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RIGHTS BY DESIGN AND DEFAULT IN HYBRID AI ARCHITECTURES: REALIZING HUMAN-CENTRIC PUBLIC SERVICE IN HUMAN – INTELLIGENT MACHINES CO-WORK

I Introduction and an argument for widened perspective

1. Theme of my presentation is to outline a possible way of the realization of the future digital government and administration with transformative artificial intelligence (AI). I discuss about the theme of responsible AI, on which for example *Virginia Dignum* has made a significant contribution (Dignum 2019), from the perspective of Nordic or Scandinavian administrative law. In this context, law is all too often seen in a narrow way both inside the law and legal discourses and, in interaction between systems development and maintenance and law, and between computer and legal sciences respectively. This albeit intersection of data, data processing and law, ICT and law and ultimately computer science of law have been and continue to be at the centre of legal informatics and information law to which Swedish scholars Peter Seipel, Cecilia Magnusson-Sjöberg and Peter Wahlgren, among others, have contributed significally. AI has been from the very beginning on the research agenda of legal informatics and subject to systematic, theoretic and practical inquiry by legal informatics scholars (see Pohle 2021).

2. The European Commission's High Level Expert Group on **Ethics Guidelines for Trustworthy AI** saw - rightly - legality, rule of law and fundamental and human rights as a point of departure for trustworthy AI. **Council of Europe in the Ad Hoc Committee on Artificial Intelligence** drafts a binding legal instrument on Artificial Intelligence. European Parliament and the Council of the European Union negotiate currently the Commission proposal for Artificial Inteeelligence Act (**COM (2021) 206 final**, Legislative Procedure **2021/0106/COD**). In United States of America, the White House Office of Science and Technology Policy has

under President J. Biden identified five principles that should guide the design, use, and deployment of automated systems in the age of artificial intelligence. This document, the **Blueprint for an AI Bill of Rights,** has, even though it is not binding and represents rather ethical principles than law, been written in an explicitly legal rhetoric about rights. In comparison to the Commission's High Level Expert Group guidelines this rhetorical difference is striking; it tells about appeal of law and digital rights in particular. However, in the US there are no such general legislative initiatives related to AI such as the the Commission proposal to EU AI Act, to which also the Commission's High Level Expert Groups work have given foundations. The law and AI ethics intersect in many fundamental ways and the law has significant functions in guiding the future development of AI systems and the digital government in general.

3. My intention here is to provide some practical reflections. In academia I have been for nearly 30 years doing research in legal informatics and its relations to administrative law on topics such as information security, architecture design, inter-operability and most recently, automatic decision-making and AI. This speech is mainly a governance practitioner's reflections on how we can move from today's digital government and administration to the future successful use of AI at the service of people and society and how we should see and develop automation in that endeavour. I have been involved in the development of digital administration and its ICT systems, evaluation of systems and governance arrangements in different roles: as an academic, Ministry of Finance senior legal and budget official and Government Controller General, Auditor General of Finland (Riksrevisor in Swedish terms), Under-Secretary of State for Social Affairs and Health Reforms at the Ministry of Social Affairs and Health, Under-Secretary of State for Governance Policy and Digitalization at the Ministry of Finance responsible for the whole-of-government wide digitalization policies. Now, I am entrusted with the supreme legality oversight of public administration and official activities of the Government with a specific remit to oversee the development and maintenance of automatic systems in the public administration, including use and development of AI.

4. Nordic countries, with Scandinavia as a legal and administrative family, are among global leaders and benchmarks in digital government and administration. Finland and Denmark alternatively appear at the top of the European Union Digital Economy and Society Index (**DESI**) and in the United Nations e-Government Survey (**UN e-Government Survey 2022**) Sweden being in the top 5. Finland widely uses automatic decision-making, for example Tax administration makes annually a bit over 16 million decisions of which around 14,5 million are done automatically; strong AI solutions such as machine learning is also used in analytical functions and delivery of health services in the public sector.

5. UN e-Government Survey's analyses confirm that institutions do have an impact on the success of digital government. The Scandinavian model of public administration and law emphasizes effective democracy and transparent administration at the service of its clients and people in general; Scandinavia values a human-centric administration. This is legally anchored to the substantive dimension of service principle in administrative law. Finland is about to legislate new general acts of parliament on the automatic decision-making in public administration to further support and create legal bases to already widely used automatic decision-making (see **Government Proposal HE 145/2022 vp** for the new legislation; for a legal analyses of automatic decision-making from the Finnish legal perspective, see also Suksi 2019 and Suksi 2020). The acts would provide the generally applicable legislative provisions on automatic decision-making in the public sector and are supposed to be adopted in Autumn 2022. The proposed provisions would:

   ▪ create directly sufficient legal foundation for the use of automatic decision-making in public administration as required by Art. 22 of the **European Union General Data Protection Regulation**, GDPR, and section 2 (3) of the Constitution of Finland and establish the necessary special protection measures for individuals

   ▪ allow use of automatic decision-making in situations where there is no wide discretion or the discretionary issues are solved by humans and the decision-rules can be expressed ex ante

   ▪ require informing client of the public administration on the use of automatic decision-making and on the automated procedures and logic of automation

   ▪ create rules on how to allocate official responsibility and accountability and which kind of planning and approval documents shall be used in the development and taking into use of automated procedures and their quality testing, quality assurance and quality control

   ▪ establish right for human review in the administrative review procedure as a condition of use of automatic decision-making

   ▪ authorise continued use of automatic registration of real estates and specific property rights to land register and information system on real estates.

6. Very old constitutional institutions do change to serve current needs of the society. The **Chancellor of Justice** is by Act (**330/2022**) designated a task of the supreme guardian of the development and use of automation including AI in the public administration as part of the Chancellor's general constitutional remit to oversee legality and fulfilment of duties by all those having public functions and tasks. The ratio behind this provision is strengthening of systemic and proactive oversight on automation of public administration and to complement judicial control and review by the courts and, also to complement and assure oversight by special authorities such as data protection authorities and equality & non-discrimination authorities; this oversight task needs specialization so there are reasons to concentrate it to

one of the supreme oversight institutions. I have here the pleasure to address you as one of the first active general AI overseers beyond data protection authorities.

II Human – Computer Interaction in Law and Computer Science is a difficult and increasingly decisive issue for successful digital government and administration

7. Human – Computer Interaction or Human-Computer Confluence or Human - Computer Integration is not only about user interfaces but also about participation and other fundamental social and user concerns in systems development and computer science. HCI has taken the mission to situate users to the centre of analyses and of ICT systems development from a multi-disciplinary perspective (see Stephanidis C et. al. 2019; Cheruvu 2022; Hochheiser & Lazar 2007). HCI is a way of thinking, and, a research and development approach acting to ensure that information systems are at the service of humanity. From a legal perspective, the philosophy is to realize the principle expressed in the para. 2 of the preamble of the 1995 EC **Personal Data Directive 46/95/EC**: the data-processing systems are designed to serve man. Same principle is found now in para 4 of the preamble of the **European Union General Data Protection Regulation (EU) 2016/679**, GDPR, stating that the processing of personal data should be designed to serve mankind; it is not only a utilitarian cost-benefit maximisation command. It is a wide principle of the fundamental design values extending to all information and communication systems. This serving of humanity shall be red in the light of fundamental and human rights (Aizenberg & van den Hoven 2020). In the AI ethics, the principle under human control or human in the loop is widely discussed and recommended with a very right concern for human autonomy. Protection of human autonomy and human agency is one of the most profound missions of law.

8. Currently there is a growing need to consider how computer systems will be designed and trained for interaction with use environment and humans, and how to assess the various aspects of the human & technology symbiosis. Humans become parts of and partners with a technological system. This creates crumbles zones familiar from safety and accident investigations (Elish 2019).

9. Interaction and influence between humans and autonomic computer systems is two-directional: computer systems influence humans and humans influence computer systems (Shneiderman 2020). In the oversight practise one can observe that rather banal mistakes, omissions or assumptions create problems. Literature and practise knows the use-case of a curios child disturbing an autonomous robot or a teenager making fun by speaking rudely to a self-learning chat-bot. The assumption that the human in the loop is always rational and

beneficial is also a faulty one or at least an over-simplification. Also many implicit assumptions of human behaviour in the systems design may become the source of problems. In the Chancellor of Justice practise, the main issue has been oversimplified assumptions underlying systems design and development (see also Matthews 2020). In the Chancellor of Justice decision **OKV/138/10/2020** on automatically generated opinion on labour market availability, the question was if every client of the public employment office was also an applicant of social benefits. The automated system inherently assumed this: system functions and decision-rules were consequently defined, and the result was an issuance of a negative statement when the client did not seek any benefit but wanted to use the public system to share his job search. Over-simplified use-cases can produce widely replicated problems albeit there is nothing wrong in the algorithm, coding and training of the system as such.

10. Law has traditionally been regulating humans and their social relationships directly or indirectly via regulation of legal relationships between legal personalities. Law is becoming increasingly sensitive on issues of information systems design and human – computer interaction. In the case law of the Chancellor of Justice there is a growing case law setting requirements on the human – computer interaction on the bases of the fundamental principles of administrative law including service principle in which the Chancellor of Justice has also requested corrections to information systems. An example of this is found in the Chancellor of Justice Decision concerning comprehensibility, transparency and user-friendliness of the user conditions in the **OmaOlo** (OwnHealth) –health and health self-help & analyses platform with applications provided by the Finnish Government, which are based on advanced AI tools, **OKV/2674/10/2020**, 7.6.2022. Another example is Chancellor of Justice Decision **OKV/338/1/2018**, 26.3.2019 on how services, which are not dependent on a specific type of user device, would promote equality. My argument here goes that law will, and it should, increasingly address the human–computer interaction and collusion.

III Broader scope of automation and digitalization to be addressed and integrated with the tech solutions

11. Use of AI and automation in general is not a stand alone issue in digital government and administration but an integrated part of the general functioning and development of public administration and services if the benefits of digital technologies would be fully realized. Avoidance and mitigation of the risks requires as well a broader look into the ways in which the government and public administration function.

The UN e-Government Survey of 2022 captures well the overall goal of the digitalization efforts: the most successful implementations of the e-Government seek to establish a cognitive, adaptive and agile government at the service of the people. This means use of data

and analytics including hindsight, real-time data foresight as the basis of policy-making and understanding government and public administration as cognitive system to make faster and better decisions in policy and in implementation as well as in individual service delivery. (**UN e-Government Survey 2022**). Adaptive means capacity to change and align with analyses and augmented societal and organizational learning capacities and agility means the ability to change governmental programmes and services sufficiently quickly if circumstances and democratic decisions so require. Governmental programmes and services shall be connected with intelligence architecture. This may sound easy but surprisingly often, the ICT and automation capacities with legacy systems are rather a brake in policy planning than an enabler of adaptive government. An example is the possibility for relief measures for higher electricity prices: the possibilities to programme necessary changes and decision-criteria to software in tax administration automatic decision-systems for tax deductions and the time this programming and system configuration would require had to be taken into consideration as a policy constraint when the Government was reflecting on the various policy alternatives.

12. Following a long-term observation by Nordic legal informatics literature the successful digitalization and particularly the cognitive, adaptive and agile government requires a look beyond tech and technical solutions to design and reform of government, its resources and processes and services. Shortly the following dimensions in digitalization and automation can be distinguished:

    1. Organization and its networks & platforms of public administration: whole-of-government or whole-of-society wide digital platforms are increasingly the organizational foundation of digital services in Finland

    2. Automatic decision-making: in Finland this will be enabled by proposed new provisions in the Administrative Procedure Act

    3. Automatic decision-support, background automation and analytics, to which general principles of good information management apply and where the line between support and de facto steering by machines is an issue

    4. Communication & advice of clients and the solutions for that

    5. Information processing, analytics and dissemination; sensors and people which all will feed data and analysed knowledge into decision-making and decision-support or following open data to whole-of-society to be used.

    Legal requirements and applicable legal solutions beyond general principles are partly different on each of these aspects of digitalization and automation. (Schartum 2019).

13. These dimensions call upon a holistic reflection in the realisation of human-centric design and human–centric administration. In addition to design of individual algorithms and software and the realization of the principles of responsible AI, the principles of accountability, transparency and responsibility, the whole of the architecture and realisation of these digital

government virtues in and with interaction with humans are in the middle of the design challenge. There we will need better understanding of decision-models and inter-action models and their anchoring to human cognitive empiric realities. This also leads us to empirically more realistic and theoretically sounder arguments what for example principles like transparency, explainability, accountability and responsibility are and can achieve (Matthews 2020, Dignum 2019, a critical assessment of transparency and what it can reasonable solve is Koivisto 2022, Koivisto 2021 and Koivisto 2020). Experience for example concerning digital patient management and record systems with diagnostic tools tell that the entirety of the working style and environment of medical staff has to be considered at the same time as the information systems and individual solutions and applications in them are planned. In other words, design of platforms, networks, organization and systems. For that very purpose design of architectures & systems & processes & personnel & stakeholders shall take place concurrently and in co-operation with the development and the designs shall be done with integration of the whole in mind.

14. In design itself, some of the internally established or tacitly adopted planning and coding patterns in software and user-interface design and engineering has to be challenged or reconsidered: a banal but real life example from my Chancellor of Justice practise: the AI powered platform for public health care solutions, including auto-diagnosis support and medical advice, included forced acceptance of the terms of use albeit it was a public service under public law. The system failed to understandably inform citizen users with whom a citizen is interacting with, and if it is a robot and who is responsible for the specific service concerned in a multi-agent platform (Chancellor of Justice Decision on the clarity and comprehensibility of the terms of use and of the service of health care advice and self-help platform OmaOlo, which is powered by AI, **OKV/2674/10/2020)** in which the user-centric information to be given to a service user was the core point. The fundamental requirement is that the user knows what their legal position is and with whom they are communicating in various parts of a multi-channel service. User information shall include all information needed for securing user rights. Beyond that, human-centric AI aiming at hybrid intelligence is designed for a partnership seeking augmented problem solving power compared to human alone or tech alone. There are places for humans and places for machine and the structure shall be sufficiently agile and fluid for changing priorities and capabilities.

15. Even though I frequently use the term architecture, I am aware of the challenges in this planning, design and integration exercise: Finland did try an ambitious approach to apply the systemic enterprize architecture (EA) model in the whole of government but the method proved to be too ambitious for interoperability goals and was implemented in a limited way (see on this **Government Proposal HE 284/2018**, p. 29). But there are more failures to come when this broader design and integration with people is not properly done.

IV Artificial Intelligence (AI) is a powerful tool - not a myth nor a stand-alone tech

16. Human history and progress of humanity is about learning to use tools and what counts is what the humans can do better with the tools and what are the risks related to specific ways of using a tool. Various AI solutions are powerful, general-purpose tech tools. Today we live already the fifth time of an era of AI promise and this time it may become real. The most significant possibility with AI is that it enables partnership between human agent and partly autonomous, ''intelligent'' systems and thereby augmentation of human problem-solving power and capabilities. Hybrid intelligence and hybrid architectures are a way to construct and situate AI applications directly as part of this human – machine collaboration where humans will work and live as part of a socio-technical system (Akata et al. 2020; Cheruvu 2022).

17. In the hybrid intelligence context design is not only an isolated optimization effort for a single algorithm albeit this remains not only as an important research and development challenge but also an issue of optimization of this wider partnership, where humans can also bring some surprising factors into play. This also raises interesting ethical issues such as will AI systems eventually need to be designed to incentivize their human users to perform according to a set of expectations? (Cheruvu 2022).

18. The role of law, fundamentally, is to safeguard human dignity and inviolability of the human person as a carrier of rights and as an autonomous agent with real agency when humans will work and live as part of a socio-technical system. This entails risks, even significant risks, but as such, there is nothing scary in hybrid intelligence. We shall not project our fears of the lack of mastery and of the AI into the development and require human in the loop solutions only out of fear.

V Hybrid architectures for human centric AI (HCAI) aim to diversified use of data and AI in order to achieve hybrid intelligence

19. Hybrid intelligence as a goal calls for considering human environment and interaction with humans widely at the design of information system and application. Principles on design have to be considered and interpreted systemically from the perspective on how to amplify and augment human activities and take the human element into account. This means both a system level approach looking for optimal human – machine problem solving and distribution of resources and time in problem solving and also designing individual algorithms and applications or accommodating them to use on the basis of this overall human – machine partnership and collusion.

20. This also means, that sometimes human in the loop is beneficial and required but human in the loop may also be a source of errors and even manipulation: design question is then also when and how the human in the loop is beneficial (Cheruvu 2022). With regards to the long-term challenges of HCI, the hybrid intelligence means also recognition of different stakeholders and their different expectations and cognitive approaches in interaction with the system. Also informing of the functions of the system, including explainability and transparency, the specifics of each user and target group including unexpected intentions have to be considered sufficiently. (Cheruvu 2022). Practical experience tells that possible mistakes and loopholes will be tested by someone. These considerations come atop of the design for values and rights (Value-Sensitive Design, Values in Design, Rights in Design) which recently have gained increased attention . Target group context sensitivity in design has been one of the core requirements derived in the Chancellor of Justice practise from the general principles of administrative law and data protection law to the human – computer interaction and how digital systems function.

21. Hybrid architecture is often used in the design and solutions: the use of AI is diversified in the architecture considering for example data transfers and the resulting optimal solution that sometimes local smart data and application is better than big data analytics (from a network optimization perspective Koudouris et al 2022; from AI ethics perspective see also Matthews 2020).

22. Hybrid architecture can refer to architecture, which from the very beginning is designed for the hybrid intelligent and aims for cognitive, adaptive and user-centric government and public administration. In other words, it is an architecture designed for human and machine collaboration and co-creation in which the optimization parameters are designed for this objective. It also sees the AI system always as a multi-agent system designed for interaction (Dignum 2019) and connects AI with emotional intelligence, social and societal issues with inter-disciplinary competences (Alyson 2019).

VI Rights by Design and Default is a Common Task for Law and Computer Science with Specific User Disciplines

23. Computer science literature on AI design speaks about design principles such as transparency, accountability and responsibility and of ethical requirements concerning the design process (rights and ethics in design), how the system responses and behaves (rights and ethics by design) and how the software and system designers and maintenance professionals as professions and professionals act (obligations and rights of the designers). Rights by design and default follows from the idea, which normatively is best expressed in data protection laws, for example in the GDPR Art. 25 of the data protection by design and default, that effective and balanced realization of the fundamental right(s) shall be coded into the

structures and code of the system and its definitions and procedures and parameters. Law-rence Lessig expressed this idea law as code but the approach is wider and extends to rights in design process, rights by design and maintenance and rights, obligations and re-quirements for designers (idea loosely follows also Dignum 2019, p. 6-16 from ethical per-spective; Lessig 1999).

24. Finland's new legislation and the amendments to generally applicable Public Information Management Act would go modestly into this direction. Proposed new provisions in the Pub-lic Information Management Act would require informing the client of the public administra-tion on the use of automatic decision-making and on the automated procedures and logic of automation. The Act would contain rules on how to allocate official responsibility and ac-countability and define which kind of planning and approval documents shall be used therein in the development and taking into use of automated procedures, quality testing, quality assurance and quality control of automated procedures in order to ensure transparency, accountability and explainability to professional audience. (See **Government Proposal HE 145/2022 vp for Acts on automatic decision-making in public administration**, in Swe-dish and Finnish only).

25. Rights by design and default means that rights are designed, coded and trained in at all layers of AI infrastructure and systems and, in the training of the algorithms, in a systematic and coherent manner. This is an action and impact or outcomes focused on design and coding exercise. The idea is a practical realization, effectiveness of rights; in other words a rights-based outcome in the behaviour of the autonomic systems and of the collusion of humans and the systems. Requirements for architecture and system development process are set from this optimal outcomes perspective. Accountability is ensured by documentation and rigorous certification and testing and systematic work, risk analyses and rights impact assessments as well as participation and other value sensitive design techniques. Here substantial requirements for design and solutions are derived from the effectiveness of rights and the resulting use cases and desired outcomes. (See also Koulu 2021).

26. Law and realization or on the other side rights and systems development and design would need some common ground for encounter. Legal and system design patterns developed by software designers and software and algorithmic design sensitive lawyers in multi-discipli-nary co-operation might be useful for this common design exercise. (Koulu et al. 2021).

27. Proper incentives are needed for the industry to achieve rights by design and default. Quality and security has been a pertinent problem in software development and this problem still calls for solutions. (Råman 2006). The European Union's draft AI Act, as it is currently on the negotiation table at the European Parliament and Council, provides only partial solutions to this old problem.

VII Legal and Ethical Governance

28. I consider legal and ethical governance as complementary to each other albeit the law and ethics are different normative systems and ethics have also the function to control the morality of law. On the other hand, positive law represents either widely accepted norms or democratically legislated norms and thereby often, but not always, specific legitimacy in addition to the law's character of being enforceable by force. Both normative systems call for responsibility and action, there are both principles and action of implementation (see Dignum 2019; on the various industry approaches see Artificial Intelligence at Google, https://ai.google/principles/; IBM Research, What is human-centered AI, https://research.ibm.com/blog/what-is-human-centered-ai and Microsoft: Empowering impactful responsible AI practices, https://www.microsoft.com/en-us/ai/responsible-ai?activetab=pivot1:primaryr6 ; pages visited 12.10.2022). Legal design patterns and legally informed software and algorithm design patterns together with principles, codes of conducts, implementation play books and impact assessment tools facilitate in common action by creating a common professional communication tool and language between software designers, lawyers and administrators.

VIII Human – Machine Partnership –friendly legislation is needed for hybrid intelligence

29. Schartum has written in Nordic legal literature on the automation friendly legislation, which would create clear rules for matters to be decided automatically and grant discretion on situations where that is reasonable and desirable (Schartum 2019). This is an important point and is supported by practical observations from Finland's public sector digitalization efforts. Law should and can support automation and hybrid intelligence. It shall be drafted for that purpose. Hybrid intelligence friendly legislation defines what can be decided by machines; the place of and extent of administrative and legal discretion should be clearly defined. The hybrid intelligence friendly legislation defines principles concerning when and how the human shall be in the loop and contains the general principles on other aspects than direct automatic decision-making to provide a value-based point of departure to planning and design tasks of computer professionals. Finland's new legislation on automatic decision-making in public administration (**RP 145/2022 rd**, in Swedish) is a modest beginning to this direction but the modesty of the beginning is considerable and legal solutions shall be revisited.

IX Conclusion

30. I have made a two-dimensional argument in my speech: (1) Hybrid Intelligence with responsible AI and rights by design and default is the future of digital government which is at the

service of people and society; (and 2) realization of Hybrid Intelligence with responsible AI calls upon an inter-disciplinary endeavour of several professions including law and computer science. If we manage this, then Scandinavian countries continue to be a global benchmark in digital government and administration not only in technical performance but in taking people in. This is our common responsibility to act upon as professionals, both inside in our respective professional fields and together in a multi-disciplinary work.

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