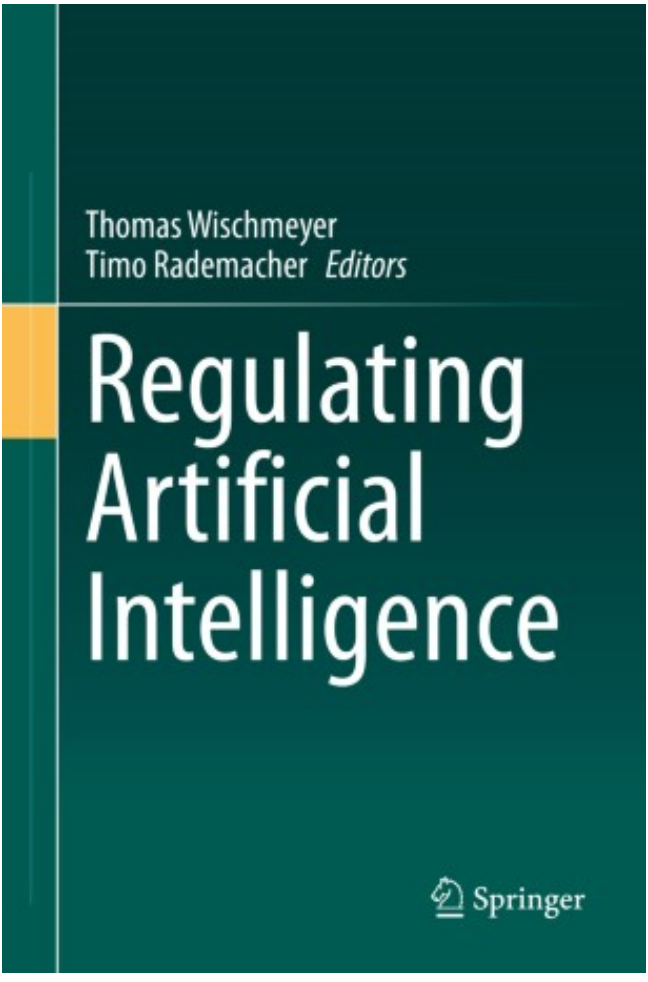

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Artificial Intelligence and Public Governance: Normative Guidelines for Artificial Intelligence in Government and Public Administration

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Contents

Abstract This chapter discusses normative guidelines for the use of artificial intelligence in Germany against the backdrop of international debates. Artificial intelligence (AI) is increasingly changing our lives and our social coexistence. AI is a research question and a field of research producing an ever-increasing number of technologies. It is set of technologies that are still evolving. These are driven and influenced by guidelines in the form of laws or strategies. This chapter examines AI systems in public administration and raises the question of what guidelines already exist and what trends are emerging. After defining AI and providing some examples from government and administration, identify ethics and politics as possible points of reference for guidelines. This chapter presents the law, technology, organization, strategy and visions as possible ways to influence and govern AI along with describing current developments. The chapter concludes with a call for

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interdisciplinary research and moderate regulation of technology in order to enhance its positive potential.

1 A Design Challenge for Government and Administration in Germany

1 Although AI technologies have been around for some time already, the effects are increasingly apparent today and will become even more so in the future. Risk management systems now guide decisions in many areas, on issues such as who has to present receipts to justify their tax returns.[1] Intelligent traffic control systems plot and direct flows. Automated lethal weapon systems are another emergent area of application. It is as if our computers are growing arms and legs, or developing capacities we cannot even imagine. While these changes are imminent, it is often forgotten that AI is a product of human activity and conscious design decisions. It is we humans who the development of technology at different levels and through different means. There are, for this reason, numerous constraints on and governance of AI. This chapter not only presents various guidelines in this regard, but also discusses current trends and developments appurtenant to AI applications, especially in government and administration.

2 Government and administration face particular challenges in managing and governing artificial intelligence. This is because they fulfil different roles in relation to technological change. First of all, they are users when they adopt AI technologies to perform specific tasks. In addition, they also directly support the technology, be it through infrastructure services, research funding or award criteria. Governments and public administrations are decisive in the regulation of technology. It is up to them to protect individual rights and the public interest. In terms of the application, promotion and regulation of AI, the particular challenge for governments and administrations derives from the uncertainties they face.[2] In light of these uncertainties, the question arises as to whether the guidelines need to be adapted to new developments or whether traditional approaches are sufficiently robust.

1.1 The Definition of Artificial Intelligence

3 AI is a research question and area of research that is today dealt with by a whole sub-discipline of computer science. It aims to create intelligent systems, i.e. those which, according to Klaus Mainzer's working definition, can 'solve problems efficiently on

[1] See also Braun-Binder.

[2] Mandel (2017).

their own'.[3] Even the inventors of the computer had systems in mind that were intended to perform intelligent actions; one of their first projects could be described as a big data venture for predicting the weather.[4] The term artificial intelligence itself was coined by a group of computer scientists in a proposal to the Rockefeller Foundation to fund a seminar. They described their central research concern as follows:

> We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.[5]

4 In its origin, the concept of AI was thus broad and reflected the intention to replace human intelligence with machines. Alan Turing foresaw that such projects would meet with contradictions in his epochal essay 'Computing Machinery and Intelligence'.[6] In this essay, he dealt with the question of whether machines can think. His hypothesis was that humans will no longer be able to distinguish between human and machine intelligence after a certain point in time and that the question will thus lose relevance. So far, this has not happened; instead, two camps have formed. Some have pursued the so-called 'strong AI thesis' according to which AI can and will reproduce human intelligence, while others, supporters of the 'weak AI thesis', the possibility and refer to the capacity of machines to solve certain problems rationally. There is thus the fundamental disagreement in computer science about the goals and possibilities of AI research.

5 However, if the goals of the technologies are controversial, their development and eventual areas of application are not predetermined. This is reflected in the dispute as to whether AI should serve to automate human tasks or augment humans. This was already discussed in the early years of the AI debate.[7] Like other technologies, one could describe AI as 'multistable'. This means that the scope and meaning of a technology in a society is only developed in the course of time and in its application, and that these are not defined by the technology itself.[8] This concept of multistability can be applied very well to AI technologies. What's more, AI is a general purpose technology.[9] By its nature, its purposes and its societal and individual consequences are contingent and dependent on its use.

6 Since AI technologies are flexible per se, they open up a new dimension of technical possibilities for action and reaction. Not for nothing is the system highlighted as an

[3] Mainzer (2016), p. 3.
[4] Dyson (2014).
[5] McCarthy et al. (1955).
[6] Turing (1950).
[7] Grudin (2017), p. 99.
[8] Ihde (2012).
[9] Djeffal (2019).

'agent' from a computer science point of view.[10] As mentioned above, you could say that computers acquire arms and legs and eyes and ears via AI. Conversely, you could also say that cameras, microphones, loudspeakers and machines are acquiring a brain.

7 If seeking to contrast AI with other fundamental innovations, one might meaningfully compare it with the 'invention' of iron. Iron is not a tool itself, but it is the basis for many different tools. A human can forge swords or ploughshares from it. Iron also forms the basis for other technologies, be it the letterpress or steam engines. It is precisely for this reason that it is very difficult to speak generally of the opportunities and risks of AI. For what is seen as an opportunity and what as a risk often depends on how AI is specifically developed and used.[11]

1.2 AI Applications in Government and Administration

8 Many AI systems are already being used in public administration. Sometimes AI contributes to the evolutionary development of existing systems. Traffic control systems are an example of this. Such systems influence the behavior of road users in various ways based on the evaluation of traffic and weather data.[12] In order to ensure the flow and safety of traffic, public administration may adopt legal measures such as bans on overtaking and speed limits. Traffic can also be affected by detour recommendations or temporary hard shoulder releases. Decisions are then no longer taken by people, but by the system, even if, as with road signs, traffic signs are legally binding administrative acts.[13]

9 The purposes, opportunities and risks of AI are contingent. The systems can help to achieve very different purposes. AI is a general purpose technology. As a consequence, it is not possible to simply state that AI is necessarily associated with certain opportunities and risks. AI is generally seen as a danger to informational self-determination, as exemplified by various applications of intelligent video surveillance, such as those being tested in Germany. At the Südkreuz train station in Berlin, the German Federal Police has been carrying out an experiment with cameras using intelligent face recognition. The aim is to use pattern recognition technologies to unambiguously identify people in order to filter them out.[14] Another experiment in Mannheim has even been trying to enable the AI-supported recognition of social situations. A camera system informs the police when it detects actions that could be considered as assault and battery or theft. It is then possible to track the people involved throughout the entire camera system.[15] Both these examples illustrate the possible data protection issues attaching to AI.

[10] Poole and Mackworth (2011).

[11] For structural challenges see Hoffmann-Riem, esp. paras 42 et seq.

[12] Bundesanstalt für Straßenwesen.

[13] Administrative acts in German law are legally binding decisions by the administration towards individuals or non-public legal persons.

[14] Bundespolizei (2017). See also Rademacher, para 3.

[15] Sold (2017). See also Rademacher, para 4.

On the other hand, AI can also be used to further data protection. In many municipalities, intelligent parking space monitoring systems are currently being set up. Various sensors can show the number and location of free parking spaces in an app or on display boards. If images are captured via cameras, AI systems can anonymize the images in real time. For example, faces and vehicle number plates can be made so unrecognizable that the driver and vehicle can no longer be identified. Also, chatbots are currently being developed that learn about the attitudes of users as concerning data protection in order to automatically change all data protection settings in the internet. These are instances of AI actually realizing data protection.

10 AI is believed to have the ability to ensure greater efficiency and effectiveness through automation. This was also one of the motives behind the Act to Modernize the Taxation Procedure, which has now been passed and, among other things, enables tax assessments to be issued automatically (§ 155 (4) of the Tax Code). This was in response to problems encountered by the tax administration, which had to deal with so many procedures that the uniformity and quality of decisions suffered.[16] The legislators emphasized that automation should not only serve to save resources. Rather, the resources should be used for cases that need to be dealt with more intensively, so that fair and just decisions are made. One could say that administration was intended to become more humane through automation.[17] Efficiency is achieved through AI management, for example, at border controls with the EasyPASSsystem. This system can identify people and verify their identity. With this system it is possible to reduce the number of border guards. It is also possible to avoid long queues since a few guards can serve many lines at once.

11 The Australian government, which is known for many successful digitization projects, experienced a disappointment with the 'online compliance intervention'. It was supposed to facilitate the collection of tax debts but ultimately resulted in a political scandal. An algorithm matches various tax-relevant data. If it finds contradictions, it notifies the citizen by letter and SMS. If the citizens do not object, a payment notice is issued to which the addressees can object.[18] The algorithm used is very error-prone and in many cases produced obviously false decisions. As a result of automation, up to 50 times more administrative proceedings against citizens were initiated than before. Because it was no longer possible to answer citizens' enquiries, temporary workers were hired and telephone contact with citizens was outsourced to a private call center. People from weaker societal strata were particularly negatively affected as well as especially vulnerable or disadvantaged population groups who could not defend themselves against the decision. The actual number of wrongfully issued notifications remains controversial. The example shows what negative effects AI can have in public administration when flawed systems are used without considering the social context. As a result, promises of effectiveness and efficiency may never be borne out in fact.

[16]See Braun Binder, paras 3 et seq.

[17]Djeffal (2017a), p. 813; see also Buchholtz, para 45.

[18]Commonwealth Ombudsman (2017).

Table 1 Comparisons of ethics and politics as normative reference points

Ethics	Politics
Experts	Politician
Good/right	Contingent
Expertise	Legitimation
Discovery	Accountability

2 Points of Reference: Between Ethics and Politics

12 Normative guidelines for technologies differ in their points of reference and are differently 'framed'. In this section, I contrast these points of reference in ideal typical terms as ethics and politics. For example, the discourse concerning 5G infrastructure is framed as political discourse. Discussions on genetic engineering are framed as ethical questions.

13 As far as AI is concerned, the discussion is based on both points of reference. In science and politics, AI is often portrayed as an ethical issue, leading, for example, to discussions about the 'ethics of algorithms'.[19] At the same time, dealing with AI is also understood as part of a political debate and, therefore, as something that can be handled by the strategies and decisions of the democratic legislature. The choice of the normative reference point has important implications, as can be seen from this comparison.

14 To frame something as an ethical question consciously places it outside political realm.[20] This is already illustrated by the people involved. While experts engage with questions of ethical design, political decisions are made by persons usually legitimized to do so. So, political decisions are often prepared by the government and the administration and debated and decided in parliament, whereas the ethical framework is often set by special institutions such as ethics councils. While experts can refer to what is good and right, contingent decisions are made in the political process that are fundamentally open. The justification for decisions also differs, in that it is based on ethical expertise on the one hand, and on the democratic legitimacy and accountability of the decision-makers on the other hand. These decision-makers justify their decisions, while experts tend to discover the right and good on the basis of their expertise (Table 1).

[19] Mittelstadt et al. (2016).

[20] Hilgartner et al. (2017), p. 830.

3 Guidelines

3.1 Law

Motivation, Limitation and Design

The law offers binding guidelines for the development of artificial intelligence. It sets boundaries for technology to ensure individual rights and safeguards public interests. But this is not the only function of law in the development of technology. The functions of law can also be described as relating to motivation, limitation and design.[21] 15

The law's role in motivating the development of technology can take different forms. It can motivate the development, advancement and application of technology by the administration or even make it compulsory. Mandatory legal obligations can result from statutory but also from constitutional law. Such a 'right to AI' could, for example, be derived from Article 41 of the European Charter of Fundamental Rights, which grants the right to good administration. Paragraph 1 sets out that '[e]very person has the right to have his or her affairs handled impartially, fairly and within a reasonable time by the institutions, bodies, offices and agencies of the Union'. If algorithms perform certain tasks much faster, more easily and better, Art. 41 of the European Charter of Fundamental Rights could require the introduction of AI. There might be even an obligation to use algorithms. Such an obligation can also be found in the United Nations Convention on the Rights of Persons with Disabilities. Art. 4 para. 1 (g) obliges states to undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communications technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost. As a member state of the Convention, this obligation also applies to the German government and administration. Direct obligations to implement AI systems for the administration can also result from statutory law. For example, the Federal Office for Information Security (BSI) is responsible for the protection of federal communications technology. The Federal Office for Information Security Law grants the power to detect anomalies in federal agencies' data traffic. According to the law, without cause the BSI may only evaluate data automatically. Only if AI has detected an anomaly that indicates malware or a lack of security may data be processed by human agents.[22] 16

As mentioned above, it is one of the functions of the law to *limit* AI in public administration. We find such limits for example in § 114 para. 4 of the Federal Civil Servants Act (Bundesbeamtengesetz). According to this provision, decisions relating to civil servants may not be taken by automatic systems exclusively. However, this only applies to the processing of personal data. While this provision refers specifically to automated systems, AI applications must also comply with general provisions. For example, IT security law is applicable to all IT systems, such as Art. 17

[21] Djeffal (2017a), pp. 811–815.

[22] This applies under the condition that there is no other reason—such as a hint.

11 para. 1 of the Bavarian E-Government Act. This stipulates that the security of IT systems must be guaranteed. This means AI may only be used in public administration if it can be adequately secured. Public administrations must take measures towards safeguarding their IT systems.

18 In addition, the law also has a *design function*. In this capacity, it influences the process of development, advancement and application of technologies in society.[23] The law not only limits and promotes technology, it also merges legal requirements with what is technically possible and desirable. AI applications make technology flexible and independent. They open technical systems to a certain degree to design according to the purposes of the laws. An increase of rules concerning technology design in public administration can be expected. In European data protection law, for example, there are obligations to implement data protection and data security through technology design. For the authorities responsible for security or criminal prosecution, this obligation follows from § 71 of the new Federal Data Protection Act (BDSG), which is based on Directive (EU) 2016/680[24]: when the controller determines the means for data processing and when he carries out the processing, he must take precautions to ensure a data protection-friendly design.

19 When 'new' technologies meet the 'old' laws, some scholars and practitioners speak of gaps in the legislation and obstacles caused by the law. There is a gap if something should be regulated but is not.[25] Thus, if a new technology threatens individual rights or the protected general interest without legal regulations for effective enforcement, there might be a gap. Such gaps can be closed in a number of ways: either by the legislature adopting new rules or by the administration and judiciary developing the law through evolutive interpretation within their mandate. However, the opposite might hold; namely that there are barriers to innovation and application.[26] Obstacles arise in particular when existing legal categories do not adequately address new technologies or their impacts. For example, special legal regimes have been created all over the world for automobile traffic. If damage is caused by a motor vehicle, the person using the car on a regular basis must be liable regardless of his actual fault. This modifies the general rule that only those who are responsible for damage, i.e. who act intentionally or negligently, are liable. The question of liability has also been negotiated within the framework of artificial intelligence.[27] In this area of conflict, AI is a challenge for the law. Questions arise whether and how the law should be developed.[28]

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[23]Djeffal (2017b), p. 103; Hildebrandt (2015).

[24]Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA OJ L 119, 4.5.2016, pp. 89–131.

[25]Canaris (1983).

[26]Hoffmann-Riem (2016), p. 33.

[27]Hilgendorf (2012). See Molnár-Gábor.

[28]Martini (2017).

The New Legislation on Automated Administrative Decisions

One development that has to be highlighted in this context is the new law on automated administrative decisions. The German Parliament introduced this law in the context of reforming and modernizing tax administration in 2015.[29] It introduced a new provision in § 35a in the Code of Administrative Procedure which reads as follows: **20**

> An administrative act may be adopted entirely by automatic devices, provided that this is permitted by a legal provision and that there is neither discretion nor margin of appreciation.[30]

This provision makes it clear that fully automated decisions are legally possible.[31] It also establishes two legal requirements that have to be met.[32] First, the decision by an automated system has to be permitted by law. In German law, the terminology used suggests that there must be either an act of parliament or a statutory ordinance, i.e. a general norm issued by the executive, which is legitimized by an act of parliament. The second criterion is that there must be neither discretion nor a margin of appreciation. In the terminology of German administrative law, the term discretion refers to instances in which parliament empowers administrative bodies to decide whether to act and what measures to take. In contrast to that, the margin of appreciation signifies instances in which expert bodies are competent to determine whether certain requirements of the law are met. The margin of appreciation in its administrative sense is only to be applied in situations in which bodies have a specific competence to make certain judgments. This applies, for example, to the evaluation of civil servants, and to the process of choosing applicants for civil service.[33] **21**

The aim of the provision is twofold. Firstly, it provides clarity on how to implement systems that can take fully automated decisions. Secondly, it specifies the requirements for lawful fully automated decisions, which make automated decisions also subject to the rule of law. The fact that a legal provision is necessary links every automated decision back to a decision of parliament. While there is no requirement regarding what the legal provision ought to include, it will be up to parliament to legitimize automated administrative decisions. In line with the state of the art of research, it is at the moment hardly conceivable that instances in which there is a margin of appreciation can be replaced by machines. In contrast, automated decisions have already been justified by provisions granting discretion to public administrations. Take, for example, § 45 German Road Traffic Order Regulations. **22**

[29] Braun Binder (2016a, b).

[30] This was translated by the author. The original reads: 'Ein Verwaltungsakt kann vollständig durch automatische Einrichtungen erlassen werden, sofern dies durch Rechtsvorschrift zugelassen ist und weder ein Ermessen noch ein Beurteilungsspielraum besteht'.

[31] For a reflection on the functions of this provision see Berger (2018), p. 1262.

[32] For a detailed interpretation see Prell (2016).

[33] Decker (2019) paras 35–36.

Intelligent traffic systems are already imposing enforceable speed limits based on this provision. Automated systems, therefore, exercise discretion on behalf of public administrations. The fact that there are many systems that currently prohibit automated decisions has been criticized.[34] From a legal standpoint, a simple solution to this problem has been found. Whenever there is a legal provision allowing for an automated decision, this provision is said to be specific to the general rule in § 35a. The specific rule trumps § 35a and the included 'prohibition of automated discretion'. This pragmatic solution has not yet been tested in courts. What is more, it adds very little to the purpose of harmonising AI systems with legal principles. In order to do that, simply allowing or forbidding automated decisions based on discretion would not be enough. It would be necessary to give guidance on how to effectively safeguard human rights and legitimate interests in situations where automated systems exercise discretion.[35]

3.2 Technology

23 It should be mentioned briefly that the technology itself can also serve as a guideline for further development. Scholars have referred to the normative effects of technology, not least under the catchword 'Code is Law'.[36] Even assuming that the future of technology is fundamentally open, its actual development can still give it a certain direction.[37] The future development of the technology concerned can be influenced by certain system architectures or programming methods. The large program libraries developed for AI are a good example. Larger applications can be taken directly from these libraries. The data sets used in the process of training can have a huge impact on the algorithms. For this reason, the Mozilla Foundation has published a data set for speech recognition that is particularly representative and freely available to all.[38] This conscious work on data sets shows that decisions taken now can impact next generation technologies.

3.3 Organization

24 Guidelines for technology development can also arise from the organization of government and administration.[39] The establishment of authorities with certain

[34] Stegmüller (2018).
[35] Djeffal (2017a), p. 814.
[36] Lessig (2006) and Schulz and Dankert (2016).
[37] Arthur (1989); David (1992), p. 134.
[38] White (2017).
[39] Hood and Margetts (2007), p. 169.

duties and powers can have a sustainable impact on the development of technologies. An obvious example are the data protection officers, who must be emplaced under certain circumstances mandatorily in government and administration, but also in companies.[40] Especially in the area of internet governance, a multi-stakeholder approach has been developed that brings different actors together.[41] Thus, organization should have a positive impact on technology development.

In the field of AI, we can observe both ideas and initiatives on how technology **25**
can be influenced by the design of organizations. An example of this is the Ethics Commission on Automated and Connected Driving. It was set up by the German Federal Minister of Transport and Digital Infrastructure and has issued a report on autonomous driving, which has become the basis for further measures and legislative proposals by the ministry.[42] This model follows the state ethics commissions, which are particularly common in the field of medical ethics and bioethics.[43] In 2018, there was an interesting proliferation of such entities created by the German government. Parliament founded a Study Commission 'Artificial Intelligence – Social Responsibility and Economic Potential', which is comprised of 19 Members of Parliament and 19 experts.[44] It aims to study future impacts of AI. The federal government has also installed a Data Ethics Commission comprised of 16 members with the mandate to draw up ethical guidelines for a data policy. The Federal Government also assembled a digital council that should give guidance on digitization. Two new agencies were founded in order to enhance digital innovations. One agency will support disruptive innovation, the other agency aims at strengthening innovations in the field of IT security.

At the European Union level, various proposals for institutions with a strong link **26**
to artificial intelligence are currently being discussed. A resolution of the European Parliament calls for an Agency for Robotics and AI to be set up to work in a multidisciplinary way across different sectors.[45] The Agency's duty is not only to advise the European institutions, but also to create a register of advanced robots. In his famous European speech, French President Emmanuel Macron called for the creation of an 'agency for disruptive innovation'.[46] The only technology he mentioned in this context is AI. The Chinese government's announcement that it would build a US$ 2 billion technology park in Beijing within five years, where companies and universities will jointly research AI, also in this direction.[47] The United Arab

[40]See Art. 37 section 1 of the European General Data Protection Directive and § 38 of the German Data Protection Law.

[41]Hofmann (2016).

[42]Ethik-Kommission Automatisiertes und Vernetztes Fahren (2017).

[43]Braun et al. (2010), pp. 8 et seq.

[44]Deutscher Bundestag (2018).

[45]European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)).

[46]Macron (2017).

[47]Yamei (2018).

Emirates made headlines with the appointment of a minister for AI. According to the minister, one of his main tasks is to promote the development of AI by creating an adequate legal framework.[48] With regard to the organizations, the distinction between a formative and control function is particularly important. In the discourse characterized by the idea of AI regulation, monitoring organizations like the so-called algorithm watchdog are being discussed. However, it should be kept in mind that it is most important to ensure legal and ethical compliance in the design process. Retrospective oversight is limited in its capacity to identifying problems and solving them.[49]

3.4 Strategies

27 State guidelines for the development and application of technologies are often found in implicit or explicit strategies. They define a goal, the resources needed to achieve it, and the environment in which the goal is pursued.[50] It is, therefore, a question of how goals can actually be achieved in a particular situation. Strategies are characterized by the fact that they make goals explicit.

28 In the international debate, strategic considerations about AI have received much attention. Russian President Vladimir Putin told pupils at a conference that AI was the future and whoever takes the lead in this technology will rule the world.[51] The Chinese government's aim to make China the leading country in terms of AI by 2030 also attracted much media attention.[52] This behavior by various states was seen by commentators as the possible beginning of a new cold war.[53] Recently, the rhetoric has become friendlier and more cooperative. The European Union has proposed a strategy built also on connectedness and collaboration.[54] The declaration on AI leading to the strategy also included Norway, which is not a member of the European Union. China's Vice President stressed that China was actively seeking cooperation in developing AI.[55] The new German strategy on AI includes collaboration with other partners and technology transfer to developing states.

29 However, AI is not always the object of strategies, but a strategic tool itself. AI can also be found in smart city concepts aimed at achieving various goals such as environmental protection or improving the quality of life. For example, Berlin's smart city strategy explicitly refers to intelligent applications of the so-called Internet

[48]Tendersinfo (2017).

[49]See also Jabri, paras 34 et seq.

[50]Raschke und Tils (2013), p. 127.

[51]Russia Insider (2017).

[52]New York Times (2017).

[53]Allen and Husain (2017).

[54]Djeffal (2018a).

[55]Knight (2018).

of Things.[56] AI will appear in many strategies in the future, both as a resource to achieve goals and as a design goal, where the technology itself will be shaped by the strategy. Such combinations can also be described as 'visions' (Leitbilder).

3.5 Visions

Visions or mind frames are concepts that have the potential for agenda setting or framing of an issue. They influence the way certain issues are perceived and interpreted. Visions result from concepts and can have an impact on further development.[57] Not only do they have a descriptive function, but also the potential to shape development.[58] In the field of administrative modernization, some concepts have gained such importance, such as 'New Public Management', that they can also be described as visions. The German federal government coined the term 'Industry 4.0' and thus successfully created a vision for technology-driven industrial modernization that has been recognized internationally. This has been imitated by public administrations. Therefore, the catchword 'industry 4.0 needs administration 4.0' has become popular.[59] **30**

The question about a vision for the design of AI has, in any case, remained unresolved within the German and European context, apart from a few initial approaches. Technology can certainly have a constitutional dimension, as can be seen from questions about a constitution for the Internet.[60] In the same regard, one could also ask about the constitutional dimension of AI. An interesting starting point for the practical handling of constitutions with these phenomena could be a provision from the Constitution of the Free Hanseatic City of Bremen which states in Article 12 (1):[61] **31**

> Man is higher than technology and machine.[62]

This is a unique provision in German constitutional history, which was inserted into the constitution of Bremen after the Second World War in view of the effects of industrialization, but which has yet to be applied in courts. However, it could provide some guidance on how generally to deal with AI. **32**

[56] Senatsverwaltung für Stadtentwicklung und Umwelt (2016) Senate Department for Urban Development and Environment, 2016.

[57] Baer (2006), p. 83; Voßkuhle (2001) pp. 506ff; von Braun (2015).

[58] Koselleck (2010), pp. 61–62.

[59] Kruse and Hogrebe (2013).

[60] Pernice (2015).

[61] Artikel 12 Landesverfassung der Freien Hansestadt Bremen vom 21. Oktober 1947 in der Fassung vom 14. Oktober 1997.

[62] The original reads: 'Der Mensch steht höher als Technik und Maschine'.

4 Outlook

33 It is already apparent today that AI has fundamentally changed social coexistence, both on a large and small scale, and will continue to do so. This is another reason why it is so important to influence the development of these technologies positively through guidelines. But since these are emergent technologies, this is a particular challenge for science, business, politics and society. Guidelines cannot just be created and adopted; they must be constantly renewed. Just as it is not possible to accurately predict the impact and development of technologies, it is also not possible to accurately assess the impact of guidelines. In this process of 'reciprocal becoming'[63], it is not appropriate to think that all existing ideas and rules should be thrown overboard in the face of the new technologies. But it is just as wrong to think that nothing will change. Our understanding of what AI technologies can mean for our social coexistence in its infancy. Therefore, it is appropriate to look at these developments from different perspectives and with different assumptions. The possible outcomes and consequences of this technology can only be conceived when AI is simultaneously understood as an opportunity and a danger, when it is simultaneously developed from a technical and social point of view, and when it is viewed from the perspective of the humanities, social sciences and natural sciences. Then we will be able to construct a picture of a socially desirable and good AI. It might then be possible to create a more human and humane society through automation.

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