Culture by Design
A Data Interest Analysis of the European AI Policy Agenda

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Abstract
This article elucidates the cultural power dynamics of the AI momentum of the 2010s with an examination of a European AI policy agenda developed by a High-Level Expert Group on AI and the European Commission. It investigates a moment of the big data age in which AI as an extra layer of complex data analytics became a fix point of global negotiations between different interests in data and proposes that a choice of cultural framework for the AI momentum is also a choice of data ethics.

Keywords: data ethics, artificial intelligence, culture, Europe, technology, interests, power.

Introduction

At the end of the first twenty years of the 21st Century, Artificial intelligence technologies (AI) [1] became the centre of a global public debate in policy, media and industry. From transpiring as a scientific endeavour and sci-fi curiosity, AI had transformed into a young socio-technical system with rapid societal adoption and consequently a fix point of global governance. Against that background, a European AI strategy was published in 2018 by the European Commission and further developed in policy and expert group initiatives over a two-year period with a growing emphasis on ethics in the shape of European values. European legislators had just implemented a momentous data protection law reform to address challenges of a big data digitalization of societies, and on a global scale states and companies alike were carving their space with more or less aggressive data harvesting advances, while citizens were toiling to understand their own role in emerging big data technological environments.

This article traces and explicates culture as an interest in a societal AI momentum with an analysis of the European AI policy agenda as it evolved in the period 2018-2019 in particular focusing on the work of a High-Level Expert Group on AI set up by the European Commission to inform the AI strategy.[2] Predominantly, it is examined as a component of a general process of value negotiations in a global environment. Indeed, the evolving agenda

was from the outset explicitly framed as European positioning in what was dubbed in public discourse the "global AI race" between Europe, and in particular the US and China.

Theoretically, the article is grounded in a discussion of the role of culture and interests in the development and governance of socio-technical systems. Thus, it builds on conceptualizations of culture and values in Cultural Studies, applied ethics and Science and Technology Studies (STS) where culture is broadly conceptualized as shared, often taken for granted, and as a result not always explicated conditions.

Notably in STS, culture denotes shared systemized knowledge cultures that form the foundation for science and technology development, as the field of resources, the skills, experiences, methods and even tools for technological development. Often silently presupposed and consequently also unquestioned. However, during consolidation and societal adoption, the taken for granted cultural components of a socio-technical development are exposed in processes of negotiation between conflicting cultural interests and sought explicated in for example policy, engineering guidelines, manuals and standards.

With this framework in mind, the objective of the article is ultimately one that is concerned with the power dynamics of the governance of AI. By making the invisible cultural components of technological change visible, I also seek to expose their power dynamics. In the 2010s the term AI gained popularity in public discourse as a way to describe an evolution of the "Big Data Society"[3] that is; as an extra layer of complex data analytics added to an expanding global information infrastructure. As a consequence, the battle over AI, I propose, was also a battle over data. Who had the right to the data resources used for the development of AI, how did AI's data intensity effect democracy, personal lives, economy, politics?

The analysis of the article takes point of departure in a data ethics of power that wants to elucidate interests, power relations and cultural positioning in the big data age.[4] Therefore, I investigate the cultural positioning of an institutionally framed process in which the European AI agenda evolved as a data interest.[5] That is; above all I understand AI as complex data processing systems and data design that form the loci of societal power dynamics.

The European AI Agenda: Sculpting the Cultural Interest in AI

In 2018-2019, AI was still a young system. The technology's adoption, however, in private and public sectors from health care, security, finance, emergency, defence, e-government, law, transportation to energy was speeding up. Like the universal electric supply system of the 1890s[6] data infrastructures enhanced by AI software systems to perceive and interpret their environments were quickly connecting and transforming the world. China and the US had been first movers in its adoption of AI, and in Europe an increasing number of examples of socially challenging applications of AI from these regions had been in the public limelight. The use of a biased sentencing software in the US judicial system[7] for example, or the mass citizen social credit scoring system of China.[8]

But gradually social implications of AI used in European settings were also edging into public awareness. [9] The European Union was for example proposing and adopting initiatives to establish smart border management systems and to integrate instruments for data processing and decision-making systems in asylum and immigration and law enforcement cooperation. Europe was also experimenting with frameworks for automating detection and analysis of terrorist-related online contents and financing activities. At the same time,

individual member states were toying with AI for predictive policing, public administration of benefits, to trace vulnerable children, for tax collection purposes and even social scoring, while private sector examples included most profoundly AI in banking and insurance.

As such, AI had also become a component of decision-making in many European sectors and consequently it became the center of negotiations between different societal interests. In particular interests were centered on the data of AI, as a resource to protect, share, acquire and to be empowered or disempowered by. A central question was, which of these interests would create the conditions for these AI systems' design and adoption in European society?

It was in this setting the contours of an institutionally framed European AI agenda took shape as a distinctive cultural positioning with an emphasis on "ethical technologies" and "Trustworthy AI". It was sought spelled out in core documents and statements in a process that involved European members states, a European High-Level Expert Group on AI, a multi stakeholder forum called the European AI Alliance and the European Commission. The EU was recognizing that AI had become an area of strategic importance, transforming critical infrastructures in all the aforementioned sectors and therefore also a driver of economic development. And its AI approach was on those grounds defined as a policy investment in ensuring Europe's competitiveness on a global scale by for example increasing annual investments in AI development and research and with the agreement on joining forces with national strategies on AI in member states.

The European Commission published its first Communication on Artificial Intelligence and Robotics in early 2018, which was accompanied by a Declaration of Cooperation on Artificial Intelligence signed by 25 European member states. As such, it presented a general initial European approach to AI with a focus on cooperation among member states, multistakeholder initiatives, investment, research and technology development. Above all, AI was at this point described as part of a European economic strategy within a global competitive field. While it was not a core strategic element of this first Communication on the topic, a values-based positioning was also offered: *"The EU can lead the way in developing and using AI for good and for all, building on its values and its strengths."*[10] And a first step to address ethical concerns was made with the plan to draft a set of AI ethics guidelines.

Following this, a European High-Level Expert Group on AI was established in June 2018 with 52 selected members of individual experts and representatives from different stakeholder groups. Their mandate was to develop AI ethics guidelines and policy and investment recommendations for the EU. From the outset, the group's work was framed in terms of a distinctive European framework. For example, at the group's first meeting in Brussels in June 2018, a European Commission representative responded to a comment regarding Europe's competitiveness: *"AI cannot be imposed on us"* and it was concluded that *"Europe must shape its own response to AI."* [11]
Notably, the "European response" was already here defined in terms of what was presumed to be a set of shared European values. For example, at the same meeting the chair introduced the core constituents of the group's mandate and the European Commission's expectations to the group as follows: *"It is essential that Europe shapes AI to its own purpose and values, and creates a competitive environment for investment in AI."*[12]
A decree that was later included in the discussions of the group and defined as the search for a distinctive European position in a global setting:

"Discussion also centred on identifying the uniqueness of a European approach to AI, embedding European values, while at the same time identifying the need to operate successfully in a global context "[13]

Turning to the very ethics guidelines published a year later in April 2019 they were also outlined on the basis of "European values". Values were in this document introduced with a reference to the European Commission's vision to among others ensure *"(…) an appropriate ethical and legal framework to strengthen European values."*[14] The key reference was here European legal frameworks such as the Charter of Fundamental rights and the General Data Protection Regulation. However, European values were also sought comprised in one unifying ethics framework defined as the "human centric approach" in which the individual human being's interests prevail over other societal interests:
"The common foundation that unites these rights can be understood as rooted in respect for human dignity – thereby reflecting what we describe as a "human-centric approach" in which the human being enjoys a unique and inalienable moral status of primacy in the civil, political, economic and social fields."[15]

Yet, it was the delineation of a specific type of technology design and culture of AI practitioners, which in the end became the ethics guidelines' unique cultural positioning. Several ethics guidelines for AI had in 2019 already been published in European member states, outside Europe and by international organisations. Most notably, only a few months after the High-Level Expert Group's ethics guidelines were published, 42 countries adopted an OECD recommendation that included ethical principles for Trustworthy AI. Though in comparison with other more principle-based ethics guidelines, the High-Level Expert Group's ethics guidelines were particularly focused on the operationalisation of ethics in the design of AI, that is; on framing the practice of building AI hence providing concrete and practical guidance to AI practitioners. Europe was consequently also described as a potential leader in the development of "ethical technology" with the call for creating a very specific approach to the design of AI. As such, ethics and values were considered a property of technological design and practice, and in addition to deployers and users of AI, practitioners were in the guidelines urged to implement and apply seven ethical requirements that were supplemented with an assessment list with concrete questions to guide AI practitioners.

During the process of developing the ethics guidelines the title of the work changed from "Trusted AI" to "Trustworthy AI".[16] While this might be conceived of as a change primarily in semantics, the transformation in fact built on core discussions at group meetings centered on the inherent values of AI design. This means that the conclusion of the group, which was also contained in the title, was that AI technologies should not just be trusted, the EU needed to ensure that trustworthiness was built into the "technology culture" of AI innovation. As stated in the report from the first workshop of the High-Level Expert Group: *"Trusted AI is achieved not merely through regulation, but also by putting in place a human-oriented and ethical mind-set by those dealing with AI, in each stage of the process."*[17]

In this way, Trustworthy AI came into being as the European "third way" in AI innovation. This also meant that when working with the policy and investment recommendations that were published in June 2019, the High-Level Group proposed Trustworthy AI as a core European strategic area of focus[18]. Thus, the recommendations emphasised the leveraging of European "enablers" for Trustworthy AI. For example providing human-centric AI-based services for individuals, making use of public procurement to ensure trustworthy AI, integrating knowledge and awareness, updating skills among policymakers, work forces and

students, developing a research university network on AI ethics and other disciplines necessary to ensure Trustworthy AI across Europe, providing legal and technical support to implement Trustworthy AI and mapping legal frameworks and creating new laws where the risks were considered high (e.g. when AI is used in the context of mass citizen scoring or autonomous weapons). Even recommendations were made to develop a European AI infrastructure based on personal data control and privacy.

To sum up, throughout the course of the High-Level Expert Group's development of a set of ethics guidelines and policy and investment recommendations on AI, a European ethics and values-based approach to AI transformed from a brief "concern" in a political strategy into a strategic point of positioning of the European Commission with a call for actual implementation in ethical technologies and legal reform. Nathalie Smuha, who was the coordinator of the group, has described how the work of the High-Level Group was quickly adopted within the European Commission's general AI strategy.[19] As she explains, the European Commission at that time counted around 700 active expert groups, as the High-Level Expert Group on AI, that were tasked to draft opinions or reports advising the Commission on particular subjects. However, their input was not binding and the Commission was independent in the way it took into account the groups' advice and expertise. For example, only rarely did they become the core topic of a Commission Communication.[20] Nevertheless, when the High-Level Expert Group in 2019 presented the ethics guidelines to the Commission in March 2019, an almost immediate agreement was reached to publish the last Communication in the two year period "Building Trust in Human-Centric AI" that stated its support for the seven key requirements of the guideline and encouraged all stakeholders to implement them when developing, deploying or using AI systems.[21] This culminated with the promise of a new president of the European Commission, Ursula von der Leyen at the end of 2019: *"In my first 100 days in office, I will put forward legislation for a coordinated European approach on the human and ethical implications of Artificial Intelligence."*[22]

Culture and Technological Change

2018 was the year when the European Commission's AI agenda was introduced. It was also the year when Viviane Reding, who had been the European Commissioner in charge of a grand reform of European data protection law implemented that year, thundered in a plenary debate in the European parliament in Strasbourg: *"(...)Who wants to be part of a global community where algorithms know what you are better than you, than your family, than your friends?(...)Nine in ten Europeans want none of this, and that is exactly why we adopted the General Data Protection Regulation – to put citizens back in control of their own data; to ensure a stronger enforcement and high fines for companies which do not comply; to set data protection standards worldwide. (....)"*[23]

She was recalling the Cambridge Analytica scandal, as it was referred to in public discourse, where complex machine learning techniques had been used to identify patterns in big data sets harvested from a global social media infrastructure developed by a private US technology company. The scandal involved the data from 87 million people worldwide, including 2.7 million Europeans.[24] Reding spoke of a cultural challenge, a loss of control and the need for strong European governance at a time when a global information infrastructure was evolving at rapid pace with increasingly autonomous data analytics transforming society as we know it.

The significance of culture in moments of technological change gains different weight depending on one's adherence to either technology determinist or social constructivist approaches: As the power of humans to shape technological transformations of society, or on the other hand, as the human disempowerment in the face of the same. When the Cambridge Analytica scandal reached the news and forced the Facebook CEO Mark Zuckerberg to explain the big data strategies of his company to regulators around the world, the global AI system that his company had become so integrally part of, was still in the first stages of worldwide adoption in diverse jurisdictions and cultural settings. As such, AI technologies were adding an extra layer of complex data analytics to critical decision-making processes in private sectors and public sectors.

As said, the global embrace of AI in these areas had enticed what was dubbed a "global race" in AI innovation and investment. But at the same time a different race took place. With the evolution of a huge transregional socio-technical data infrastructure for AI, different legal jurisdictions and cultural approaches were bound to clash forcing out not only new legal and policy discussions, but also fierce cultural positioning and competition. Indeed, the urge to explicate a shared European cultural framework for AI and the data pools on which the technology strove emerged in direct response to an evolving global technological system. However, the European governance agenda that arose from this response was not disempowered, rather it was applied with such force in terms of targeted investment, joint European members state actions, the explication of an alternative AI technology culture, and even the suggestion of new law, that it could be said to drive a new direction in Europe for the young AI system parting from what was before.

How can we explain this kind of forceful explication of cultural values as a generator for governance in the face of technological change? Early in the history of the computer revolution of society, one of the pioneers within applied computer ethics, James H. Moor, described in his famous essay "What is computer ethics?" the kind of policy vacuums that emerge when policies clash with technological developments that force us to "discover and make explicit what our value preferences are"[25]. He predicted that the computer revolution would happen in two stages marked by the questions we ask. In the first "Introduction Stage" we would ask the functional questions – how well does this and that technology function for its purpose? In the second "Permeation Stage", when institutions and activities are transformed, we will start asking questions regarding the nature and value of things.[26]

The historian Thomas P. Hughes has detailed the general developmental phases of large evolving and expanding technological systems from invention, development, innovation, transfer, growth, to competition and consolidation[27]. Though unlike Moor, Hughes does not consider these moments of explication as solely induced by the transformative character of the technological systems. He considers their negotiation in complex social spaces. In fact, Hughes holds that technologies themselves are intertwined with social, economic and cultural problems.[28]

Now, to explain the shape of the AI momentum of 2018-2019 that seemed to arise simultaneously from the "inside" and the "outside" of the technological system we need some additional perspectives. Let us imagine this shape as cultural. Two perspectives on culture are here relevant to explain:

Firstly, Cultural Studies has shown us that culture is not just one, but multifaceted - informally and formally created by and in interaction with people and artefacts - and the

meaning of these cultural relations are in constant contestation and social negotiation. The founding scholar of the British Cultural Studies tradition, Raymond Williams, for example famously defined culture as "shapes", a set of "purposes" and "meanings" that are expressed "in institutions, and in arts and learning" and in "ordinary" practice[29]. Accordingly, culture is "a whole way of life"[30]. It consists of prescribed dominant meanings, but importantly also the negotiations of these. The meaning of culture is in "(…) active debate and amendment under the pressures of experience, contact and discovery (...)"[31] and as such it is simultaneously "traditional" and "creative". Hence, there are two sides of culture, "(…) the known meanings and directions, which its members are trained to" and "the new observations and meanings, which are offered and tested".[32]

Secondly, cultural negotiation exists in a complex social space of interests, power dynamics and their conditions. Here, we may consider a sociological depiction of technological development. The sociologist Francesco Lapenta describes the social interests at play in technology design with a model for technology-oriented analysis based on a broadly defined set of stakeholder groups (developers, policymakers, financial actors, "users and users" groups) and their "driving forces" that in combination are "(…) responsible for the path of evolution and trajectory of any technology." These interests do not pertain to uniform societal groups, he argues, but rather they are general *forces* and "interlinked influences" shaping the conditions of technology development[33]. We may therefore also infer here that technological development can actually be directed, if we manage to orchestrate the complex forces at play. As the STS scholars Wiebe Bijker and John Law put it, technologies do not represent their own inner logic, they are "shaped", by a range of heterogeneous factors indeed, nevertheless shaped, even "pressed" into a certain form, that "might have been otherwise"[34].

In this way, we may also trace culture or the cultural in the very design of technological development as shared systems and conceptual frameworks that are socially negotiated based on their material, economic and social conditions. Hughes contends that differences in "technological styles" became particularly apparent in the 20th Century due to the increasing availability of "international pools of technology" (including e.g. international trade, patent circulation, the migration of experts, technology transfer agreements, and other forms of knowledge exchange)[35]. He holds that technological style is the language of culture, so to speak, or it is, as he says, an "adaption to environment"[36]. That is to say; culture is the sum of "systemized knowledge" created in interaction with the economic and social institutions involved.

This view is characteristic of an STS perspective on the cultural components of technology development. Although also a contested concept, culture is here most often described as the way we get to know things and the skills and resources we use to create a technology. This means that distinct "knowledge cultures" or "technological cultures" are the foundations of a technology's design and adaption in society. Andrew Pickering for example describes culture as the resources that scientists use in their work or a shared conceptual field[37]. Harry M. Collins defines cultural skills as intents and purposes and sets of rules of action for the design of a technology[38], and in his view, they are the inexplicable or "hidden" components of technology development[39]. In this connection, the concept "data cultures" can be used to illustrate the cultural variations of the different technological "styles" of the way in which data is managed and treated in technology design. These various styles could also be described as the "technological cultures" of data design based on shared skills and knowledge frameworks for data technology practitioners. Implicit for example in ideals about the big data value for technology development[40], but also explicitly described in data protection laws

or ISO standards, such as the 27701 on how to create privacy information management systems (PIMS). As the Information Studies scholars Amelia Acker & Tanya Clement explains it: “Understanding data cultures as underwritten by collections of data (as relata) means understanding data cultures as phenomenon shaped by ideas about the cultivation and production of data that reflect epistemologies about, for example, ordering, classification, and standards.”[41]

Collins holds that the implicit cultural skills of technology practitioners transform when they are made explicit and that this transformation of skills depends on changes in a “cultural ambience” that is “enmeshed in wider social and political affairs”[42]. Hughes equally defines technological culture as a complex composite of socially embedded interests, goals and intentions.[43] Famously he held that technological systems do not become autonomous by themselves, but require momentum, which depends on the interests (the culture) of the organisations and people invested in the system. He mentions a few of these that were invested in the development of the modern electric power system that we might also recognise as stakeholders in the AI Momentum of the 2010s: “Manufacturing corporations, public and private utilities, industrial and government research laboratories, investment and banking houses, sections of technical and scientific societies, departments in educational institutions, and regulatory bodies…”[44].

Fundamentally what we can take from this is that culture in technology development is not just a randomly adapted technological style. They are enmeshed in cultural spaces, the epicenter of power negotiations between competing cultures. Notably, Hughes illustrated how each developmental phase of a technological system produces, a specific "culture of technology", which is the sum of this complex set of interests. The technology culture is also what effects the momentum of a technological system and importantly competing cultures must convert to the dominant culture of the momentum or perish.

Making the Invisible Visible

As disparate as they may seem in their perception of the relation between culture and technological change, there is in respectively applied computer ethics, STS and Cultural Studies, a shared emphasis on the importance of making the invisible visible and explicating cultural components in order to effect change. With various objectives from enhancing human capability and empowerment in shaping the micro design of a technology to doing the same in the grander societal adoption of socio-technical systems.

Moor considers the “invisibility factor”[45] such as “invisible programming values”[46] principal ethical challenges of the computer and its use per se. Collins’ explains the move of the taken for granted cultural skills from inexplicable to explicable categories as among others a way to reduce ambiguity in knowledge and practice due to cultural and contextual distance[47]. Hughes takes a grander view when looking at the consolidation in society of larger technological systems arguing that they do have a direction and therefore the explication of goals is more important for a young system than for an old one.[48]

Finally, in Cultural Studies, the explication of cultural components is most often coupled with the exposure of cultural power dynamics. In this view, the various sense-making and producing cultural practices and shared taken for granted cultural systems that naturalize specific situated views of the world and enforce power dynamics can only be challenged if explicated. As Roland Barthes states with a reference to the only language that he does not consider myth, “man as producer”, the language that he says humans can use to transform

reality: “Revolution is defined as a cathartic act meant to reveal the political load of the world: it *makes* the world; and its language, all of it, is functionally absorbed in this making.”[49]

In other words, the cultural foundation of a technological system, what we have also referred to here as its “shape”, the “knowledge culture” behind or its “technological style”, we may also see as a prioritization of inherent values of a cultural system. In an applied ethics perspective, values are for example described by the philosopher of technology Philip Brey as “(…) idealized qualities or conditions in the world that people find good.”[50] Ideals that we can work towards realizing in the design of a computer technology. To this conceptualization of the realization of values in technological development we might add the previously outlined more complex STS perception of embedded stakeholder interests. Technologies can have a specific cultural shape that consists of the implicit systems of organized knowledge, practices and meanings that go into their design. That is, values are not just personal ideals or transcendentally “true” or “good”; they are culturally situated and constantly engage with shared cultural purposes and common meanings by enforcement and/or negotiation.[51] This is also true for our ethical thinking about digital technologies, where culture for example, as Charles Ess has illustrated in his analyses of ethics, culture and technologies play an essential role and accordingly in Western societies an ethical emphasis is placed on “the individual as the primary agent of ethical reflection and action, especially as reinforced by Western notions of individual rights”[52]. As such, culturally situated ethical thinking also has a preference within the power dynamics of society regarding who or what ethics is for.

Challenging the Data Cultures of AI

Now let us consider the “cultural ambience” of the AI technological systems of the 2010s and their technological cultures. My attempt at making an invisible cultural component of AI development visible. Opacity was in fact described as a core ethical challenge of the very design of AI[53]. As either intentional acts of creating obscurity with “secret algorithms”[54], unconceivable “math”[55] or permeating discursive power that concealed the interests of institutions and corporations[56]. I propose that we consider the cultural shape and “technology culture” explicated in the European AI agenda as an ethical choice made in response to this development.

Let me explain, the term AI was used in public policymaking and discourse in the 2010s generally to describe the next frontier in the big data society. Developed, designed and used by all types of societal stakeholders to make sense of large amounts of data, predict patterns, analyze risks and act on that knowledge to make decisions within politics, culture, industries, and on life trajectories. In essence, the popular use of the term came to denote a particular advanced complex design of big data systems, automated, goal oriented, perceptive, reasoning and made powerful by complex data acquisition and processing.[57] If we return then one moment to Viviane Reding’s concern with global “algorithms”, what she was concerned with, was not algorithms as such, it was a particular technological data culture that she perceived to be embedded in a global technological data infrastructure. That is; the “algorithms” she considered were representative of a particular data culture, or what we have previously referred to as “technological style” or “shape” of modes of designing data technologies and handling digital data, and we may offer the explanation that it was this very data culture that she said worried Europeans, contested their data control and challenged a European legal jurisdictional control with data. Viviane Reding was not alone in her concerns. I have previously[58] described how European policy and decisions-makers in the same period were positioning themselves against a threat to European values and ethics

perceived to be embedded in a particular technology - and in particular "data culture" - of what was named "GAFA" (acronym for the four big US tech companies Google, Apple, Facebook, Amazon). As a previous president of the European Parliament, Martin Schultz, for example said in a speech in 2016, technology innovation is a *"wrecking ball"*, with the aim to not just: *"play with the way society is organized but instead to demolish the existing order and build something new in its place."*[59]

In Collins words, technological change depends on transformations of cultural skills from implicit to explicit categories, a process intrinsically connected with what he refers to as a "cultural ambience"[60]. Here we may refer to the "cultural ambience" of the 2010s concerning the big data technological evolution of societies, which Hasselbalch and Tranberg in 2016 described as a social movement characterised by rising concerns in regards to particular ways of acquiring and processing big data ("data cultures"): "Across the globe, we're seeing a data ethics paradigm shift take the shape of a social movement, a cultural shift and a technological and legal development that increasingly places the human at the centre."[61]

Choosing a Data Ethics of Power

What role do we play as humans in the face of technological change? I purport that command of culture in the complex cultural spaces of technology development can be equated with command of technological change and that this essentially also involves an ethical choice. But which choices do we have in the age of big data? Mayer-Schonberger & Cukier described the big data society as a data (re) evolution of the Information Society, enabled by computer technologies and dictated by a transformation of all things (and people) into data formats ("datafication") in order to "quantify the world" to organise society and predict risks [62] Viewing this process as the realisation of a vision of modernity to control nature and living things, we might consider a type of post-modernist call for a specific type of "ethical action"[63] concerning the embedded power dynamics of the evolving big data infrastructures of the 21st Century. The Surveillance Studies scholar David Lyon for example describes a "Liquid Surveillance Society"[64] and has proposed an "(…) ethics of Big Data practices (…)" [65] to deal with the unequal distribution of power in the technological data systems of societal infrastructures. He is concerned with not only the conventional focus on the state as the primary power actor but includes new actors that gain power through accumulation and access to big data. I have proposed that to direct a technological momentum of the AI extension of the big data society, we need an ethics concerned with the embedded data interests and powers, a "data ethics of power"[66]. A first step would be to make the cultural foundation (the data cultures) of AI visible and essentially, we need to consider this explication of cultural components an ethical and moral choice. As the Information Studies scholars Geoffrey C. Bowker and Susan Leigh Star states in their work on classifications and standards in the development of information infrastructures: "Each standard and each category valorizes some point of view and silences another. This is not inherently a bad thing - indeed it is inescapable. But it *is* an ethical choice, and as such it is dangerous - not bad, but dangerous."[67]

Data Interest Analysis: The European Agenda's Cultural Shape of AI

"A system usually has direction, or goals. The definition of goals is more important for a young system than for an old one, in which momentum provides an inertia of directed motion…"[68]

If technology has a cultural shape, can a cultural interest then shape the development of AI? I evidently believe so, if the approach is as multi-layered as the culture. I have in this article examined how a European AI Agenda evolved over a two-year period into a distinctive European cultural positioning with an emphasis on "ethical technologies" and "Trustworthy AI".[69] I have first and foremost examined this as an interest in shaping a technological AI momentum. In this last part of the article, I move on to an investigation of four cultural components of this cultural interest in first and foremost the data of AI based on the previously outlined theoretical framework on culture and technological development.

The Four Cultural Components of the European Data Interest in AI

As illustrated, in the two-year period, a negotiation of a shared cultural framework for the development and adoption of AI took place and was above all broadly defined in terms of European values and ethics. Importantly, this also included a conceptualization of a European technology culture. I propose here that the European AI Agenda sought to explicate this in four cultural components: 1. The cultural context 2. The cultural foundation 3. The technological data culture and 4. The cultural data space.

1. **The cultural context: Defining the technological momentum**

As we have learned, a technological system does not evolve autonomously, it is directed within a momentum that arise from the interests invested in the system[70]. The culture of a larger technological system is internal to the system in the sense that it represents the sum of the focused interests and forces at play in the momentum of this particular system. But culture is also a force external to the very system, a "cultural ambience", that is entangled in general social and political affairs[71]. Transformations in the resources, skills and knowledge that drive the development and adoption of a technological system can therefore also be influenced by changes in this "cultural ambience".

We may consider AI a "young system"[72] in terms of its general adoption in society, and accordingly the European AI agenda as a cultural interest in shaping the technological momentum of in specific AI systems and directing their evolution in society in Europe and globally. The European values-based approach to AI can also be said to indicate a change in "cultural ambiance" regarding the social implications of the big data society. The High-Level Group's policy and investment recommendations published one year into the period in which the European AI Agenda unfolded, describes the different societal phases of digitalization where AI forms a "third wave" characterized by its adoption in European society: *"Europe is entering the third wave of digitalisation, but the adoption of AI technologies is still in its infancy. The first wave involved primarily connection and networking technology adoption, while the second wave was driven by the age of big data. The third wave is characterised by the adoption of AI which, on average, could boost growth in European economic activity by close to 20% by 2030. In turn, this will create a foundation for a higher quality of life, new employment opportunities, better services, as well as new and more sustainable business models and opportunities."*[73]

The two-year period was characterized by a sense of urgency to gain force within a global AI momentum and in particular the stakeholders that make a momentum were therefore a central topic of the negotiation and debate. This included for example a focus on AI-practitioners, entrepreneurs and data analysts, educators, the work force, policymakers and citizens in general. That is; not only were the stakeholder interests of the members of the High-Level Expert Group a continuous topic of contestation in public debate, but generally a broad range of societal stakeholders were either sought out to participate in for example the AI Alliance

multi-stakeholder online platform created as part of the strategy and the public consultations of the High-Level Group reports, or they were addressed in the content of the reports and in presentations at various public events.

The depiction of an AI momentum was for example prevalent at the first public event that the High-Level Expert Group was invited to attend[74]. Launched with a press release emphasizing the role of AI in "boosting European competitiveness"[75], the event took off with a speech by the then Commissioner for European Commissioner for Digital Economy and Society Maryia Gabriel that outlined the strategic goals of the European Commission with a clear message. European stakeholders could indeed shape the direction of AI:
"We all have an important role to play in defining a shared European vision for Artificial Intelligence. Yes, ladies and gentlemen, digitalization is everywhere, data is everywhere. This is just the beginning of a new technological revolution." [76]

Notably, like many others in this period, Gabriel in her speech also equated digitalization with data and at the same time described data as the foundation for its AI evolution. In fact, the first European Commission Communication on AI had recognized data as a key factor for the development of AI in Europe with a reference to the creation of "data rich environments" as "AI needs vast amounts of data to be developed."[77]. Thus, the main driver for AI was held to be data. As described in the High-Level Expert Group's policy and investment recommendations, this "third wave" of technological development was in fact "driven by the age of big data". The EU was here consequently also described as "(…) a pivotal player in the data economy (…)" [78] as data "(…) is an indispensable raw material for developing AI."[79] Therefore, data was therefore also held to be core to what the stakeholder interests of the AI momentum were invested in:
"Ensuring that individuals and societies, industry, the public sector as well as research and academia in Europe can benefit from this strategic resource *is critical, as the overwhelming majority of recent advances in AI stem from deep learning on big data."*[80]

2. The cultural foundation: The values and ethics framework

Culture is a shared conceptual framework for meaning production that consists of what we know and what we are trained to. A conceptual values-based framework for personal data is in the European context for example formalized in legal frameworks, such as the General Data Protection Regulation and the Charter of Fundamental Rights. But culture also consists of the new meanings that are offered and meanings contested. That is to say; culture is negotiated and conflicts of interests as well as clashes of cultural value systems always emerge.

With the rise of data intensive technologies, such as AI, not only the law, but the meaning of a traditional European approach to handling personal data was challenged, and a process of cultural meaning negotiation therefore was initiated. This we may refer to as "data ethics spaces of negotiation"[81] that exposed the cultural contexts that were shaping the ethical thinking of this period and ultimately sought to resolve conflicts between value systems in conflict.

As described, the European AI agenda explicated a general human centric approach that stressed that the human interest prevails over other interests as well as a particular approach to data governance that emphasized the empowerment of individuals in the handling of their personal data. For example, the High-Level Expert Group's ethics guidelines outlined a clear framework for the management of data with one of the seven requirements "Privacy and data

governance" specifically addressing the human centric values embedded in the data design of an AI technology. In this context, the concept of human agency stood out as the individual's knowledge and the information provided for the individual to make decisions and challenge automatic systems.[82]

The human centric approach came to represent the overarching framework of the European AI Agenda for resolving different interests and values embedded in AI innovation. Conflicts between data protection/privacy, ethics and data driven innovation; between machine automation and the human work force; and between the interests of the individual and society/public institution, scientific and governmental interests. That is most importantly, as stated in the policy and investment recommendations: *"AI is not an end in itself, but a means to enhance human well-being and flourishing."*[83] As a result human centric practical solutions for resolving such conflicts were suggested: Ethical technology as a competitive advantage (resolving conflicts between ethics and data driven innovation); human in the loop AI solutions for the work place and upscaling the AI skills of the work force (resolving conflicts between automation and the replacement of workers); data design as an enabler of human wellbeing and protection, e.g. developing mechanisms for the protection of personal data and individuals to control and be empowered by their data (the interests of the individual and society); and generally focusing on the use of non-personal data in B2B AI solutions rather than the personal data of B2C solutions (resolving conflicts between risks of using personal data and the data intensity of AI technology development).

3. The technological data culture: Skills, knowledge, style and resources.

Technological development is not neutral. Engineers and designers develop technologies within shared knowledge cultures that form the foundation for their work. From an STS perspective, these foundational cultural frameworks can be described as "technology cultures" that is; shared fields of resources, implicit and/or explicit skills, experiences, methods and even tools they use when they build technologies and that therefore also contribute to the shaping of technological development.

As described previously, during the process of developing the European AI agenda, the explication of a European "technological culture" for the development of AI became an essential focal point. In this respect, the skills, the education, the methods and practices needed in the developmental phase of what was referred to as "ethical technology" was core to discussions concerning economic investments, awareness raising, and policies. In fact, as previously illustrated, a European ethical design culture grew into being as the European position of the global AI momentum.

In 2019 at the first AI Alliance assembly in Brussels, Commissioner Maryia Gabriel talked about getting the *"policy right"*, which meant adopting and developing AI with *"a decisive, yes, but"* as she said. This "but" was a reference to the European risk mitigation of the ethical challenges of AI[84]. The first, she mentioned, was global competition (e.g. that the EU was several billion euros behind in terms of investments in AI), the third was "ethical and legal concerns". In between was the second challenge, which according to Gabriel was the social impact of AI. Her suggestion was to invest in education and training, digital education plans, and developing the digital skills in Europe.

The European strategic investment in a particular "technology culture" of AI was also an essential focus of the High-Level Expert Group's policy and investment recommendations[85]. It first and foremost came to equate a shared foundational AI knowledge culture. Europe

needed to "foster understanding" and "creativity"[86] and generally "Empower humans by increasing knowledge and awareness of AI"[87]. In this way, an entire section of the recommendations focused on "Generating appropriate skills and education for AI." This was not just limited to technical skills, but also "socio-cultural skills"[88]. In general, there was a key focus on the development of new skills or the updating of skills of not just engineers but also policymakers and the general work force. This was also extended with the call for developing basic education on AI and literacy in higher and lower education and an *"AI competence framework for individuals*"[89]. In many instances, the term "data literacy" was here used interchangeably with the concept "digital literacy". Markedly, the public sector was described to have a fundamental role in the development of a trustworthy AI "technology culture", e.g. by fostering "responsible innovation" through public procurement.

One thing was the assumption that a particularly European "technology culture" of AI was needed for Europe to succeed in global competition. But how was this "technology culture" then explicated? Here, the assessment list of the ethics guidelines was particularly interesting as it explicated in details concrete questions to guide the design, management and development of AI within each of the seven requirements for Trustworthy AI. We saw here explicated a "data culture" for AI, most explicitly in section 3 on "Privacy and data governance". The point of departure being privacy and data protection, moving on to ensuring quality and integrity of data and procedures for managing access to data.

4. The cultural data space: The infrastructure

According to Hughes technological style differs from region to region and nation to nation. He equates culture with geographically and jurisdictionally delineated spaces. But we may also add to this depiction, the technological evolution of space that has challenged this very correlation between culture, geography and jurisdiction. As a consequence, culture is no longer just the asset of a nation, rooted in geography and national law, but is increasingly extended into virtual communities with "cultures" or "subcultures" delineated by symbolic borders of cultural values and ideas. At the beginning of the 21st Century, "data cultures" had been created on the basis of an interjurisdictional digital flow of data. As such, the very "architecture" of a global data infrastructure had emerged as an interjurisdictional space challenging first and foremost European data protection/privacy values and legal frameworks. For example, looking at case law of the European Court of Human Rights (ECHR), it very early started considering the level of uncertainty that the challenges of technological progress posed to the ECHRs territorial definition of jurisdiction in cases concerning the right to privacy. [90]

AI was in the 2010's developed primarily on this basis of an interjurisdictional and territorial global big data infrastructure. However, an emergent focus in Europe based on the revelation of embedded data asymmetries in the form of surveillance scandals, fake news and voter manipulation, had provoked a European concern with foreign "data cultures" and their "data architectures".

The European AI agenda proposed an alternative European data sharing infrastructure for AI based in a foundational values-based approach to data, but also confined within European jurisdiction and geographical space. In the policy and investment recommendations published in June 2019, the High-Level Group described data infrastructures as the *"basic building blocks of a society supported by AI technologies"*. That is; data infrastructures were described as the foundation of a European AI critical public infrastructure and therefore should be treated as such: *"Consider European data-sharing infrastructures as public utility*

infrastructures." Therefore, the values embedded in this European space should also be invested with a specific set of values and designed *"with due consideration for privacy-, inclusion- and accessibility- by design"*[91].

It was particularly in this description of a European AI data infrastructure and architecture that the cultural interest in data stood out. Thus, the values-based approach was also conceived of as a cultural effort to transfer European values into technological development positioned against a "non-European" threat perceived to be pervasively embedded in technological infrastructures:
"Digital dependency on non-European providers and the lack of a well-performing cloud infrastructure respecting European norms and values may bear risks regarding macroeconomic, economic and security policy considerations, putting datasets and IP at risk, stifling innovation and commercial development of hardware and compute infrastructure for connected devices (IoT) in Europe. (…)*."*[92]

CONCLUSION

As wild and unruly as it may seem, construed in a hodgepodge of complex relations, interests, symbolic meaning-making, people and artefacts, a technological momentum also has a shape. A shape that guides its direction, the values, knowledge, resources and skills that form its technological architecture and its governance, adoption and reception in society. At times, this shape is more explicitly "cultural" and values-oriented than others. When it is large and socially and culturally transformative, for example, or when it spreads on a global scale.

The global AI Momentum of the 2010s was a moment like that. Big data systems empowered by AI technologies were transforming European societies. Challenging what was held to be European fundamental values, one might say, and driving out an explication of what it means to do AI in the "European way". With which values should AI be designed? Which interests should drive the development? What skills and education? What role should technology and science play in society? And could Europe even compete on those grounds? Information policy approaches were transforming from having narrow functional focuses on the digitalization of "everything" to more complex and multifaceted values-based emphases on the ethical and social implications of data technologies including everything from legislative measures in competition, data protection, criminal and consumer protection law to research and innovation investments in "ethical technology" development and a European data sharing infrastructure.

In 2018, Europe had been going through a period of self-exploration regarding the role of big data and emerging technologies in European societies in general. Following an all-encompassing digitalization wave, the social and ethical implications were materializing with big data scandals and revelations. A recent reform of the European data protection legal framework was seen as Europe's powerful global response to these challenges. However, law did not seem to be a sufficient governance response by itself, and therefore a process was initiated to develop a European approach to the AI evolution of the age of big data.

In this article, I investigated a European cultural interest in the global AI momentum. The cultural shape it took with an emphasis on "ethical technology" and "Trustworthy AI" in

response to global AI innovation; how it evolved in a process of public events and a High-Level Expert Group on AI established by the European Commission; and how this cultural interest took form as a data interest that was sought explicated in policy and investment recommendations as well as a set of ethics guidelines.

I relied on the thesis that technological development is not neutral. This also means that the culture of a technological design is not a randomly adapted technological style. It is one sum of interests, value frameworks and the negotiations of these, and if these are made visible, we may therefore hold that the technological development of society can be shaped and chosen. Though the choice to do AI ethically and responsibly is not a simple one. In fact, it is as complex as the culture we are trying to shape with it.

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[1] The definition of Artificial Intelligence has changed throughout history since the 1950s along the development of different scientific and social paradigms. As such, in the 2010s the term AI still did not have one shared signification. In this article, I do not consider the "intelligence" of AI (technologically or philosophically), but use the term AI generically to address public discourse on the topic. My emphasis is on AI as automated decision-making *data* intensive systems that are designed to perceive their environment through acquiring data and interpreting the data to decide action to achieve a goal (HLEG A of AI, 2019) p. 36.)

[2] The author of this article was a member of the High-Level Group on AI

[3] Mayer-Schonberger & Cukier

[4] Hasselbalch, "Making Sense of Data Ethics"

[5] The aim is here to trace and explicate an institutionally framed cultural interest in data and to understand how it is sought explicated in a proposed shared European AI Agenda. Thus, my intention is not to predict the path of AI adoption that will be shaped by the sum of all actors, interests and conditions, which includes the formally mitigated consequences of law, policy and institutional practice, as well as the unintended outcomes of people's (users, engineers etc.) practices (Epstein et al, 2016).

[6] Hughes, *Networks of Power*

[7] Angwin et al.

[8] See e.g. Kobie, 2018

[9] The following examples are from the Berlin based NGO AlgorithmWatch's report published in 2019 that takes stock of Automated Decision-Making (ADMs) in the EU. Accessed 18th December 2019: https://algorithmwatch.org/en/publication/automating-society-available-now/

[10] European Commission (A)

[11] HLEG (C), 4.

[12] Ibid., 2.

[13] Ibid., 5.

[14] HLEG (A), 4.

[15] Ibid., 9.

[16] See e.g. first point of discussion "Trusted AI" of the meeting agenda of the first High-Level Expert Group workshop,

[17] HLEG, D, 2.

[18] HLEG B, 2019.

[19] Smuha

[20] Ibid., 14.

[21] Ibid., 15.

[22] von der Leyen, 13.

[23] Reding.

[24] Lapowsky. Teffer.

[25] Moor, 267.

[26] Ibid., 271.

[27] Hughes, *Networks of Power* and "The evolution of large technological systems".

[28] Hughes, "The evolution…", 51.

[29] Williams, 6.

[30] Ibid., 8.

[31] Ibid., 6.

[32] Ibid., 6.

[33] Lapenta, 157.

[34] Bijker & Law, 3.

[35] Hughes, "The evolution…", 69.

[36] Ibid., 69.

[37] Pickering, 3-4.

[38] Collins, 344.

[39] Ibid., 338.

[40] Mayer-Schoenberger & Cukier, 98-122.

[41] Acker & Clement, 3.

[42] Collins, 344.

[43] Hughes, *Networks of Power*, 15.

[44] Hughes, "The evolution…", 76-77.

[45] Moor, "What is Computer Ethics", 272.

[46] Ibid., 273.

[47] Collins, 343.

[48] Hughes, *Power of Networks*, 15.

[49] Barthes, 147.

[50] Brey, 46.

[51] Williams.

[52] Ess,196.

[53] Burell

[54] Pasquale

[55] O'Neil

[56] Zuboff

[57] Definition of AI in High Level Expert Group's ethics guidelines, 78.

[58] Hasselbalch, "Making Sense of Data Ethics".

59 Schultz

[60] Collins, 344.

[61] Hasselbalch & Tranberg, *Data Ethics*, 10.

[62] Mayer-Schonberger & Cukier, 79.

[63] Frohmann, 63.

[64] Lyon, "Liquid Surveillance: The Contribution of Zygmunt Bauman to Surveillance Studies".

[65] Lyon, "Surveillance, Snowden, and Big Data: Capacities, consequences, critique", 10.

[66] Hasselbalch, "Making Sense of Data Ethics".

[67] Bowker, G. C., & Star, S. L. *Sorting Things out: Classification and Its Consequences*, 5.

[68] Hughes, *The Power of Networks*, 15.

[69] I examine the European AI strategy (Described in the two communications "Artificial Intelligence for Europe") and "Building Trust in Human-Centric Artificial Intelligence" (April, 2019), in the "Declaration of cooperation on Artificial Intelligence" (April, 2018), and the "Coordinated Plan on Artificial Intelligence "Made in Europe"" (December, 2018)) with a core focus on the work of the European High Level Group on AI and the two core deliverables of this group: the "Ethics Guidelines for Trustworthy AI" (April, 2019) and the "Policy and investment recommendations for Trustworthy AI" (June 2019). The investigation is based on a qualitative reading of these documents, and includes perspectives from the process of the very development of these two documents (with reference to public minutes and records from meetings), as well as concurrent European policy responses.

[70] Hughes

[71] Collins, 344.

[72] Hughes, *Power of Networks*

[73] HLEG, B, 6-7.

[74] The AI Forum held in Helsinki in October 2018 co-hosted by the Ministry of Economic Affairs and Employment of Finland and the European Commission.

[75] Finnish Ministry of Economic Affairs and Employment.

[76] Speech accessed 18th December 2019: https://www.tekoalyaika.fi/en/ai-forum-2018/

[77] European Commission, A

[78]HLEG, B, 6.

[79] Ibid., 28.

[80] Ibid., 28.

[81] Hasselbalch, "Making Sense of Data Ethics".

[82] HLEG B, 16.

[83] HLEG B, 9.

[84] Speech accessed 18th December 2019: https://ec.europa.eu/digital-single-market/en/news/first-european-ai-alliance-assembly

[85] HLEG, B.

[86] Ibid., 9.

[87] Ibid., 10.

[88] Ibid., 32.

[89] Ibid., 10.

[90] See an analysis with key case law references here:
https://mediamocracy.files.wordpress.com/2010/05/privacy-and-jurisdiction-in-the-network-society.pdf

[91] HLEG, B, 28.

[92] Ibid., 3.

Bibliography

Angwin, Julia; Larson, Jeff; Mattu, Surya; Kirchner, Lauren "Machine Bias - There's software used across the country to predict future criminals. And it's biased against blacks.", Propublica. 2016.
Accessed 19th December 2019: https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

Acker, Amelia & Clement, Tanya "Data Cultures, Culture as Data - Special Issue of Cultural Analytics," Journal of Cultural Analytics, 2019.

Barthes, Roland. *Mythologies*, Selected and translated from French by Annette Lavers, New York: The Noonday Press Farrar, Straus and Giroux, 1972.

Bijker, E. W. & Law, J. *Shaping Technology/Building Society Studies in Sociotechnical Change*. Cambridge, Mass.: MIT Press, 1997.

Bowker, G. C., & Star, S. L. *Sorting Things out: Classification and Its Consequences. Inside Technology*. Cambridge, Mass: MIT Press, 2000.

Brey, Philip. "Values in technology and disclosive ethics" in L. Floridi (ed) *The Cambridge Handbook of Information and Computer Ethics* (p 41-58). Cambridge: Cambridge University Press, 2010.

Burrell, Jenna. "How the machine 'thinks': Understanding opacity in machine learning algorithms". Big Data & Society January–June 2016: 1–12

Collins, H. M. “Expert Systems and the Science of Knowledge” in W.E. Bijker, T. P. Hughes, & T. Pinch (Eds.), *The Social Construction of Technological Systems* (pp. 51-82). Cambridge, MA: MIT Press, 1987.

Ess, Charles. *Digital Media Ethics*. Cambridge: Polity Press, 2014.

Frohmann, Bernd “Foucault, Deleuze, and the Ethics of Digital Networks” in Capurro, Rafael; Frühbauer, Johannes; Hausmanninger, Thomas (Eds.), *Localizing the Internet. Ethical aspects in intercultural perspective*. Munich: Fink, p 57-68, 2007.

Hasselbalch, G. "Making sense of data ethics. The powers behind the data ethics debate in European policymaking". Internet Policy Review 8 (2), 2019.

Hasselbalch, G. & Tranberg P. *Data Ethics The New Competitive Advantage*, Copenhagen: Publishare, 2016.

Hughes, T.P. *Networks of Power: Electrification in Western Society 1880-1930.* Maryland: The John Hopkins University Press, 1983.

Hughes, T. P. “The evolution of large technological systems”. In W. E. Bijker, T. P. Hughes, & T. Pinch (Eds.), The Social Construction of Technological Systems (pp. 51-82). Cambridge, MA: MIT Press, 1987.

Kobie, Nicole. “The complicated truth about China's social credit system”. Wired, 7th June 2018.
Accessed 18th December 2019: https://www.wired.co.uk/article/china-social-credit-system-explained

Lapenta, Francesco “Using technology-oriented scenario analysis for innovation research” in *Research Methods in Service Innovation*. Cheltenham: Edgar Allen Publishing Limited, 2017.

Lapowsky, Issie: “Facebook Exposed 87 Million Users to Cambridge Analytica”. Wired, 4th April, 2018.

Accessed 17th December 2019 https://www.wired.com/story/facebook-exposed-87-million-users-to-cambridge-analytica/

Lyon, David. "Liquid Surveillance: The Contribution of Zygmunt Bauman to Surveillance Studies", International Political Sociology 4, 325–338, 2010.

Lyon, David. "Surveillance, Snowden, and Big Data: Capacities, consequences, critique", *Big Data & Society*, July–December 1–13, 2014.

Mayer-Schonberger, Victor & Cukier, Kenneth. *Big Data: A Revolution That Will Transform How We Live, Work and Think*. London: John Murray, 2013.

Moor, James H. "What is Computer Ethics?" Metaphilosophy 16, nr. 4, 1985.

O'Neil, Cathy, *Weapons of Math Destruction*, Penguin Books, 2016.

Pasquale, Frank *The Black Box Society – The Secret Algorithms That Control Money and Information*, Cambridge: Harvard University Press, 2015.

Pickering, Andrew. "From Science as Knowledge to Science as Practice" in *Science As Practice and Culture* (ed. Andrew Pickering), Chicago: The University of Chicago Press, 1992.

Reding, Viviane. "Cambridge Analytica and Facebook: Data protection and citizen's privacy as a line of defence against election manipulation". Plenary debate, European Parliament, Strasbourg, 18thApril, 2018.
Accessed 19th December 2019: http://www.europarl.europa.eu/doceo/document/CRE-8-2018-04-18-ITM-019_EN.html

Schultz, Martin. "CPDP 2016: Technological totalitarianism, politics and democracy", 2016. Accessed 19th December 2019: https://www.youtube.com/watch?v=We5DylG4szM

Smuha, Nathalie A. "The EU Approach to Ethics Guidelines for Trustworthy Artificial Intelligence A continuous journey towards an appropriate governance framework for AI".

Computer Law Review International, Vol. 20, iss. 4 (pp. 97 – 106), 2019.

Teffer, Peter: "Data breach affected 2.7 million people in EU, says Facebook". Euobserver, 6th April 2018.
Accessed 17th December 2019: https://euobserver.com/justice/141528

Williams, Raymond: "Culture is Ordinary" in Gray, Ann and Jim McGuigan (eds.) *Studying Culture an introductory reader*, London: Edward Arnold, 1993.

Zuboff, Shoshana. "A Digital Declaration", Frankfurter Allgemeine, 9th September 2014.
Accessed 19th December 2019: http://www.faz.net/aktuell/feuilleton/debatten/the-digital-debate/shoshan-zuboff-on-big-data-as-surveillance-capitalism-13152525.html

European AI agenda documents:

European Commission (A) "Artificial Intelligence for Europe". 25th April, 2018.
Accessed 17th December 2019: https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe

European Commission (B) "Building Trust in Human-Centric Artificial Intelligence". 8th April, 2019.
Accessed 17th December 2019: https://ec.europa.eu/digital-single-market/en/news/communication-building-trust-human-centric-artificial-intelligence

European Commission (C) "Declaration of cooperation on Artificial Intelligence". 10th April, 2018.
Accessed 17th December 2019: https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-artificial-intelligence

European Commission (D) "Coordinated Plan on Artificial Intelligence "Made in Europe"", 7th December, 2018.
Accessed 17th December 2019: https://ec.europa.eu/digital-single-market/en/news/coordinated-plan-artificial-intelligence

High-Level Expert Group on Artificial Intelligence (HLEG A) (2019) "Ethics Guidelines for Trustworthy AI". April, 2019.
Accessed 19th December 2019: https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

High-Level Expert Group on Artificial Intelligence (HLEG B) "Policy and investment recommendations for Trustworthy AI". June, 2019.
Accessed 19th December 2019: https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence

High-Level Expert Group on Artificial Intelligence (HLEG C) (2018), "Minutes of the 1st Meeting 27th June 2018". July, 2018.
Accessed 19th December 2019:
https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeeting&meetingId=5190

High-Level Expert Group on Artificial Intelligence (HLEG, D)."Outcomes of the AI HLEG Workshop of 20 September 2018", 2018.
Accessed 17th December 2019:
https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=21545

High-Level Expert Group on Artificial Intelligence (HLEG, E), "AI HLEG 1st Wokshop Agenda". 2018.
Accessed 18th December 2019:
https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=17645

OECD, "Recommendation of the Council on Artificial Intelligence". May 2019.
Accessed 17th December 2019: https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449

von der Leyen, Ursula. "A Union that strives for more My agenda for Europe", 2019.

Accessed 17th December 2019: https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission_en.pdf

Finnish Ministry of Economic Affairs and Employment, "AI Forum 2018: Artificial intelligence to boost European competitiveness". 13th September, 2018. Accessed 19th December 2019: https://tem.fi/en/article/-/asset_publisher/ai-forum-2018-tekoaly-vahvistamaan-euroopan-kilpailukykya