Interim report 2- Flagship Next Generation Internet - Recorder David Overton

1) Introduction

This second interim report for the Next Generation Internet initiative that the European Commission has launched this autumn shows progress beyond the first few weeks of the consultation. The EC is inviting experts, innovators, researchers and the general public to shape the vision for the future internet and Europe's role in its development. Several workshops and a social media campaign have happened to drive interest in the consultation, itself designed to ask key questions. The ambition of this report is to analyse the mid-stage consultation results as stimulus for others joining on the Futurium platform.

2) Overview -

Summary of main findings to date - the two hot topics

With the consultation now a little over a month old it's great to see over 300 participants. As the audience has grown we've gained a more diverse view from an increasing geographical spread of experts and actors engaged and knowledgeable of the areas involved.

The statement that the internet "***should ensure citizens' sovereignty over their own data and protect privacy***" remains as the most important. However the technology area has shifted so that **Personal Data Spaces** and **Artificial Intelligence (AI)** are now the two most important technology areas. Scratching these further, whilst a certain amount of the challenge is in the more technical "infrastructural" elements of the internet, the centre of gravity is much more upon social elements, the ethics of managing privacy and the relationship between humans and machines.

The consultation also appears to conclude that the answers can be arrived at by a mix of approaches and via a mix of industry and academia. Given the social bent to much of the observations it surely has to have a strong "user" element which seems to be less present in the consultation questionnaire or in the responses to it.

3) Who is responding

Gender, Age and Role Balance

337 respondents have taken part by Monday 12th December 2016. This was a doubling of response since 25th November. The researcher component remains the largest segment at 41%, but balance is suggested as the next largest is 19% (Civil Society) and 18% (SMEs). Perhaps it's notable that the ICT sector represents just 6%, though it should be noted that people were given the option of selecting 2 areas. The gender balance now reflects this broadening of the audience over the past 3 weeks. From

the initial analysis, one week into the consultation, the audience of females increased from 14% to 27%. Perhaps this now reflects better those involved in business and civil society rather than those engaged in research. The age range is now more consistent with the group most strongly affected by the internet during their normal working lives. Previously 37% were over 50 years old, now, over 72% are 50 years old or below with 47% in the age range 35-50 years. However, there is little involvement from the younger groups. Only 11 people aged 18-24 responded and the 25-35 group represents only 21% of respondents. Arguably these are the groups most impacted by the Next Generation Internet, yet it appears the views of the older generations could dominate. Can they rely upon the wisdom and perhaps self interest of their elders?

Geographical influence?

Geographically things have changed significantly. At the last interim Italy appeared to have the most engaged community with 19% of all respondents coming from the country.

Now the largest representation (14.5%) is from Great Britain, Italy (12.5%) and Germany and the Netherlands (11% each). Overall there is a greater spread across the nations. The consultation lacks input from Latvia, Lithuania and Cyprus. New Member states are relatively poorly represented with Croatia, Czech Republic, Hungary and Estonia only fielding one response each.

Experience of EC funding

Overall 45% of the participants have participated in Horizon 2020 funded projects.

Conclusion about the respondents

This is an increasingly representative sample from a broad base of experience and exhibiting at least some level of diversity.

4) What are the main areas of interest

8 statements about the potential priorities for the Next Generation Internet were provided and the respondents selected which ones they rated the highest.

Hottest Topic

Clearly the statements cover some very important areas according to the responses. Each respondent had to rate the importance of each topic area on a scale of 1-5 where 5 was the highest importance. Every topic gained was scored at the highest importance by at least 25% of the respondents. However there is a gulf between the highest and lowest scoring.

The view that the internet "***should ensure citizens' sovereignty over their own data and protect privacy***" remains the strongest view in the consultation with 75% rating its importance as high (255 participants).

Next highest is ***"Internet should ensure diversity, pluralism and a right to choose***." at 66% (224 respondents). Third highest remains "***Internet should avoid the concentration of data in a few proprietary platforms.***" (213 participants).

Least "hot" topic was "***Internet should be more human - social, easy, immersive, emotional***." Still, 102 participants classed it as highly important. A lot of these subjects emerged when they considered the technologies in more detail near the end of the consultation.

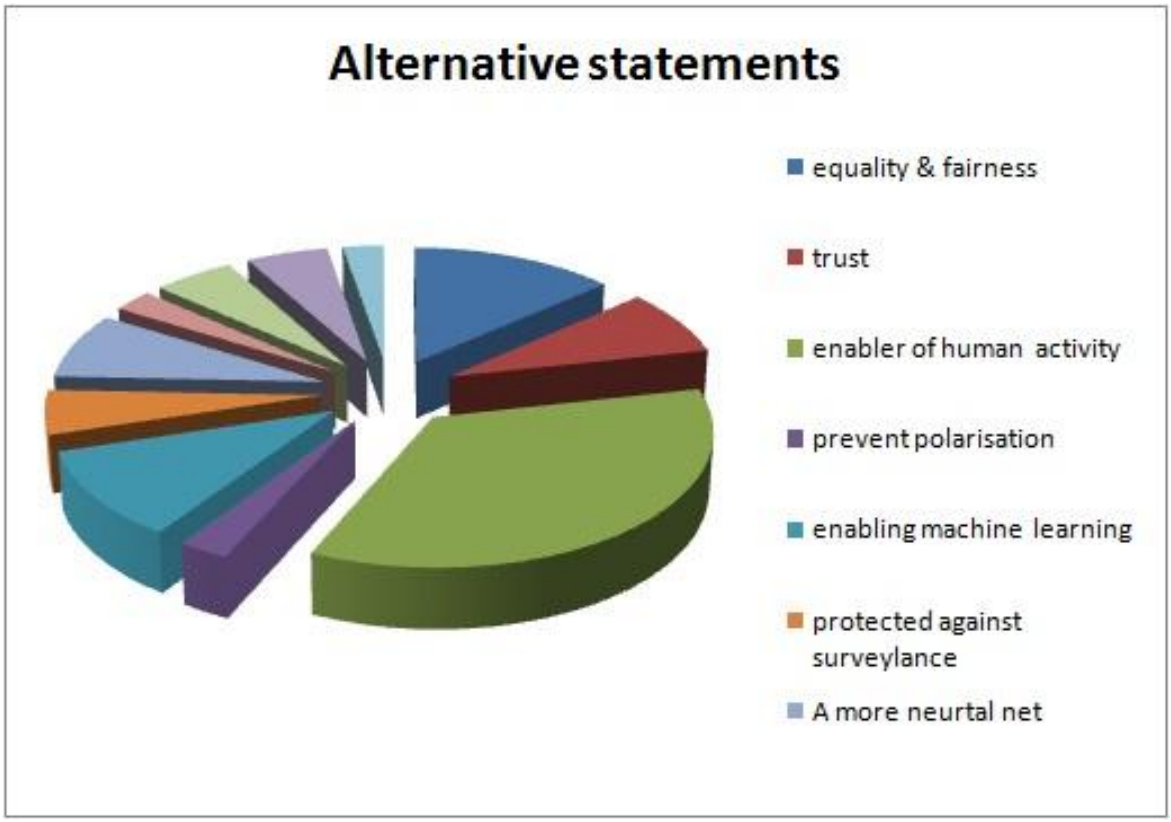
Conclusion on the main areas of interest

It is probably telling that despite the doubling of the participants in the past 3 weeks, the areas of highest interest have remained the same. The consensus on responses to the statements could be concluded as:

> ***"The Next Generation Internet should ensure citizen's sovereignty over their own data and protect their privacy as a priority. It should ensure diversity, pluralism and a right to choose and should avoid the concentration of data on a few proprietary platforms."***

Other potential statements (previously reported)

Participants were invited to develop their own statements to express their own priorities. I have categorised these here:

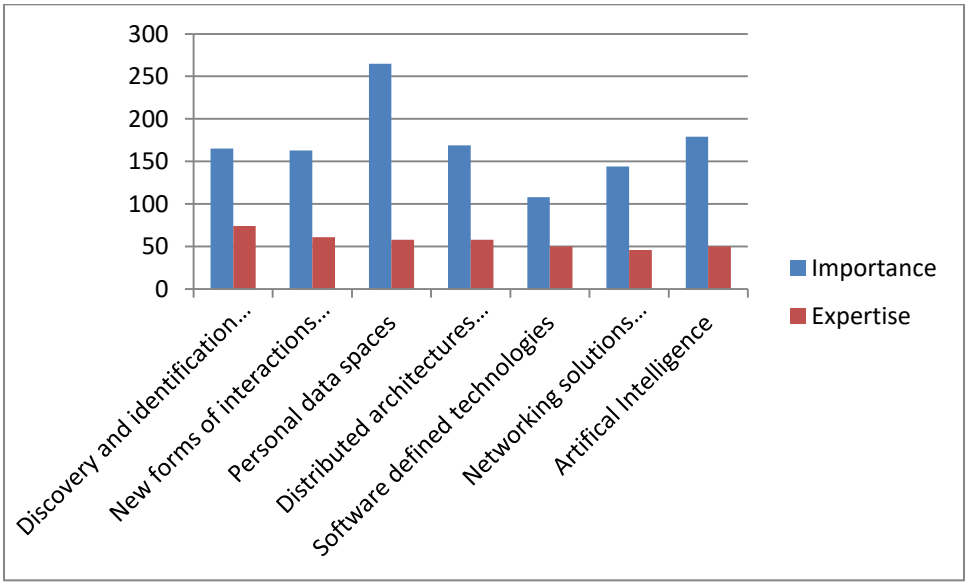


Enabling human activity was the most popular theme. One statement seemed to represent this segment best,

> ***"The internet should be a place for citizens to create and contribute to global society, not merely consume and 'like' content. Citizens should have agency, not 'be the product."***

5) Technology Areas

7 technology areas are proposed in the consultation and participants are encouraged to consider which would be the most important in the transformation of the internet. In this area there have been significant changes over the past 3 weeks.



Overview of the Technical areas

Overall the relative importance of technology areas was more evenly spread than for the statements. Likewise expertise (taken as those that actually work in the area) is reasonably evenly spread across the technology areas, with a slightly higher level of experience in discovery and identification tools.

It is interesting to note that those experts working in the ***Software defined technologies*** industries are well represented however, this technology area became the lowest priority area. Note, however, that 108 people (32%) of respondents considered this a high importance technology area.

Personal data spaces

Personal data spaces has become the most important technology area for the respondents. **260 people** share this view, scoring it the highest. People responded to this description of the technology area:

"Personal data is everything that identifies an individual, from a person's name to telephone number, IP address, date of birth and photographs. The next generation Internet aims to develop technologies to help us achieve greater control of our personal data, knowing what is being shared and with whom."

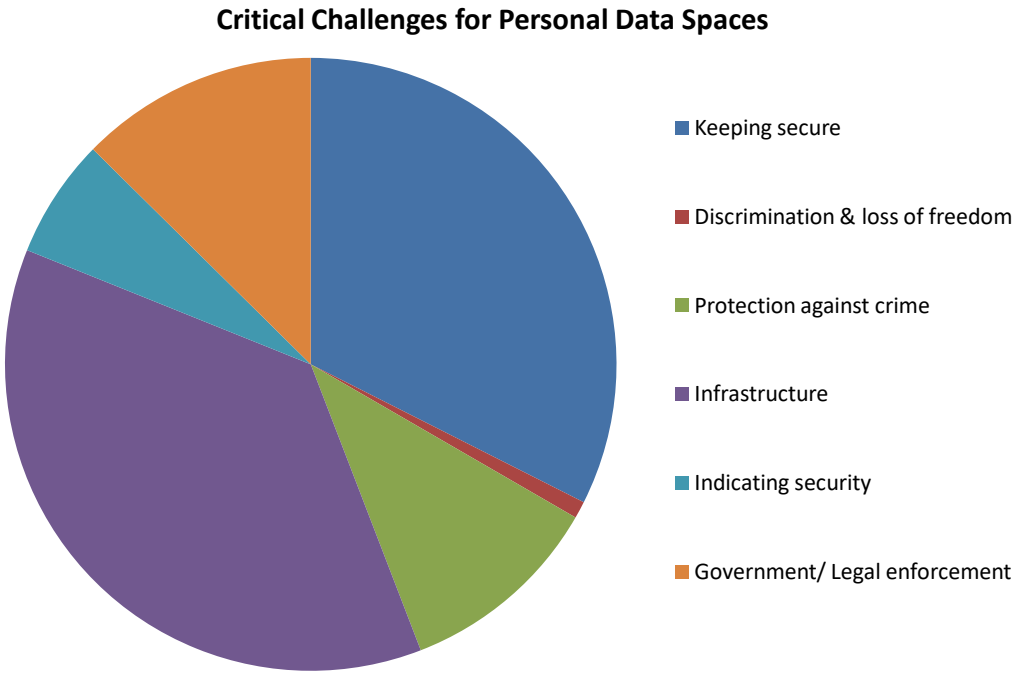
Clearly this marries well with the sovereignty of data statement.

Challenges in this technology area could be categorised

Participants were asked which are the greatest challenges in the technology area. Their responses were free-form but I've made a broad categorisation:

- ***Keeping Secure*** - Challenges that relate to keeping an individual's data secure from abuse by big business and cyber criminals alike. In this area we see issues related to health data (for example).
- ***Discrimination and Loss of Freedom*** - The specific issues associated with abuse of data to support discrimination
- ***Protection against crime*** - Challenges that reference specific crimes
- ***Infrastructure*** - Challenges for the creation or support of infrastructures both to enable benefits and minimise exploitation of personal data
- ***Indicating Security*** - Challenges to give users clear signals and controls over use of their data. Includes education of citizens
- ***Government/ Legal enforcement*** - Challenges where greater governance, laws and policies need to be proposed.

Challenges



Infrastructure - example answers from the consultation

- "Data-mining algorithms' accountability-, prevent data moving across contexts"
- "Privacy-aware Access Control in Social Network, Privacy-aware Data Mining "
- "Blockchains, Big data, Open data "
- "Community-based services and self-hosting managed by local communities."

Keeping Secure - example answers from the consultation

- "How can people be equipped with the skills to be able to protect their personal data? "
- "How to facilitate data collection for investigation without losing privacy."
- "SECURITY systems that assure citizens that their data is stored safely (both governmental and corporate) in a manner that they can see (transparency), are able to opt out of corporate data storage, and the rights to edit items that are incorrect or defamatory...

National or European Initiatives

Many are quoted and mostly negatively viewed as they are policy driven by our various governments in the name of national security. The list is too long to reproduce here and is annexed instead at the end of this report.

Conclusion on personal data spaces

The trade-off is between the benefits of Innovation possible with IoT and Big Data & the need to prevent abuse of personal data.

- Main challenges are in;
    - Keeping data secure
    - Infrastructures
- Interesting observation from one respondent: "Who are the bigger villains re. personal data? Big business or the hackers?"

Artificial Intelligence

Artificial Intelligence was the next most important technology area with **179 people**.
"Artificial intelligence will also change the Internet. Inspired by how the human brain works, mathematical models can learn discrete tasks by analysing enormous amounts of data. So far, machines have learnt to recognize faces in photos, understand spoken commands, and translate text from one language to another. But this is only the beginning. Artificial Intelligence will greatly sharpening the behaviour of any online services and be core technical enabler of the future Internet."

Challenges in Artificial Intelligence

The Challenges covered more categories and were spread more evenly amongst them. But the biggest challenges lie in Privacy, Ethics and Human Machine relations rather than in specific technical areas.

Ethical Challenges - example answers from the consultation

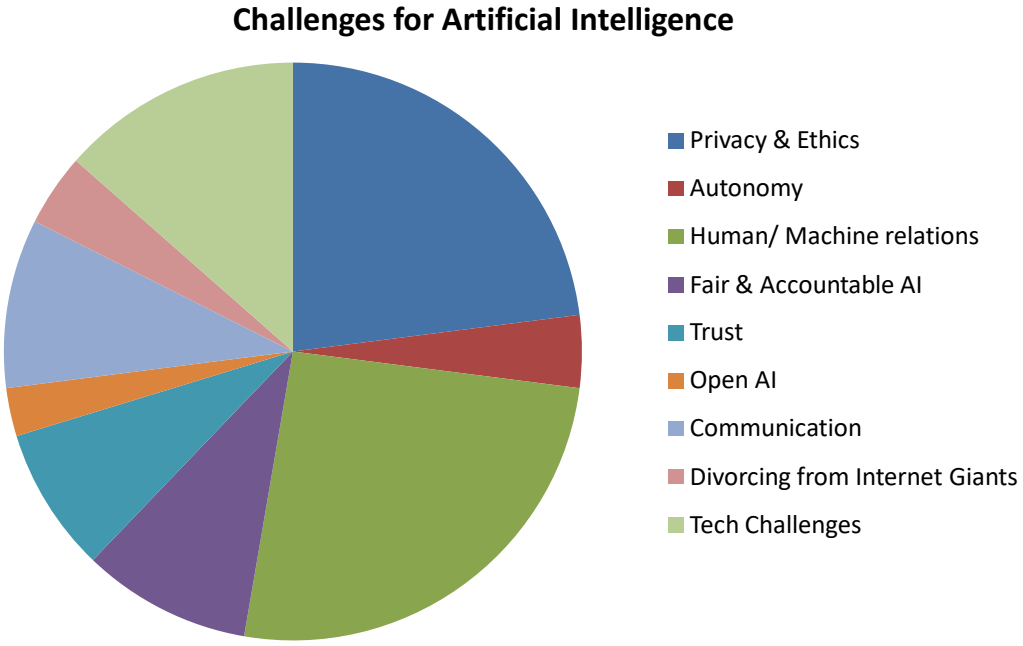
- "Ethics and policies regarding algorithms is The Key Defining Challenge for our century ... “
- “Ethical and legal aspects should be addressed. “
- “Ethical framework; legal issues related to liability; transparency of algorithms and data use; accountability"

Human Machine relations - example answers from the consultation

- “How to enable humans to live and work in a pleasant environment with just the right support.“
- “Stop thinking about Human-Machine relations with a master/slave model; for AI to evolve it needs autonomy; autonomy means lack of human control; make neural networks share with humans its process of thinking-, keep 'human-in-the-loop'. “

- “To ensure we don't allow machines to rule over us."

Challenges



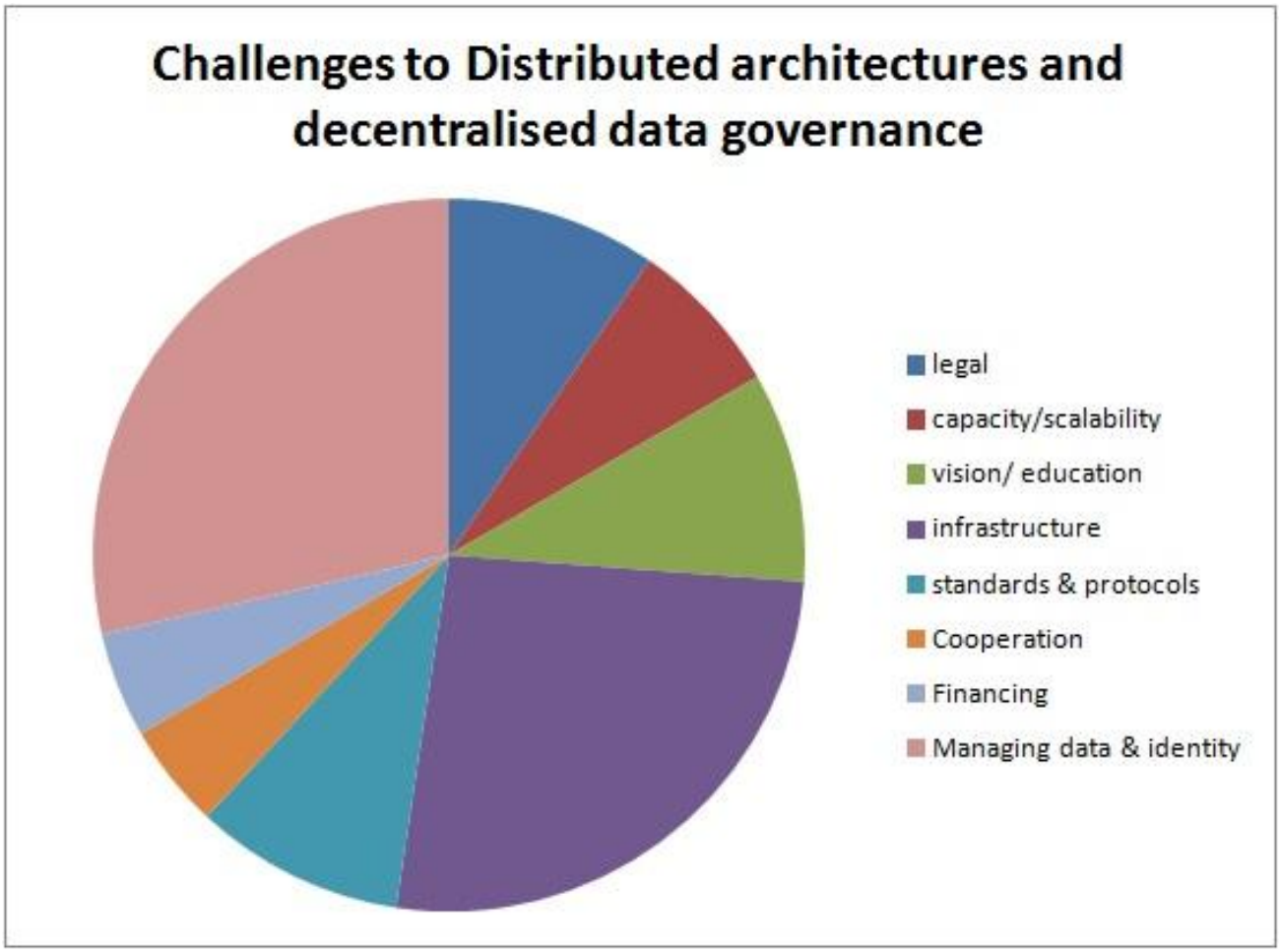
National or European Initiatives

Relatively few responses came back indicating as one person said "this is a fragmented area". Another said "ICT PPP completely missed this area" and one laments "...many MEPs invite <me> to round tables around AI and Algo transparency. Politicians in the driving seat? - Where is the real research". Yet another "Industry already takes care of this". No single initiative was referenced by two or more separate sources. See Appendix for the list proposed by respondents.

Conclusion on Artificial Intelligence

Overall the responses indicate that the Challenges for AI are less technical and more ethical and social. Human-machine-relations should be central when considering the way these challenges are handled. Trust, Fairness and accountability for the increasing demands on AI are also a big challenge.

Interesting ideas are put forward on how AI needs to grow independent of the Internet Giants in order to be trusted.



6) What intervention is needed?

Things have changed since the first interim report. Last time 83% of the respondents looked for a mix of long term research and applied research with only 10% believing applied research alone was the priority. This time it is 86% and 8% suggesting a stronger bias toward a mix of research.

The belief that combining academia and industry and start-ups is needed was supported by 72% (increased from 67%).

7) Overall Conclusion

Again there is a fair balance of experience and expertise of the respondents relevant to the areas in question. As the consultation has progressed a greater diversity in gender, age group and geography has been achieved.

The latest view on the data suggests 2 technology areas are the priority; ***personal data spaces*** and ***Artificial Intelligence***.

Personal Data Spaces

The main challenges for personal data spaces concern ***infrastructure*** (creating the protocols and systems that allow data to be secure whilst still allowing innovation to occur) and ***keeping data secure*** (assuring that users are equipped to protect and manage their own data easily).

Artificial Intelligence

In Artificial Intelligence the key challenges are in ***ethics and privacy*** (an ethical framework to cover legal issues related to liability, transparency of algorithms and data use and accountability), and ***Human-machine-relations*** (living with greater autonomy for the "machines").

The most important theme from the consultation remains that the internet "***should ensure citizens' sovereignty over their own data and protect privacy***" and secondarily the "***Internet should ensure diversity, pluralism and a right to choose***."

The responses suggest that a mix of longer term research and applied research is needed from a mix of academia, start-ups and industry. However, given the social bent to much of the observations analysed there is surely a need to have a strong "user" element which seems to be less present in the consultation questionnaire or in the responses to it.

The consultation is now quite well representative with good views on the main subjects and a consensus on the critical areas for development. There is a strongly emergent social dimension which I am sure will be further examined in the on-line debate.

Annex 1

Initiatives for Personal Data Spaces

One important is OpenPDS, lead by a Belgian at MIT (no, not Europe), but it's an open source initiative.

MesInfo, Fing are European initiatives.
New Skills Agenda for Europe
European digital agenda
https://tacticaltech.org/projects/security-box
Not informed
secure data places, TNO
Cyber security initiative
knowing what is being shared and with whom. - well practical this would imply quite some time, to follow and to react if there's a sharing I don't want

Decentralized Social Networks
FuturICT Knowledge Accelerator and Crisis-Relief System, Europe
netcommons, confine, p2pvalue
netCommons, confine, abc4trust
Big Data PPP
CHIST-ERA call 2015 "User-Centric Security, Privacy and Trust in the Internet of Things"
ePrivacy directive
The worrying implications of the UK's Investigatory Powers Bill.
* social machines in the UK
I can quote three negative examples: data retention directive, personal identification of mobile subscribers by law in many countries (and on-the-sly in all countries because the standards do not have built-in privacy), illegal mass espionage. These need to go. A next generation internet (even the current internet) under these conditions is worse than worthless, it is a terrible dragnet that poses big unanswered privacy issues.
H2020 FIRE

H2020 FIRE ARMOUR

FP7 epSOS

GNUnet, I2P, ARPA2
EU Antitrust Agency, EU Digital Agenda
UK: Midata

Finland: MyData Initiative

France: MesInfos

USA: Green Button, Blue Button

... And the provisions for "data portability" in Europe's new General Data Protection Regulation.
https://ind.ie/ethical-design
FLAMINGO; the GDPR

H2020 NETXTLEAP / ERC CIRCUS
Blog: netzpolitik.org (German), Free Software Foundation Europe
Codice di regolamentazione della privacy.
Eurojust
Midata (German cooperative)
Chaos Computer Club e. V.
HAT
Big Brother awards in various countries, the Europe vs. Facebook campaign (Austrian), the crypto design challenge.
IERC - European Research Cluster on the Internet of Things
Cybersecurity PPP, Big Data PPP, Future Internet PPP, and 5G PPP, The Alliance for Internet of Things Innovation (AIOTI)
A number of research projects, such the EPSRC funded Databox project (http://www.databoxproject.uk/) are developing decentralized methods for the providing of services that rely on personal data without requiring that the data is transferred from the user to the service provider.
Control of Private, personal date, avoid misuse of it, effective laws to protect people against act of hackers and comoanies free will to use personal data (whether selling without the person's consent to other companies or by compiling non authorized data). Right to oblivion on the Internet
Passenger Name Record (PNR)
Big Data in Healthcare Symposium (Munsbach, Luxembourg)
C'mooon, this is a weird questionnaire.
Regulation of data portability including personal data portability; Free flow of data initiative; US/EU Privacy Shield Agreement;
Spain, France, Italy
SoBigData
GDPR
none
FraunhoferFOKUS/Jolocom "Identity on the Blockchain", COALA.global "identity & governance working group"
MyData inititative (Finnish government). Estonian X-Road. New EU legislation on privacy.
EU FP7 project "PRACTIS"
New data privacy regulations, not agreeing to water it down in the Safe Harbor agreement with the USA
eID
MYDATA, personal data minimisation in ABC4Trust (EC), IRMA (NL), MIDATA-coop (CH)
USEMP project (http://www.usemp-project.eu/), TYPES project (http://www.types-project.eu/), ReCred (http://www.recred.eu/)
Innovate UK Quantified Self Contest
AIOTI, CAPS

Annex 2

Initiatives for AI as proposed by the respondents

Industry already takes care of this...
Workshop on Artificial Intelligence and Internet of Things (ECAI)
Do not know of any.
DFKI
ECAI
Cambridge (Centre for the Study of Existential Risk)
Oxford (Future of Humanity Institute)
Smart Data Forum, Berlin Capital AI
Maker Faire Rome.
http://www.mlplatform.nl/researchgroups/
Chaos Computer Club e. V.
AIOTI, SPARC PPP and Big Data PPP
UnBias Emancipating Users Against Algorithmic Biases for a Trusted Digital Economy (UK EPSRC funded) http://unbias.wp.horizon.ac.uk/ ;

IEEE The Global Initiative for Ethical Considerations

in the Design of Autonomous Systems
https://standards.ieee.org/develop/indconn/ec/autonomous_systems.html
xLiMe
Accenture and IPsoft team up to launch AI initiative
Institute for Artificial Intelligence; Machine Translation Service;
Tieto Corporation nominated AI to their top management team
EIT Digital; Innovate UK Competitions: Manufacturing and Materials; Robotics and Autonomous Systems Applications
MT@EC / Industrie 4.0 /