Personal Data Vaults.
 - › **Gaps:** AI to extract semantic meaning; education of Creative Commons with extension to CC type licensing; solutions to contextually manage data release.
 - › **New research and innovation:** remote/automated enforcement of data handling rules.

Early Adopter (SME) Lens on trustworthy search and content discovery

Discussion leaders: Alexandru Stan, In-Two (SME) and New European Media (NEM Technology Platform) and James Clarke, Waterford Institute of Technology, SpeakNGI.eu and NEM Steering Board Member.

- › **Framing the issues:** SMEs are working on developing content-rich applications with trustworthiness and quality of content, as well as powerful search capabilities and content exploration interfaces. In-Two is one example of usage of the NEM platform for European SMEs working on media-related technologies. Applications span events, tourism, cultural heritage. In relation to NGI, it is important to support SMEs through collaboration. Researchers need to work with SMEs to make their innovations a commercial success. European businesses are key to pushing the innovation process behind research institutes. A good case in point is the Marconi project with its excellent collaboration between research and industry on the combined fields of radio and media, with very promising results for SMEs like In-Two. It is one example of the key role that SMEs play in the NGI initiative through the value chain of innovation by continuously experimenting and quickly taking new innovations to market. Because SMEs need to come up with feasible solutions that make sense in solving real-world problems, they are very well positioned to give a guided view on how to design solutions that are “people-centric”.
- › **Multi-pronged stakeholder interactions:**
 - › **Human values:** openness, access, inclusiveness, trustworthiness.
 - › **Challenges related to human values:** trend towards echo-chambers and walled gardens in sharp contrast to the concept of an open internet. Content without proper context or with the wrong context. Raising the profile and reputation of SMEs with innovative solutions in the face of large, dominant players. Need for a peer review of reputation strategy showing customers that SME solutions are trustworthy. Trustworthiness across the entire value chain in large-scale systems, ensuring all steps are verifiable in real time, e.g. smart farming, smart pharma, to avoid one sensor with incorrect readings does not compromise the entire system.
 - › **Potential solutions:** “less is more”, e.g. social networks. Conversation versus engagement. Publishing on your own site and syndicating elsewhere (IndieWeb). Trade-offs: convenience versus privacy. Selective serendipity, i.e. enabling algorithms to step out of the models. Transparency into peer-to-peer reputation systems and increasing trustworthiness. Connecting with experimental platforms like smart city initiatives, Fed4FIRE and other experimental facilities would help raise the profile and reputation of results from the NGI work programme.
 - › **Known initiatives:** The Caprice community; European trusted cloud platform of EIT Digital, e.g. the Telecom Italia My Data Store. F-Secure Trusted Cloud Platform, which is trailing a commercially available offer of Security as a Service, which In-Two has integrated into one of their solutions to give customers secure and trustworthy content hubs, building search and discovery on top of trust content only. The pharma industry, which is working on some elements of end-to-end verification process but with more research and development required to reach maturity. The FIWARE context broker is a key component of the FIWARE platform and could help tackle the challenges of mapping content and context.
 - › **Gaps:** Ensuring content context is correct and evolving, including content lifespan, such as challenges related to the time it could take to gain reputation from today’s models; need to develop alternative ways to speed up the process for a reputable review of trusted authorities and/or certification. Ensuring there is no corruption of data anywhere in the end-to-end harvesting of data.

- › **New research and innovation:** Detailing the correctness and authenticity of the entire value chain verification mechanisms, building on work in smart pharma and smart farming. Verifying the economic and technological feasibility of using blockchain technologies to fill these gaps in such a low power-based system.

Champion's (SME) Lens on Search and Discovery – the Slovenian Interoperability Framework

- › **Discussion leaders:** Aleš Černivec, XLAB (SME) and member of the ECP with Andrea Schillaci, Trust-IT (SME) and SpeakNGI.eu.
- › **Framing the issues:** search and discovery tools from the perspective of the Slovenian interoperability and open data portal, covering security, ID management, authentication and authorisation frameworks, data sharing and privacy. Work is led by XLAB, which has extensive experience in building knowledge management services and portals. The Slovenian portal allows public authorities to publish their solutions and make them discoverable to citizens. The openness and compliant public-sector data helps build trust in them. Citizens can also develop their own solutions based on easily accessible and searchable information. Thus, openness, management, trust, and responsibility are important values for such environments, including responsibility to improve data quality, quantity and management, as well as giving citizens a single access point for easy search, analysis and linking of data. The new processes developed rely on technologies enabling search and discovery, linking, and analysis to enable easier and faster knowledge management, faster production of new content, underpinning human-centric values of the NGI.
- › **Multi-pronged stakeholder interactions:**
 - › **Human values:** openness, trust, security, transparency, responsibility, inclusiveness, awareness.
 - › **Challenges related to human values:** legislation on openness of public-sector data. Increasing trust and review. People engagement. Improved data quality, quantity and management. Education. Increased market opportunities for small and large organisations.
 - › **Potential solutions:** Distributed ledger technologies. Certifications. Micro-service oriented solutions.
 - › **Known initiatives:** Public Service Initiative (PSI). NIFO. JoinUp. Open Data Portal. ISA2. My Data Hub.
 - › **Gaps:** Usability; accessibility; business models for data; transparency on data retention; skills (human resources); sources of funding.
 - › **New research and innovation:** Distributed ledger technologies. Survey supporting NGI. Citizen consultation platforms. Semantic search. Specialised search, e.g. IoT, big data, AI.

Champion's Lens on Internet Policy Lens for Tackling online disinformation: a European Approach

Discussion leaders: Professor Jamal Shahin, Vrije Universiteit Brussel, Global Internet Policy Observatory (GIPO, www.giponet.org) and ECP member, with Sara Pittonet, Trust-IT (SME) and SpeakNGI.eu.

- › **Framing the issues:** the continuing work in GIPO, supported by SpeakNGI.eu as an NGI asset, helps connect NGI policy and technology communities. The discussions led by Jamal Shahin zoomed in on the major challenges surrounding disinformation online, most notably skills for the public; media and journalism in the public sphere; platforms and algorithms. The scale of the issues can be illustrated through simple statistics: only 2% of children have the critical literacy skills they need to tell whether a news story is real or fake while half of teachers (53.5%) believe that the national curriculum does not equip children with the literacy skills they need to distinguish between real and fake news. Key challenges range from defining liability and responsibility for online platforms and having the right tools for tackling online disinformation head-on to skills development, digital literacy, and reaching the public sphere and news/media ecosystem.
- › **Multi-pronged stakeholder interaction:** exploring possible ways forward from self-regulation, regulation, education, supporting quality journalism, non-intervention by letting new ideas enter the marketplace.
 - › **Human values:** authenticity, authoritativeness, diversity, transparency, trustworthiness.
 - › **Challenges related to human values:** sensationalism and negativity as dominant social forces. Advertising not equating to content trustworthiness, including adverts masquerading as reviews. Needs driven by large entities for their own benefit. Information overload. Lack of open/democratised algorithms.
 - › **Potential solutions:** Reputation metres for ranking information. Control (at certain times).
 - › **Known initiatives:** GIPO. Fact-checking organisations.
 - › **Gaps:** Education. Integration between technology and human intervention. Means of control.
 - › **New research and innovation:** AI-supported supervisor. Tackling human and societal impacts.

6. THE RISE OF REGIONAL INTERNET BLOCS

SpeakNGI.eu Early Adopters, Sam Butler (USA) and Joop Ringelberg (Netherlands) have connected through the Consultation Platform to create a dynamic dialogue on internet blocks. Here's what they had to say.

Early Adopters' Lens on Internet Blocs - Game of Nodes and the Rise of Regional Internet Blocs

This section gives a summary of an exchange between two SpeakNGI.eu early adopters on the consultation platform in March 2019 [14, 15].

Sam Butler, CrowdFact, "Game of Nodes"

- › In 2016, Joshua Cooper Ramo hypothesized the shift from one global internet to a system of regional internet blocs, each with distinct characteristics and values, in his book *The Seventh Sense*. In 2019, we can see that world shaping before our eyes: The American internet. Laissez-faire, hyper-capitalistic, increasing public authority for private companies, fighting to keep Net Neutrality alive. On the opposite end of the world, we have the censored Chinese internet. The international proliferation of China's biggest ventures (WePay, Alibaba, Huawei) and Google's collaboration with the Chinese government look to accelerate its development.
- › On the other side, we have the European internet. Deploying the GDPR to protect its citizens in the digital space. Holding businesses accountable when they break the rules. Admittedly, dealing with some serious threats -- see Article 11 and Article 13, but on the whole, Europe is funding innovative and human-centric efforts to create an ethical, open, and fair internet for the next generation.
- › As the strength of a network is based on the number of nodes, Ramo argues that the strength of these (presumably competing) regional internets will depend on the number of countries they have "signed on." So, MENA and Oceania countries will have a chance to choose between the USA, EU., and Chinese internet. Consequently, whichever regional internet creates the most attractive internet architecture for these nations will have the leading network in the world.
- › Rather than a world where our identities, healthcare, and public services are administered by Facebook, we should thrive for one where "we" control and earn from our personal data. Where our access to information is limitless, and as a community, we collaborate to protect the integrity of our information landscape. A world where governments embrace technological innovation to improve the common good.
- › These divergent digital futures are the context of our work today, illustrating the urgency and responsibility we all face in this moment. As the internet dictates more and more of the physical world, the values and characteristics of our internet will determine the world we experience every day. In relation to the regional internet blocs in the U.S. and

China, Europe's rising internet seems truly aligned with the interests of its people. That gives us a rare opportunity to shape our world and a responsibility to take advantage of it.

- › Now is the time for us to determine the values and standards of the European internet. We need to embrace the task with diligence and care -- exposing our ideas to scrutiny, identifying our blind spots, and compensating for them as best as we can. As we validate the values and standards of our future internet, we need to collaboratively build the technology to support it. And if we want these values to be the standard for people around the world, we need to invite those people and their nations to join us on the journey.
- › With initiatives like the NGI initiative, we start reaching out to communities beyond Europe -- MENA, Africa, Oceania, South America, the Balkans, Southeast Asia -- and involving them in the creation of our Next Generation internet. When we have those voices at the table, we begin a focused + interdisciplinary dialogue about *specific* values, standards, and visions for the European internet.
- › We're catalysing open innovation in some main topic areas. This enables creative solutions -- but in the absence of a clear vision, it's ambiguous whether these solutions will be useful down the road, making the effectiveness of those efforts ambiguous as well.
- › Of course, as an online community of 15,000 people, we shouldn't just shepherd our vision from the Ivory Tower either. But if we ensure our dialogue is accessible and interdisciplinary, inviting voices from different classes, regions, subject matters, and perspectives to the table, I believe we can avoid reduce the pitfalls of the Ivory Tower, and craft a robust vision for the Next Generation Internet.
- › Once that vision starts to take place, we can begin identifying *specific* needs for the Next Generation Internet -- and start catalysing open innovation for those *specific* ends. From there, the game is on.

Joop Ringelberg, Perspect IT, March 2019 - Inspiration from "Reality is broken"

- › It seems there is still a huge gap between the declaration of values, the level of intent, and the practical work I see around, which all too often centres on issues like identity management, data vaults, and standards. Somewhere in between we must develop new ideas of what we apply that internet to - what is it for? How to use it?
- › While this might seem a non-issue - after all, we all use the infrastructure daily, isn't it? - I would like to point out that much of what we can do today is the result of the 'commercial internet'. The applications we have, are there because of a business model that we reject, a mindset we abhor.
- › So, of course it is important to try to keep those services, but make them safe, inclusive, respectful, etc. But my hunch is that in ten years we'll look back and say: the internet in 2019 didn't even scratch the surface!
- › But we need to step back and ask that question: what is it for? What can it be used for? I recently found inspiration in a book I read some years ago: "Reality is Broken", by Jane McGonigal. I propose to look afresh at the NGI with her idea of 'gamification' in mind. I made the effort to elaborate that thought. Wonder what you make of it.

7. POLICY RECOMMENDATIONS

SpeakNGI.eu finding #1: Innovation accelerators like artificial intelligence and blockchain still pose several research challenges, including sustainable growth, ethical, societal and legal challenges. Moreover, we are still faced with a patchwork of disparate initiatives, with the risk of either duplication of effort or widening of the gaps in terms of challenges not being addressed and of coverage across the full range of vertical markets and 5G networks.

› **Recommendation #1** – Technology radars: Technology radars are essential in informing future proposers on current initiatives and are a successful feature of the NGI Consultation Platform. Future calls should provide sufficient funds to conduct technology radars, helping future proposers applying for funding both through R&I actions and Open Calls.

SpeakNGI.eu finding #2: The continued work in GIPO supported by SpeakNGI.eu has demonstrated the need to bring on board NGI internet policy experts and civil society representatives. To tackle large-scale challenges like disinformation online, NGI should also consider funding for skills, media and journalism in the public sphere alongside platforms and algorithms. Technological solutions to the challenges need to also target schools, their pupils and staff so national curricula equips European citizens with the necessary skills for the digital society.

› **Recommendation #2** – On internet policy and civil society: Future funding could be allocated to addressing key challenges range from defining liability and responsibility for online platforms and having the right tools for tackling online disinformation head-on to skills development, digital literacy, and reaching the public sphere and news/media ecosystem.

SpeakNGI.eu finding #3: The European Union and its Member States strongly promote an open, free, stable and secure cyberspace, where human rights and fundamental freedoms and the rule of the law fully apply for social well-being, economic growth and the integrity of free and democratic societies. According to Eurobarometer 2018, EU citizens are concerned about cybersecurity and privacy. Indeed, one of the biggest challenges for IT and network security is the human factor due to the lack of skills, which are key for achieving resilience, deterrence and defence.

› **Recommendation #3** – Stronger connections with cybersecurity research: NGI needs to build a stronger connection with European policy and research on cybersecurity to help crack major challenges that stand in the way of a trusted and secure digital society. In doing so, NGI can benefit from pooling, sharing and ensuring European expertise while offering funding opportunities for the many innovative SMEs across the European Union. It is also an opportunity to engage with civilian spheres on cybersecurity and privacy as vital end-users of NGI technologies, thinking also about how they are already merging with other enablers and innovation accelerators.

SpeakNGI.eu finding #4: The “fifth generation” of telecommunication systems, or 5G, will be one of the most critical building blocks of our digital economy and society in the next decade. Europe has taken significant steps to lead global developments towards

this strategic technology, with Horizon Europe will bring additional opportunities to innovate around smart connectivity. Moreover, more research is needed on AI to develop solutions dealing with safety, privacy, security and trustworthiness. Pressing issues within AI include compliance with privacy regulations, tackling bias in algorithms, mitigating risks and threats with suitable techniques and methods.

› **Recommendation #4** – Co-ordinated investments in 5G and AI: NGI needs to invest in 5G and complementary enablers, including AI, addressing gaps and reducing the disconnect with the telecommunications industry. Future funding can trigger new partnerships also with vertical industries and small businesses as new entrants bringing new business models to this space. It is also an opportunity to empower citizens, by making sure everyone everywhere has access to the internet, especially in remote and underserved areas. Another focus area could be on smart cities as flagships for connectivity, putting the emphasis on the more vulnerable sectors of society.

SpeakNGI.eu finding #5: The Early Adopters Club and successful candidates of the NGI Open Calls through the R&I actions funded under ICT-24 are proving the significant potential of the Next Generation Internet. Small-scale funds are a key opportunity to create and grow businesses through smart uses of technology underpinning European values.

› **Recommendation #5** – On small-scale funding and the Early Adopters Club: Future calls should not only continue to provide small-scale funding (especially targeting SMEs), but also innovation vouchers to individuals. Such a funding mechanism would help keep the Early Adopters Club alive and boost its growth potential.

8. CONCLUSIONS

- › **EC funding for the Next Generation Internet (NGI)** is a massively important opportunity to re-image the internet driven by human values. One that ensures free societies, media and a secure and sustainable future. One that enables liberty of identity, control over data and is underpinned by ethical technologies.
- › **Funding is key to supporting a much-needed large-scale, cross-disciplinary effort** that will help merge key enabling technologies and innovation accelerators, spanning 5G, cloud computing, IoT, big data, artificial intelligence, blockchain and cybersecurity. Investments in NGI open calls are already giving opportunities to new entrants, who benefit in two important ways: from simpler funding mechanisms and the chance to work alongside industry and specialised research institutes to co-develop new applications, products and services. This funding is helping small businesses and others to inspire, push boundaries and respond to challenges. Future funding mechanisms could also expand to innovation vouchers for individuals or very small teams, including serial entrepreneurs.
- › **Future funding streams** could also investigate the human values around merging technologies, help build stronger connections with cybersecurity, and leverage smart connectivity to serve the underserved and weakest members of our society.
- › **There are tangible benefits in working together and including everyone** in the discussion to create better solutions to old or emerging problems. By bringing together diverse stakeholders, we can collectively shape the future internet, from multi-disciplinary researchers, IT operators and service providers, hi-tech start-ups and SMEs, IT clusters, internet policy makers and activists, national and EU policy makers, civil society and standards organisations.
- › **Five, practical policy recommendations** can be drawn on the fundamental role of 'Technology radars', on 'internet policy and civil society', on the need of stronger connections with cybersecurity research and of co-ordinated investments in 5G and AI, as well as on the option of small-scale funding and innovation vouchers to further build the NGI vision, also through positive initiatives such as the Early Adopters Club.

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APPENDIX: MECHANISMS & SHOWCASE FOR STAKEHOLDER ENGAGEMENT

Europe's large-scale NGI programme is aimed at making the Next Generation Internet an interoperable platform ecosystem that embodies the values that Europe holds dear: openness, inclusivity, transparency, privacy, cooperation, and protection of data. This ambitious vision calls for the involvement of the best internet researchers and innovators to tackle technological opportunities arising from cross-links and advances in research fields ranging from network infrastructures to platforms, and application domains to social innovation.

Herein lies the remit of SpeakNGI.eu: provision of an open and dynamic consultation mechanisms supporting participation in the NGI programme for engaging with ecosystem stakeholders, especially new entrants from small businesses, who are tech-savvy and agile enough for their innovations to be quickly rolled out to the market.

To meet these goals, SpeakNGI.eu has created a diverse and rich set of engagement mechanisms, starting with a Champions panel, helping to shape the engagement strategy for NGI.

European Champions Panel: a select group of experts on NGI-related technologies and human values. A key differentiator is the tailored guidance on stakeholder engagement to help maximise impacts with the resources available. Set up early on in SpeakNGI.eu, the Panel was an important starting point for stakeholder engagement in the NGI ecosystem. ECP Members have played a key role in:

- › Supporting workshops on NGI technologies and values, bringing in key insights on the issues that need tackling to help create a human-centric internet;
- › Leading webinars with a national focus exploring the opportunities brought by NGI open calls as key mechanisms for new entrants from small businesses and research teams to work together on new applications and services for the open, inclusive and sustainable internet. Examples include: Ireland, Italy and Spain;
- › Co-creating content to help enhance the NGI narrative, from their respective professional perspectives, including the consultation platform;
- › Offering practical guides on engaging with the targeted audiences, including message creation and most effective timelines (who, when, what);
- › Bringing attention to the NGI programme at events across Europe.

Members of the European Champions Panel

- › **Alessandro Bassi**, IoT Italy and ABC France: expert on IoT. Has engaged in SpeakNGI.eu workshops and webinars, playing a key role in defining the overall NGI offer. Speaker in the SpeakNGI.eu webinar on NGI open calls – Italy².
- › **Ales Cernivec**, XLAB (SME, Slovenia): expert in privacy and security by design. Has engaged in SpeakNGI.eu workshops, including sessions on trustworthy content.
- › **George Christou**, Warwick University (UK): expert in civil society and standardisation. Has contributed key insights on civil society aspects, including SpeakNGI.eu events.
- › **Christian de Larrinaga**, FirstHand Network (UK): expert in technology transfer, start-ups and incubators. Has contributed insights into the development of the internet.
- › **Frédéric Donck**, Director European Regional Branch Internet Society (ISOC): expert in internet Policy. Has contributed as a keynote speaker at NGI events, offering insights into policy and governance aspects of the internet.
- › **Michel Drescher**, Market and Technology Readiness Levels Ltd (SME, Ireland): expert in cloud computing and standards. Has contributed to SpeakNGI.eu workshops, including NGI sessions on security and privacy.
- › **Mireille Hildebrandt**, Vrije Universiteit (Belgium): expert in Interfacing law and technology; law science technology and science studies. Has shared her early findings on the foundational research into computational law, e.g. artificial legal intelligence or data-driven law (based on machine learning), and cryptographic or code-driven law (based on blockchain technologies).
- › **Geir Horn**, University of Oslo (Norway): expert in large distributed computing and adapted software engineering. Has contributed insights into top-level research challenges and gaps for NGI-related technologies.
- › **Tua Huomo**, VTT (Finland): expert in big data and technology convergence. Has helped create links with several associations for NGI-related technologies. Has contributed insights to SpeakNGI.eu workshops, and also recruited an institutional expert to present at sessions on NGI-related technologies, e.g. RDA Europe summit on blockchain and IoT Week.
- › **Wolfgang Jamann**, International Civil Society Centre (HQ in Germany): expert in civil society and digitisation. Has contributed key insights into civil society aspects and supported the Salon during Global Perspectives 2018 co-hosted with NGI Move. Has contributed to SpeakNGI.eu sessions on privacy and trust.
- › **Anna Monreale**, University of Pisa (Italy): expert in big data analytics and privacy issues. Has contributed insights into research gaps related to NGI.
- › **Monique Morrow**, The Humanized Internet (co-founder, Switzerland): expert in the humanitarian use of technology, identity and privacy. Has contributed to SpeakNGI.eu events with keynotes on blockchain and its application to human issues, as well as an RDA Europe summit on blockchain as panellist, and raised awareness of NGI at external events.
- › **Stephen O'Reilly**, Irish National Delegate and Contact Point: expert in EC Horizon 2020 programmes with links to SMEs through Enterprise Ireland. Has contributed insights into best approaches to engage with small businesses. Speaker in the SpeakNGI.eu webinar on NGI open calls – Ireland³.

2 https://www.ngi.eu/event/national-webinar-italy/?instance_id=188

3 https://www.ngi.eu/event/national-webinar-ireland/?instance_id=190

- › **Ian Osborne**, Knowledge Transfer Network (UK): expert in key application areas of Space, Robotics and Autonomous Systems, Data Analytics and Defence and Security. Has contributed insights into disruptive technologies and advice on how to best target small businesses and research teams.
- › **Aljosa Pasic**, Atos (Spain): expert in Open innovation, internet architectures, cloud computing, Future Internet and virtualisation. Has contributed to SpeakNGI.eu events, including sessions on privacy and security. Speaker in the SpeakNGI.eu webinar on NGI open calls – Spain⁴.
- › **Jamal Shahin**, Global Internet Policy Observatory (GIPO, www.giponet.org). Has contributed key insights into internet policy, including SpeakNGI.eu events. Has provided content on this topic for the consultation platform and also helped SpeakNGI.eu connect with other experts in the field.

Early Adopters Club: bringing together early movers on NGI-related topics and technologies. SpeakNGI.eu has recruited members embracing the digital technological revolution brought by the disruptive development of blockchain, artificial intelligence and convergence of key enabling technologies like 5G, big data, cloud computing, cybersecurity, Internet of Things (IoT) underpinned by the human values of NGI.

Differentiator: a showcase of innovators and new entrants for the Next Generation Internet, championing NGI values, spanning start-ups, SMEs, large companies, research institutes, entrepreneurs and initiatives combining technology disruption and human-centric approaches.

Consultation Platform and Knowledge: two intertwined online tools for NGI ecosystem stakeholders. The Platform comprises a set of channels on diverse NGI-related technologies and values, including topics targeted in Europe’s NGI programme under Horizon 2020. A key differentiator is the continuous flow of information enabling a dynamic dialogue between stakeholders, and a sustainable tool as a lasting legacy. The Knowledge Base captures curated content with add-ons such as advanced search and links with other European Commission funded initiatives. This valuable set of knowledge on NGI is a key differentiator.

Integration of the GIPO community: key to building a niche for NGI on internet policy and civil society, supported also by experts in the Champions Panel bringing multi-disciplinary perspectives to the NGI narrative. A key differentiator is making sure internet policy is central to the NGI agenda. On top of this, SpeakNGI.eu has also engaged with citizens through Missions Publiques⁵, in a workshop as part of their wetheinternet.org programme entitled Global Citizens Debate on the Future of the Internet, organised by SpeakNGI.eu coordinator, WIT, in Ireland on 12th January, 2019, whose purpose was to raise awareness directly to citizens of priority human-centric approaches being motivated and advocated by the NGI initiative.

Workshops and Webinars: A regular flow of dialogue directly with stakeholders through well-timed events in easily accessible locations or at zero cost for participants. Compelling topics, funding opportunities, chances to showcase innovative work, insights from the Champions Panel, interactive surveys with live feedback and discussion are all key differentiators.

4 https://www.ngi.eu/event/national-webinar-spain/?instance_id=194

5 <http://wetheinternet.org/who-are-we/>

Summary of engaged communities

SpeakNGI.eu has engaged with a broad range of stakeholders for the NGI initiative, such as the community building through the Consultation Platform, with the support of its Champions Panel, webinars, workshops, and by creating a “network of networks” through its partnerships. SpeakNGI.eu has also created cross-policy synergies within the European Commission, such as EC Innovation and Blockchain; EC Broadband; EC Sector Multilingualism. Here, we give a snapshot of the countries and communities engaged. In addition to these stakeholders, SpeakNGI.eu has recruited many individuals and small teams, including standards specialists (e.g. ISO, ETSI CYBER), social entrepreneurs (e.g. Fundacion CIBER VOLUNTARIOS), social journalists (e.g. AbruzzoLink), and educationalists from various multi-disciplinary domains.

Coverage of EU Member States:

- › Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Sweden, UK.

Coverage of Associated Countries:

- › Albania, Israel, Norway, Switzerland, Turkey, Ukraine.

International Outreach:

- › Bangladesh, Brazil, Canada, China, India, Pakistan, Saudi Arabia, Singapore, USA, Vanuatu.

The biggest growth has come from Belgium, Germany, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Switzerland, UK and USA, with the consultation platform now counting 300+ members. This community shows a broad interest in NGI-related technologies values, as we show below.

Outreach to initiatives and associations has helped create an important snow-ball effect, while also helping SpeakNGI.eu pinpoint early adopters and other stakeholders for events and content co-creation on the Consultation Platform. The SpeakNGI.eu differentiator has been to capitalise on their strong connections and memberships in various initiatives and public private partnership platforms that have taken a strong interest in the NGI Initiative from the very start, as outlined below.

Associations and IT Clusters – including human values

- › **NGI technologies & human values:** The Alliance for the Internet of Things Innovation (*A/IOTI*), Big Data Value Association (BDVA); Dutch Blockchain Coalition; EU Coworking Assembly; FIWARE Foundation, IoT Council; IoT Italy; Laval Mayenne Technopole (AR/VR cluster); INCON (AI and next generation human-centred products and services); New European Media (NEM Technology Platform); School of Disruption (exponential and emerging technologies); World Education Blockchain Association.
- › **Business & Start-up/SME networks:** CNA Lombardia; EBN network of BICs (Business and Innovation Centres), eHub Torino; Enterprise Ireland, F6S Network Ltd; FirstHand Network, IDA Ireland.
- › **Civil Society and Internet Policy/Activists:** Fundacion Ciber Voluntarios (Spain); GIPO (Global Internet Policy Observatory), www.giponet.org; Internet Society (ISOC);

International Civil Society Centre (ICSC), Missions Publiques, Tech Solidarity NL; The Humanized Internet (ECP).

- › **Research Associations:** APRE (Italian Agency for the Promotion of European Research); EURODOC (the European Council for Doctoral Candidates and Junior Researchers), ECSO (European Cybersecurity Organisation).

Start-ups and SMEs in the Early Adopters Club

Club members include (serial) entrepreneurs and small businesses, as well as consultants and developers working to drive innovations in the NGI space. Here is a sample:

- › **AI:** LIFEdata.AI (Switzerland); Effect.AI (Netherlands); Nifty.Works (Italy); Perspect IT (Netherlands); Triple (Netherlands).
- › **AI and blockchain:** F6S Network Ltd (Portugal).
- › **Blockchain:** Blocknet (USA); Fintastico (Italy).
- › **Citizen co-design, including IoT & 5G:** Axschat (Ireland); Bridgit, S.P.C. (USA); CrowdFact (USA); HOP Ubiquitous (Spain); ImpattoZero srl (Italy); Inspired (Poland); Nextworks srl (Italy); MobiDev (Ukraine); Qurami srl (Italy); Sensifai (Belgium)
- › **Data protection and privacy:** Dataiku (Germany); Detecon International GmbH (Germany); EnRoute-Consulting (Ireland); StethoMe (Poland); You Are My Guide (Italy); WPWEB (Italy).
- › **Interoperability and Standardisation** (e.g. 5G, IoT): Anything Connected (Netherlands); b-things (Belgium); Beringar (UK); ETOS Solutions d.o.o. (Slovenia); Knowledge Innovation Market (Spain); Nae (Spain); Robots in Schools Ltd (UK).
- › **New applications and services:** AmberScript (Netherlands); Briteyellow Ltd (UK); Dronee (Estonia); Factmata (UK); KEISDATA (Italy).
- › **Privacy and security by design:** Alma Dlgit srl (Italy); asvin.io (Germany); C3L - Cadzow Communications Consulting Ltd (UK); CARFIT (USA), Cashforce (Belgium); DigioTouch OU (Estonia); In-Two (UK); SixSq (Switzerland); Strategic bridge (UK); webRunes (UK).
- › **Trustworthy content, search and discovery:** In-Two (UK).
- › **Multiple NGI technologies** (e.g. AI, blockchain, robotics, industrial IoT): School of Disruption (Belgium).

Other small businesses in the SpeakNGI.eu community

- › **Austria:** Danube Tech; inMotion Verlag GmbH.
- › **Belgium:** Collibra.
- › **Denmark:** Peercraft Aps.
- › **France:** Afnic; Qwant.
- › **Greece:** Cavino; Terracom Informatics Ltd.
- › **Italy:** 3LOGIC; Aesse.net; ExtraRed; Level 7; Qurami srl; U-Hopper srl; Zaz Ventures
- › **Malta:** NLS Systems
- › **Netherlands:** AmberScript; F5 Projectengroep; The Incredible Machine.
- › **Portugal:** IT Tech Buz.
- › **Spain:** UNEX; Xeso Innovation.
- › **Switzerland:** 89grad GmbH; GIG Europe SA; Lovefield Wireless GmbH.
- › **UK:** Advance Software; Aquamatix Ltd; Cybersolace; Deliveroo; Saint Nicks; Vialog.

International: Collibra (USA); Delos Aerospace (USA); eSENTIAL Accessibility (USA); Lovefield Wireless GmbH (Switzerland); One Kind Mind (Canada).

Academia and Research

- › **Austria:** RIAT - Research Institute for Future Cryptoeconomics; Institute for Meteorology and Geodynamics.
- › **Belgium:** Brussels Open University; Gent University.
- › **Finland:** Aalto University; Oulu University.
- › **France:** CNRS; Inria.
- › **Germany:** Fraunhofer FOKUS; Fraunhofer ZV; Institute for Economics and Law; IRT; Saarland University.
- › **Hungary:** Obuda University.
- › **Ireland:** SFI ADAPT Centre; SFI CONNECT Centre, SFI Insight Centre, SFI Lero Centre; Dublin City University; Limerick University; National University of Ireland Galway (NUIG), Trinity College Dublin, University College Dublin, Waterford Institute of Technology.
- › **Italy:** European University Institute; Fondazione Bruno Kessler; Milan Polytechnic.
- › **Latvia:** Riga University of Technology.
- › **Malta:** University of Malta.
- › **Netherlands:** Amsterdam Open University; RUG - University of Groningen; TU Delft.
- › **Poland:** Digital Economy Lab (DELab), University of Warsaw; PSCN.
- › **Portugal:** COPELABS/ULHT and Senception Lda; Escola Superior de Educação de Santarém; Nova IMS Management School; University of Beira Interior; University of Porto.
- › **Romania:** University of Beira Interior.
- › **Slovenia:** Josef Stefan Institute.
- › **Spain:** Madrid University of Technology; San Jorge University; Univeritat Autònoma de Barcelona; University of Malaga; Valencia University of Technology.
- › **Sweden:** RISE AI; RISE SICS; Södertörn University.
- › **UK:** Kings College London; University of Surrey.

Associated Countries and International: Academic College of Tel-Aviv (Israel); Bern University (Switzerland); DreamWorks (USA); Simula Research Institute (Norway); Southeast University (China); Uzhhorod National University (Ukraine)

Members of the Early Adopters Club: Fundacio i2CAT (Spain).

Large Enterprise

- › **Austria:** FACC AG
- › **Belgium:** Fujitsu; VVA Group
- › **Finland:** Nokia
- › **Greece:** Intrasoft International
- › **Italy:** HP Enterprise; Lepida SpA; UniCredit
- › **Spain:** Atos Spain, BCC; Emeryga; Grupo INMARK; RACC
- › **UK:** Atos; BT

Associated Countries and International: FINSCONS Group (Switzerland); Turkcell Technology (Turkey); Yap Kredi (Turkey); Huawei (USA).

Members of the Early Adopters Club: Atos Ireland: initiatives fostering an open and inclusive internet; Atos Spain: big data and energy.

Government and Public Services

Enterprise Ireland, Finnish Ministry support of U-Space Business via VTT and the ECP; IDA Ireland, Milan City Council; RvIG (Dutch government agency for identity protection); Slovenian Open Data and Interoperability Framework; VINOVA (Sweden's innovation agency); ZAMG (Austrian data protection and open government initiative).

LinkedIn Groups

SpeakNGI.eu partners are members of the Next Generation Internet and Next Generation Experimentation (NGI-EXP) groups, both as individuals and via relevant networks. In addition, SpeakNGI.eu have also shared NGI events and opportunities to the following LinkedIn groups: Augmented Reality (AR), Virtual Reality (VR) & Virtual Worlds (VWs); Augmented & Virtual Reality Professionals. Blockchain; Blockchain: health and technology; Blockchain Business; Blockchain Nation. Blockchain Professionals Network. Blockchain, open innovation and co-creation. Blockchain in Europe. Future Internet Socio Economics and Irish Future Internet Forum. Information Technology, FinTech, Blockchain and Bitcoin Innovation. The Big Data Institute - IOT, Big Data Analytics, Cloud Computing, Blockchain. IoT- Internet of Things, eHealth, Smart Cities, Applications for Future Internet. Bitcoin Blockchain & FinTech Think Tank > Cryptor Trust. Blockchain Camp - Advisers, Consultants & Enthusiasts. Blockchain Tech - Block Chain Crypto ICO Distributed Ledger Smart Contract Solidity Ethereum Bitcoin. European Alliance for Innovation: IoT- Internet of Things, eHealth, Smart Cities, Applications for Future Internet. Data Protection and the EU GDPR. Privacy professionals. European Data Protection Forum (EDPF) - The Best Networking Group for Privacy & Data Protection Professionals.

Stakeholder Engagement Mechanisms for Artificial Intelligence

European Champions Panel: Mireille Hildebrandt is working on an interdisciplinary research project covering artificial intelligence.

Early Adopters Club: Effect.AI (a decentralised artificial intelligence and machine learning development service provider); LIFEdata.AI (Omnichannel AI solutions). **AI and blockchain:** F6S Network Platform implementation of ML, AI and blockchain); Nifty.Works (knowledge platforms supporting easy integration of AI layers and blockchain).

SpeakNGI.eu community and networks:

- › **Networked Community:** Access to 200 AI experts/users as 1st-degree connections on partners' LinkedIn networks.
- › **LinkedIn groups:** Info Tech Professionals, big data, AI, IoT, VR, blockchain; Future Technology: AI, Robotics, IoT, blockchain.
- › **Related networks:** 5G (2000+ connections).

Trust-IT has several connections with Samsung UK, through its network, including Yue Wang, and the Chair of the 5G PPP Steering Board, of which it is a member. It also has connections with Fujitsu Europe: Head of Artificial Intelligence (UK) and Italtel AI expert nominated by the Italian government.

Standardisation: EAC member, Ray Walshe, chairs a working group in ISO SC42 AI. As activity leader of the 5G Infrastructure Association Pre-Standardization Working Group, Trust-IT is working with the ETSI Experimental Intelligence Industry Specification Group (ENI ISG), its chair and 5G PPP project SLICENET (approved item on “Proof of Concept on Network Slice Management” for end-to-end network slicing).

Stakeholder Engagement Mechanisms for Blockchain

European Champions Panel: Monique Morrow, co-founder of The Humanized Internet, is a renowned expert on blockchain, especially the human values. Engagement examples include the 1st SpeakNGI.eu Workshop (March 2018), where she gave a keynote, the RDA Europe summit on blockchain (January 2018), and many other events around Europe. Wolfgang Jamann, and Thomas Howie, International Civil Society Centre.

Early Adopters Club: Blocknet (open-sourced, community governed, community developed blockchain interoperability protocol); World Education Blockchain Association.

SpeakNGI.eu community and networks:

- › **Networked Community:** Access to 200 experts/users of blockchain as 1st-degree connections on partners’ LinkedIn networks.
- › **LinkedIn groups:** Info Tech Professionals, big data, AI, IoT, VR, blockchain; Future Technology: AI, Robotics, IoT, blockchain; Blockchain camp: advisers, consultants, enthusiasts; Blockchain; Blockchain: health and technology; Blockchain Business.
- › **Related networks:** privacy and data protection (500 connections). 127 connections on LinkedIn. Members of the SpeaksNGI.eu community: Innovation and Blockchain (policy); Dutch Blockchain Coalition; Elond Network (start-up); Fujitsu blockchain expert.

Stakeholder Engagement Mechanisms for Trustworthy Content

European Champions Panel: Alessandro Bassi, IoT Italy (President) and ABC France, is an expert in semantic data organization. Jamal Shahin, Open University of Brussels and Amsterdam, has brought key insights into the topic of online disinformation, such as the 2nd SpeakNGI.eu workshop entitled “CAN YOU BELIEVE WHAT YOU READ? GUARANTEEING TRUSTWORTHY SEARCH RESULTS AND CONTENT DISCOVERY” at the NGI Forum 2018, organised by SpeakNGI.eu⁶. The goal of the session was to explore trustworthy content from multiple technological perspectives, zooming in on human values linked to those challenges, known initiatives working on possible solutions, alongside gaps that new research and innovation actions could focus on.

Early Adopters Club: blocknet (open-sourced, community governed, community developed blockchain interoperability protocol); In-Two (intelligent content hubs and co-design principles); World Education Blockchain Association.

6 <https://www.ngi.eu/news/2018/09/21/report-session-3-better-search-trustworthy/>.

SpeakNGI.eu community and networks:

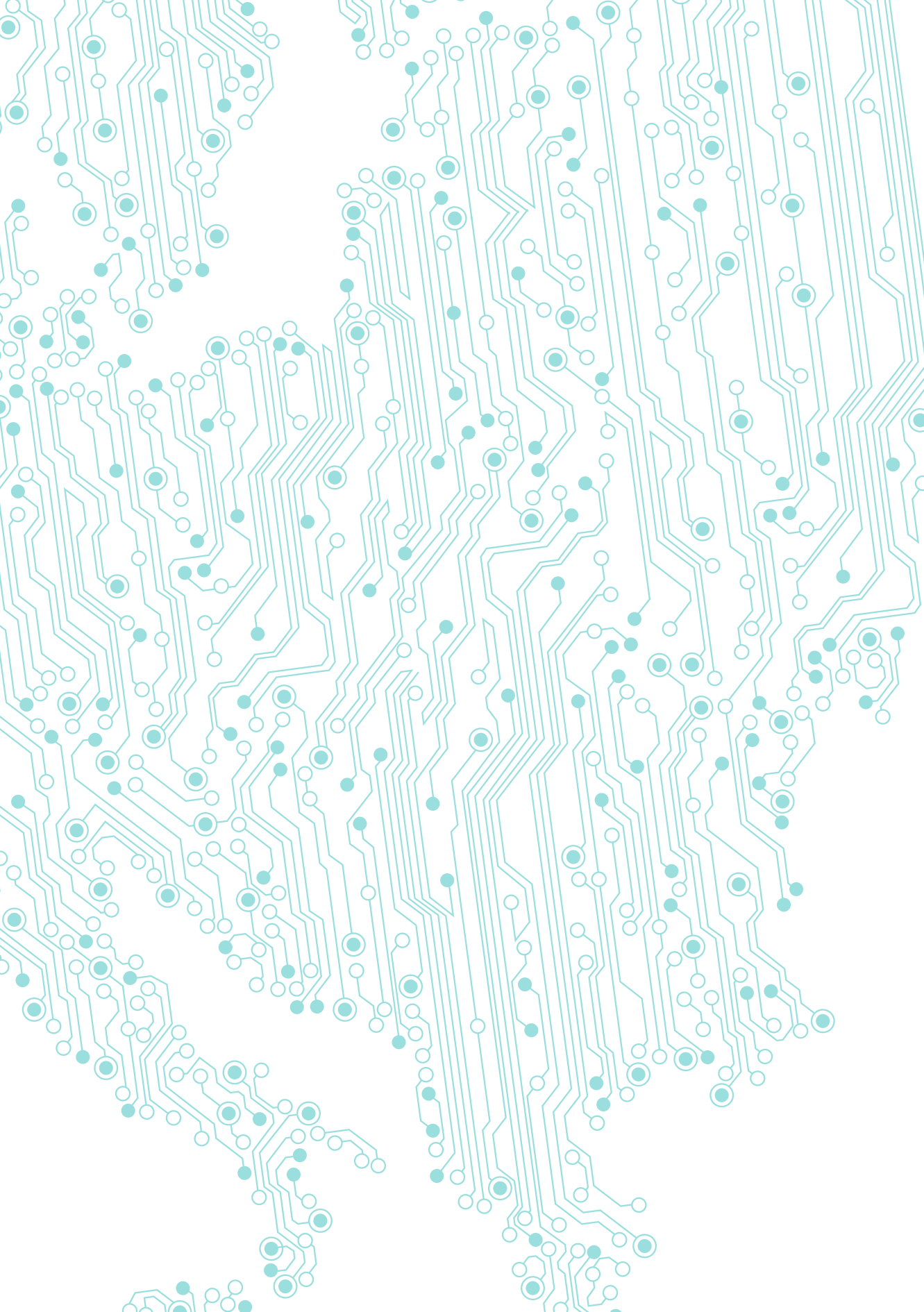
- › **Networked Community:** Access to 150 privacy and data protection experts as 1st-degree connections; 950 experts and standards specialists as 1st-degree connections on 5G network security and privacy through partners' networks.
- › **LinkedIn groups:** Data protection and the EU GDPR; privacy professionals; European Data Protection Forum (EDPF).
- › **Related networks:** privacy and data protection (1000 connections). [Dedicated channel on the Consultation Platform](#): H2020-2019 Call Topic #1 - Strengthening internet trustworthiness; privacy and trust-enhancing technologies; discovery and identification technologies.

SpeakNGI.eu has investigated trustworthy content and related challenges in conjunction with its European Champions Panel and Early Adopters. Here, we present their perspectives.

Early Adopters Club: CrowdFact (crowdsourced fact-checking solution); Perspect IT (peer-to-peer software, private by design, human- and community centred).

SpeakNGI.eu community and networks:

- › **Networked Community:** privacy and data protection; 5G network on security and privacy.
- › **LinkedIn groups:** Data protection and the EU GDPR; privacy professionals; European Data Protection Forum (EDPF).
- › **Related networks:** privacy and data protection (1000 connections). [Dedicated channel on the Consultation Platform](#): H2020-2019 Call Topic #1 - Strengthening internet trustworthiness; privacy and trust-enhancing technologies; discovery and identification technologies.





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