# Flourishing in a Data-enabled Society

June 2019

## About this Series

The ALLEA Discussion Paper series is an initiative to provide up to date and informed perspectives from the academic world on some of the most pressing issues facing societies across Europe and beyond. The objective is to connect and contribute to debates in the fields of science, society and policy. It serves as a transnational forum of the academies of sciences and humanities for outstanding scholars to present and discuss their work within ALLEA. Issues may draw on workshop reports, statements and position papers by ALLEA working groups or other ALLEA initiatives. The series provides an intellectual space to reflect on complex questions and potential solutions and seeks to inform policy decisions as well as the public debate.

## About the ALLEA and Royal Society Flourishing in a data-enabled society conference

The ALLEA and Royal Society *Flourishing in a data-enabled society* conference took place at Chicheley Hall, UK on 1-2 November 2018. This interdisciplinary event convened experts from academies across Europe and from different sectors to reflect on how society can best seize the opportunities and cope with the major challenges brought on by new uses of data. The conference was led by a cross-Academies Organising Committee chaired by Professor Richard Catlow FRS (UK), and comprising Dr Maria Ganzha (Poland), Professor Dame Wendy Hall FRS (UK), Professor Christoph Markschies (Germany), Professor Deborah Oughton (Norway), Professor Genevra Richardson FBA (UK), Professor Alain Strowel (Belgium), Professor David Rios (Spain), Professor Joos Vandewalle (Belgium), and HR Eveline Wandl-Vogt (Austria). This discussion paper summarises the discussion and debate at the conference. It is not intended to represent the views of either ALLEA or the Royal Society, nor does it represent the views of individual attendees at the event.

## About the Royal Society

The Royal Society is the national academy of sciences in the UK. It is a self-governing Fellowship of many of the world's most distinguished scientists drawn from all areas of science, engineering, and medicine. The Society's fundamental purpose, as it has been since its foundation in 1660, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity. The Society's strategic priorities emphasise its commitment to the highest quality science, to curiosity-driven research, and to the development and use of science for the benefit of society. These priorities are: promoting excellence in science; supporting international collaboration; demonstrating the importance of science to everyone.

## About ALLEA

ALLEA (All European Academies) is the European federation of academies of sciences and humanities. It was founded in 1994 and currently brings together almost 60 academies from more than 40 countries in the Council of Europe region. Its Member Academies are self-governing communities of leading scholars and researchers across all scientific fields. Independent from political, commercial and ideological interests, ALLEA contributes to the improvement of framework conditions under which science and scholarship excel. Together with its Member Academies, ALLEA addresses the full range of structural and policy issues facing Europe in science, research and innovation. Via its interdisciplinary and international working groups, various public engagement activities, and by participating in pan-European projects, ALLEA informs European policy and society through evidence-based advice.

# Executive summary

New applications of data have the potential to deliver a wide range of benefits, but, to realise them, societies must navigate significant choices and dilemmas: they must consider who reaps the most benefit from capturing, analysing and acting on different types of data, and who bears the most risk. In this fast-moving landscape, governance challenges also need to be addressed in a timely manner to enable safe and rapid uptake of digital technologies, and for the overall system of governance for data management and data use to establish public trust.

The academies of sciences and humanities from across Europe have a wealth of experts, spanning the range of disciplines required to tackle such challenges, and have the opportunity to convene timely discussions. For instance, the British Academy and the Royal Society published the report *Data management and use: Governance in the 21st century,*[1] which set out principles for good governance – including an overarching principle of 'human flourishing' or in other words data serving humanity – and recommended the establishment of a stewardship body to oversee the data governance landscape in the UK. Data governance can be defined as everything designed to inform the extent of confidence in data management, data use and the technologies derived from it, including laws, norms and technologies.

In partnering with the Royal Society to convene the *Flourishing in a data-enabled society* conference, ALLEA recognised it is essential and urgent to further connect debates across Europe. A key issue here is that an appropriate governance regime needs to consider how Europe can both safeguard values and maintain its technological edge – and thereby also the living standards and political power it has been protecting.

The following paper, based on discussions at the conference, covers broad questions affecting many people. As such, it will be of interest to different stakeholders from researchers to policymakers, across disciplines and sectors. It covers both broad issues, and elements of specific interest to different individuals and groups. The discussion paper concludes by posing some reflections for further consideration and action, regrouped under three main objectives: putting societal values at the heart of data use; establishing governance and regulation; and understanding opportunities for Europe.

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1 The British Academy and The Royal Society (2017), Data management and use: Governance in the 21st century. Online source: https://royalsociety.org/-/media/policy/projects/data-governance/data-management-governance.pdf (accessed 18/06/2019).

# 1. The nature and pace of the digital transformation

## Data is transforming our lives

The pace and scale of data collection and use has increased dramatically over the past two decades. Hardware is vastly more powerful and miniaturised than two decades ago, scaling up exponentially as predicted by Moore's law. A myriad of AI algorithms are running on our smart phones and on our computing infrastructure.

This is changing the way we live, work and learn, and presents both huge opportunities and challenges. Some of these changes manifest themselves at the system level. For example, an increasingly connected world entails new systems security challenges.

Other changes show in our everyday behaviours. Many of us spend more time interacting with our phones than with anyone in our lives – more than with our partners or our children. As we interact with the digital world, we seem to be giving away information we might not have shared so easily in the physical world. We do so in exchange for free services or goods. Despite reporting concerns about their privacy, many people might in practice still end up 'trading data for a free pizza', as one speaker put it – for example with one click they might give away their friends' contact details.

## Data is transforming markets

The data we generate by using various apps on our phones is relayed to companies who can use it and sell it on. This data can feed algorithms and underpin new services or even new business models. Many companies have understood that the data they handle is a most valuable asset, one that can indeed increase a business's valuation. It is not, perhaps, surprising that a number of companies have been 'hoarding', or accumulating, data, sometimes without a clear purpose for its use.

Whether that data is proprietary or not can dramatically alter markets. For example, when the US Supreme Court declared that the human genome could not be patented per se, there was an impact on the value of companies listed on the NASDAQ exchange. The opening of the human genome as a common shared construct has generated huge amounts of potential value. In London, the opening of public transportation datasets has powered new start-ups and services. Conversely, the 'hoarding' of data by a few can stifle an innovation ecosystem. It can create an information asymmetry and thereby a power asymmetry.

It is clear that data comes in different varieties and strains and that not all data should be open; some data is sensitive and must be protected. But the choice is not binary – there is a spectrum between open and closed data.

## Where will this lead us?

Some describe the digital transformation as a massive challenge we are only starting to comprehend. There is, for good reason, much debate about AI and its impact. In fact, we are dealing with complex systems, of which AI is only one component.

There are bold claims about risks coming from technologies, affecting for example democracy, personal autonomy or mental health. However, in many instances, hard evidence of impacts has

been lacking – or lagging. It is still unclear whether the digital transformation will bring about a revolutionary change unparalleled by other technologies, or if it will play out in the same way as other technology changes through history.

**A European way?**

This transformation is a global phenomenon, happening both in the developed and developing worlds. There are over 5.1 billion mobile phone subscribers worldwide corresponding to around 70% of the world's population.[2]

Different countries might make different choices when it comes to developing technologies and navigating the uncertainties around their impacts. There may be similarities in approaches to trust and privacy across Europe, contrasting with approaches of other countries around the globe.

There might be different answers to similar 'exam questions'. In terms drawn from economic theory, how can we maximise the advantages provided by the ready availability while minimising its risks? In more philosophical or ethical terms, how can data be collected, processed and managed in the spirit of the common good?

It is often said that the dominant players in the development of AI and digital technologies are the US and China, with Europe lagging behind. European countries have adopted various strategies for developing and adopting digital technologies. What are the strengths, values and goals that could influence the outcome of the digital transformation in Europe?

# 2. Opportunities for human flourishing

Data can benefit research and applications in many existing sectors, enabling individuals, communities and societies to flourish. The conference focused in particular on three promising areas of applications: healthcare, public policy and services, and social good and sustainable development goals.

**Data for healthcare**

Data and digital technologies promise huge benefits for health. For example, London-based DeepMind's tool for the diagnosis of eye retinopathy, using AI-powered image recognition, yielded very good results. This could be soon routinely used by health services, as the Food and Drug Administration (FDA) in the US approved the use of the first such medical device in 2018.[3]

The analysis of medical records and other written health information, using in particular natural language processing, is more challenging but promising. Such analysis could be used for personalised medicine, for retrospective studies or to track a patient's journey through multiple hospital departments. This is complicated by the fact that health data is not homogeneous, e.g. records might be in different formats and the language used might be more or less informative.

The availability of well-curated health data can make a big difference, such as the opening up of prescription data in the UK. It has made it possible to track very interesting variations in prescribing behaviour from region to region, from demographic to demographic.[4]

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2 Tobin, A. (2019), 5G Will Account For 15% Of Global Mobile Market By 2025. Online source: https://www.forbes.com/sites/annatobin/2019/02/25/15-of-global-mobile-industry-to-run-on-5g-by-2025/#4c6af032f9a8 (accessed 18/06/2019).

3 See https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-artificial-intelligence-based-device-detect-certain-diabetes-related-eye (accessed 21/6/2019)

4 See https://www.nhsbsa.nhs.uk/prescription-data/medicines-optimisation-dashboard (accessed 21/6/2019)

## Data for public policy and services

Data can help improve public services and make them more efficient. Statistical offices in many countries are exploring how to use alternative sources of data for building more accurate, more scalable and more efficient censuses than the traditional methods based on manual surveys. Conversely, public organisations may hold data that could be valuable for the provision of services, either in the public or private sectors: in the UK, the opening up of postcode data and transport data led to new and improved services for citizens.[5]

Governments across Europe are implementing their own digital transformations. However, there are different sensitivities compared with the private sector. Businesses' analytics generate information about consumers, whilst analytics in the public sector is about citizens. Data can inform decisions and public policies, but values also come into play. How the different elements should be integrated is an important question.

In fact, it is not new practice to use algorithms or similar mechanisms to help decide how to allocate public resources for public policy. But a key change here would be if this type of procedures would be implemented through autonomous systems.

There are a number of challenges around the use of data to shape policies: how can policy design be improved? How can we measure welfare in terms of capabilities? How do we represent collective risks? How do we use algorithms for describing, predicting and prescribing (social responsibility)?

## Data for social good and Sustainable Development Goals

From advancing research to enabling the response to humanitarian crises, data can substantially contribute to social good. It could in particular help monitor the achievement of Sustainable Development Goals (SDGs), and help achieve these goals.[6] Such topics are on the agenda of the UN World Data Forum.

For example, the large-scale data from telecommunication companies offers the possibility to quantify human behaviour at scale. As a large fraction of the population uses mobile phones, it creates a wealth of data that can be used for social good. Call detail records (metadata and aggregated data) collected at the level of the cell tower can bring a lot of value to any situation requiring understanding displacement of population, human mobility or assessing numbers of people affected by an event. Mobile data can be used to: respond to disasters (e.g. estimate population affected by an earthquake); infer financial inclusion and economic development, which relates to SDG 1 'no poverty'; predicting urban behaviours (e.g. peaks in energy consumption, crime hotspots), thus contributing to SDG 11 'sustainable cities and communities; public health (e.g. containing the flu or preventing the spread of malaria), part of SDG 3 'good health and well-being'.

Even more could be done to use data for social good, and this is supported by legal frameworks. In Europe, the legal background and basis for processing personal data are different in the case of using data for scientific research or for humanitarian crises, and can be much simpler than for other data uses.

Data skills are required to use data for social good, and not everyone on the planet has the same opportunities to acquire such skills. To address this

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5 See https://www.gov.uk/government/publications/uk-digital-strategy/7-data-unlocking-the-power-of-data-in-the-uk-economy-and-improving-public-confidence-in-its-use (accessed 21/6/2019)

6 United Nations (2014), A world that counts: Mobilising the data revolution for sustainable development. Online source: http://www.undatarevolution.org/report/ (accessed 27/05/2019).

large data skills gap, Data Pop Alliance and the UN are streaming courses anyone can take.[7] Data Pop Alliance also pushes for more research into using data for social good. Currently such projects tend to rely on the leadership of individual researchers.

There are also limitations associated with the data itself. This includes questions about the representativeness of the data and potential biases. Combining different data sources is also a challenge, because data comes in different formats. Finally, whilst there are many applications to the use of non-personal, low granularity data at the level of the cell tower, even more applications could be enabled by the use of personal data. However, this requires further understanding mobile personal data markets and the value of personal data.

# 3. European values in tension

Discussions at the *Flourishing in a data-enabled society* conference highlighted the importance of values when considering the development and application of digital technologies. This emphasis on values was linked with the rich, shared cultural heritage in Europe, and in particular the influence from the Enlightenment, and the Kantian ideas of the 'categorical imperative', a general moral obligation. In fact, one of the motivations for tech giants to set up offices and labs in Europe is to tap into that heritage and develop ethical technologies. What are the 'European values' shared across the continent and what do they mean for data-enabled societies?

## Privacy

Privacy is understood and valued differently around the world, and this is demonstrated in the way digital technologies are used and governed, for example, in China and Europe. Europe, overall, has a strong emphasis on privacy. However, there are different sensitivities from country to country. These differences show for example in the way various states use technologies such as CCTV and facial recognition.

Over the past years, it has become apparent that many companies around the world had been collecting data with limited transparency, in order to 'track patterns of life', build individual profiles and target ads and products to consumers.[8] They had also shared data and derived insights that people may not actually want to share. The author Shoshana Zuboff pointed the finger at this practice, which she refers to as 'surveillance capitalism'.[9]

In fact, even when organisations offer some level of information about privacy, it can still be difficult for online users to navigate privacy dilemmas. For example, Facebook's 'privacy settings' might give a false sense of control and e.g. might not prevent in-built apps from collecting certain data to target ads.

Perhaps related to this complex environment, general privacy concerns expressed in public attitudes studies are not necessarily very good predictors of privacy-related behaviour. Having a good understanding of how the internet and technology works, or experiencing a data breach first-hand, are better predictors.

Neglecting privacy concerns could damage the

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7 See Data Pop Alliance (2017), Introducing the UNSSC/Data-Pop Alliance Big Data & Sustainable Development Open Learning Hub. Online source: https://datapopalliance.org/open-learning-hub/ (accessed 28/05/2019).

8 The Royal Flemish Academy of Arts and Sciences (2018), Privacy in an age of the internet, social networks and big data. Online source: https://www.kvab.be/sites/default/rest/blobs/1501/tw_privacy_en.pdf (accessed 28/05/2019).

9 Zuboff, S. (2019), The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. Profile Books.

digital economy. It risks contributing to the erosion of trust.[10,11] It has been observed that, in order to protect themselves, a number of online users obscure their real data when signing up to online services. This risks creating an 'info smog' that adds noise to meaningful information and, if unmitigated, could limit the usefulness of the data.

### Autonomy

The use of data and machine learning to build and target individual profiles creates convenience, in that users are presented with options they are more likely to favour. But it also fuels concerns that we risk losing our autonomy in a 'subliminal' way. It could reinforce cognitive biases such as confirmation bias.[12] Combined with approaches from behavioural economics, such applications of digital technologies make up a very effective tool to manipulate human behaviour.

The role of machine learning and AI in decision-making also prompts questions. Algorithms have become very good at calculative decision-making. However, even if we have highly performing algorithms it does not entail we may want to use them for any problem, even if it were possible.

This might be for several reasons. First, humans do not always want to be predictable. For example, algorithms used in dating apps have become proficient at matching profiles and this has prompted a counter-trend of letting serendipity dictate how you find a partner. Second, data is

necessary but might not be sufficient to make decisions.

There are situations where human judgement is necessary, for example for ethical decisions. In a Royal Society public dialogue on machine learning,[13] most members of the public indicated they would not rely solely on technologies for medical decisions, instead they asked for a human-in-the-loop in order to be able to trust the system. There are decisions for which we can agree to give responsibilities to an automatic device – other decisions where we will not. Participants of the Royal Society's public dialogue wanted clear evidence that driverless cars could effectively adapt to road conditions and respond to sudden changes. In fact, many examples like chess playing have shown that the combination of machine and human learning outperforms each of the two individually.

### Rationality

Participants underscored the need to counter certain narratives about data-enabled decisions, such as that 'machines act objectively' or 'AI is magic'. Machines are, in fact, encoded with value-based choices, and it is not good enough for those who devise or use algorithms to claim that they are a 'black box' and cannot be explained. Algorithms need to be amenable to audit and evaluation. The EU's General Data Protection Regulation (GDPR) introduced a right for citizens to receive an explanation for algorithmic decisions. Interpretability of algorithms is also an area of active research.

While machine learning tends to be very good at finding patterns and correlations, it is in many cases currently not sufficient to establish causality.

10 ALLEA (2018), Loss of Trust? Loss of Trustworthiness? Truth and Expertise Today. Online source: https://www.allea.org/working-groups/overview/truth-trust-expertise/ (accessed 21/05/2019).

11 ALLEA (2019), Trust within Science: Dynamics and Norms of Knowledge Production. Online source: https://www.allea.org/working-groups/overview/truth-trust-expertise/ (accessed 21/05/2019).

12 ALLEA (2019), Trust in Science and Changing Landscapes of Communication. Online source: https://www.allea.org/working-groups/overview/truth-trust-expertise/ (accessed 21/05/2019).

13 The Royal Society and Ipsos MORI (2017), Public views of machine learning. Online source: https://royalsociety.org/topics-policy/projects/machine-learning/ (accessed 28/05/2019).

Machine learning may give the 'what' but not the 'why'. It generates information from data, and maybe knowledge, but it does not yield *wisdom*.

### Equality

One of the central tenets of Europe is that society should aspire to equality. Whilst the US have an approach focusing on individual liberty and a new social order,[14] Europe's own approach overall, since the Enlightenment, has been to ensure that the kind of protections that were in place for a few are now provided for all people.

This focus on reducing inequalities shows in how European states have, to various degrees and in different ways, established rights and also welfare systems based on redistribution through taxation. How can digital technologies support this public value of equality? This is also related to the complex issue of fairness: how can we ensure that algorithms used, e.g. for public policy, will be fair?

### Dignity and flourishing

The protection of image, privacy and honour in law can be traced back to the 19th century in European countries such as France, Germany and others. Whilst the 1950 European Convention on Human Rights (ECHR) did not explicitly mention dignity, the European Court of Human Rights has acknowledged that protection of dignity and human freedom is "the very essence of the ECHR" and that protecting dignity is a matter of civilisation.[15]

As technology is increasingly becoming part of us, what are the implications to human dignity?

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14 Whitman, J. (2004), The two Western cultures of privacy: dignity vs liberty. Online source: https://digitalcommons. law.yale.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1647&context=fss_papers (accessed 27/05/2019).

15 Heselhaus, S. and Hemsley, R. (2019) ‚Human dignity and the European Convention on Human Rights. Handbook of Human Dignity in Europe, 969-992. See https://link.springer. com/referenceworkentry/10.1007%2F978-3-319-28082-0_47 (accessed 21/6/2019).

For example, even though a user's Facebook account is just numbers in a server in Singapore, if the account is attacked the user may still feel personally attacked.

Human flourishing is a distinct concept, which is complementary to human dignity. When it comes to data and digital technologies, the principle of human flourishing is about data serving individuals, communities and societies. Flourishing relates to the unfolding of every aspect of the human being: it is about the cognitive, emotional and spiritual.

It may be tempting to put a break on the use of data with the aim to safeguard human dignity and human flourishing. The tension here is that Europe could be losing its technological edge and that this may lead to the decline of the very living standards and political power it has been protecting. This prompts several questions: does Europe value human dignity and the protection of human dignity above economic growth? What will undermine human flourishing more, the harms from using data inappropriately or the missed opportunities if we do not use data?

# 4. Governance and data-enabled innovation in Europe

The governance of data use and data-enabled innovation in Europe both need a system-wide approach to be most effective. There is a role for every stakeholder.

### Regulation

*Leadership in establishing regulatory frameworks*

Europe has pioneered bold regulatory frameworks that can influence data use. The human rights framework is concrete and analytical, effective at

the protection of human dignity and individual rights, but limited in terms of protection of common interests.

Europe was the first to adopt data protection laws in the 1970s-80s, with a strong focus on human dignity and putting the human being at the centre. With the GDPR, the EU has reasserted its leadership in this space. While data is global, GDPR has shown it is possible to legislate technologies at the territorial level.

Because of the scale of these technologies, we will need international cooperation. GDPR has inspired changes around the world. California followed suit and an uplift to data protection in federal law is likely to be part of the debate in the run up to the next Presidential election in the US. Regulation might restrict innovation in certain fields, but it might divert energy into other areas and potentially accelerate innovation.

*Limits of enforcement*

The effectiveness of data protection regimes is limited by an under-resourced enforcement. Very low levels of compliance have been reported in a number of cases. The UK Information Commissioner surveyed large price comparison sites and their transparency provisions and found that between 80-90% were non-compliant. There is fresh hope that the European Data Protection Board will be a helpful resource to support effective enforcement.

Regulators need to be more agile to respond to the acceleration of the digital transformation. GDPR took years to be developed and observers pointed out some aspects are already outdated. Likewise, blunt enforcement could harm progress and those in charge of it need to be thinking about the implications of using technologies within their briefs. For example, during the West African Ebola outbreak in 2014, there was an effort to convince regulators in affected countries that the specific

use of mobile data to curb the spread of the disease did not present privacy risks but, because these countries lacked experience and information about such data applications, this was not very successful.[16] There is also a need for regulatory bodies to keep abreast with and gather evidence about the impact of technology, as it evolves.

*States and tech giants: what's the name of the game?*

Given the size and importance of the European market, tech giants are very concerned about what European law may or may not mean for them. This means that Europe does have a unique opportunity to control the digital transformation if it sticks with its commitments to the values that are central to the European project. A threat to such a collective endeavour is that every country has an incentive to be the 'regulation-light entry' into the European market.

In fact, Microsoft and others have been calling for regulation now. Tech giants may welcome regulation as this would clarify the 'rules of the game' and the companies' responsibilities. Each company may lobby for what they can actually deliver and what will be better for them to do.

*Future evolutions*

Conference participants suggested shifting the balance from the democratic states responding to technologies to them proactively setting the rules under which technologies play.

Evolutions to legal frameworks could include addressing the question of trust. In the UK, the Human Fertilisation and Embryology Authority (HFEA) was an example of a process to build a trusted regulatory framework.

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16 The Economist (2014), Why mobile data to prevent Ebola has not yet been released. See https://www.economist.com/the-economist-explains/2014/11/09/why-mobile-data-to-prevent-ebola-has-not-yet-been-released (accessed 21/6/2019)

More broadly, political philosophy has an important role to play in reconfiguring the social contract in a hyper-networked digital age.

### Technology

*Creating tech responsibly*

Europe has a history in championing responsible research and innovation. Teams developing technology need to be multi-disciplinary and diverse. Researchers and technologists need to think about the potential unintended consequences of data use.

The creation of international standards and the use of certifications have a role to play, although there is a risk of a politicisation of technical standards.[17] With responsible innovation, the emphasis is placed on self-regulation and the GDPR recognises ethical standards set by researchers. 'FATED' is an example set of principles that was proposed at the conference, advocating the development of Fair, Accountable, Transparent, Ethical and Diverse technology.

The civil society organisation doteveryone proposed a '3C' model for developers of technology,[18] considering Context, Consequences and Contributions. Many technologists want to do good and they could be a driving force in establishing good practice in companies.[19]

As small companies face the dilemma of doing good whilst remaining competitive, there is a role

for public sector procurement and for systems that specifically incentivise and provide support to start-ups who are behaving responsibly. The Horizon2020 VIRT-EU project is an example initiative developing frameworks for start-ups and small companies that want to make money and to innovate responsibly.

*Creating tech that can help us be responsible*

Europe currently consumes a lot of technology from the US and China. If Europe wants to steer the development of technology so that it embeds its values and behaves a certain way, the most straightforward way would be for Europe to be building such technology.

Technologies known as Privacy Enhancing Technologies (PETs) can protect privacy in practice. Considering how technologies can be used as a means of governance is the essence of the 'data protection by design and default' approach required by the GDPR. This is a good example of regulation boosting the development of a given class of technologies and approaches. Europe has an opportunity to spear-head the development and use of PETs, and more broadly of technologies for governance (RegTech) and for governments (GovTech).

Some of these technologies could support a move from centralised to decentralised models of trust, with a different way of sharing and protecting data. Personal data stores, such as the data-sharing apps underpinning web founder Tim Berner Lee's SOLID platform, offer this possibility. Another example is not-for-profit Data Pop Alliance's project to use data for social good in a privacy-preserving way (OPAL), by bringing algorithms to the data rather than the other way around.

Such technological developments can not only protect data but also provide data subjects with more agency and autonomy. A different avenue

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17 Chadwick, P. (2018), To regulate AI we need new laws, not just a code of ethics. Online source: https://www.theguardi-an.com/commentisfree/2018/oct/28/regulate-ai-new-laws-co de-of-ethics-technology-power (accessed 18/06/2019).

18 Brown, S. (2018), A model to help tech companies make responsible technology a reality. Online source: https://medi-um.com/doteveryone/a-model-to-help-tech-companies-ma-ke-responsible-technology-a-reality-837c50713c65 (accessed 18/06/2019).

19 Doteveryone (2019), People, power and technology: the tech workers' view. Online source: https://doteveryone.org. uk/report/workersview/ (accessed 28/05/2019).

to empower users is to design technologies so that they are not meant to replace humans but to augment their capabilities. With that in mind, it may be more important to build technology that is interpretable rather than perfectly accurate. After all, people use Google Translate even if it is not perfect, but 'good enough', and there is a parallel to be drawn with the way people use existing healthcare systems.

## New governance challenges, new initiatives

### Data as an infrastructure

If Europe wants to lead in the research and development of digital technologies that support human flourishing, it needs to have a data infrastructure to ensure it makes the best possible use of its data. The UK's National Infrastructure Commission report *Data for the public good* makes the case for investing in a data infrastructure that supports data sharing and good governance.[20]

Data infrastructure needs to be reliable, high-quality, supporting good governance, interoperable and economic. European states have been experimenting with different models of national data infrastructures. X-road is the backbone for e-Estonia, a blockchain-integrated platform supporting data sharing. The UK Government announced it would pilot data trusts, cooperative models of data use and sharing. At the supra-national level, the European Commission has created an expert group on business-to-government data sharing.

### National and European initiatives on data ethics

National and international governance initiatives can be complementary. Whilst pan-European initiatives might be the ideal fora to serve shared values and goals, they might also require more

time to be set up, to navigate differences and to come to agreements.

The European Group on Ethics in Science and New Technologies (EGE) recommended the launch of an integrative and inclusive process to foster the dealing with data and artificial intelligence in Europe (March 2018) and published its views on the future of work. [21,22]

Supplementing the work of the EU's High-Level Expert Group,[23] AI4people ran a meta-analysis of principles for AI from multiple previous projects. They identified five 'big blocks': beneficence; non-maleficence; autonomy; justice; and explicability.[24]

The German Government's Data Ethics Commission's principal goal is to set up an ethical, legal framework for data policies in Germany. In the UK, the Centre for Data Ethics and Innovation aims to help the country deal with the novel ethical issues raised by rapidly developing technologies such as artificial intelligence, agreeing best practice around data use and identifying potential new forms of governance. France also has a National Digital Council, as well as an AI strategy (AI for Humanity) that set out priorities to develop AI capacity, including ethical and ecological considerations.

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20 UK National Infrastructure Commission (2017), Data for the Public Good. Online source: https://www.nic.org.uk/wp-content/uploads/Data-for-the-Public-Good-NIC-Report.pdf (accessed 18/06/2019).

21 European Group on Ethics in Science and New Technologies (European Commission) (2018), Statement on artificial intelligence, robotics and 'autonomous' systems. Online Source: https://ec.europa.eu/research/ege/pdf/ege_ai_statement_2018.pdf (accessed 18/06/2019).

22 European Group on Ethics in Science and New Technologies (European Commission) (2018), Future of work, future of society. Online source: https://ec.europa.eu/info/news/future-work-future-society-new-opinion-ege-2018-dec-19_en (accessed 21/06/2019)

23 See https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence (accessed 21/06/2019)

24 Floridi, L. et al. (2018) AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations. Minds and Machines, 28:689–707. Online source: https://doi.org/10.1007/s11023-018-9482-5 (accessed 21/6/2019)

These nascent initiatives face common challenges: how do they identify and prioritise common issues? How do they avoid duplication?

Connecting debates between these initiatives sheds light on cross-cutting themes that they must tackle. These include interpretability and understanding how algorithmic systems work; discrimination and fairness; and 'bridge building' by fostering truly multi-stakeholder debates.

*Meaningful public engagement*

Citizens and consumers should not be expected to simply accept the outcome of the digital transformation, whatever it is. As it is, they cannot be expected to take on the burden of navigating complex new environments. For example, it is unrealistic to ask that consumers provide informed consent by reading and understanding pages of terms and conditions. Digital systems need better designs and citizens need to be trained to have sufficient digital literacy.

Crucially, an upstream, ongoing, multi-stakeholder conversation is necessary about how we want technologies to serve us as a society. As part of this, deep, meaningful public engagement is essential to negotiate the best outcome of data for society and maintain public trust. However, there is an enormous gap in finding a common vocabulary allowing everyone to have productive conversations about data and its impact.

# 5. Considerations

This section summarises considerations towards a vision for a flourishing data-enabled Europe. The Chicheley conference highlighted the following areas requiring further thought and action:

• Putting societal values at the heart of data use:

o What are the roles of different stakeholders in ensuring the use of data enables human flourishing?

o How can public trust in data use and data governance be established and maintained? How can the public be meaningfully engaged and empowered with the development of technology?

• Establishing governance and regulation:

o How fit for purpose are existing governance frameworks to adapt to the accelerating pace of technological development? A review of the data governance landscape and infrastructure in Europe would help identify any gaps and needs to improve it, such as particular sectors where action is needed or specific aspects of data use. The EU has a number of existing initiatives that relate to data governance and European countries set up national stewardship bodies that have oversight of data governance questions. Is there a need for a European data stewardship body?

o What is the potential impact of new regulations or data governance infrastructures on industry and business?

o What is the role of technologies in the enforcement of, and compliance with, regulation? In particular, how might PETs, RegTech and GovTech contribute to good governance?

• Understanding opportunities for Europe:

o How can Europe remain competitive in the global digital market? In which areas of governance and technology development can Europe develop and maintain leadership? There is a need to identify and promote key cross-sector research challenges supporting good data governance, and where Europe can develop leadership, such as PETs and other 'responsible technologies'.

o What would a European values framework ('new Enlightenment') look like? How would it underpin both responsible technological developments and legal frameworks?

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