Blockchain and the Right to Good Administration: Adding Blocks to or Blocking of the Globalization of Good Administration?

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ABSTRACT

In this article, the author addresses the complex and multifaceted relationship between the right to good administration enshrined in the Charter of Fundamental Rights of the European Union and the uses of blockchain technology by the public administration, which is in charge of making the right to good administration real. The opportunities and threats come hand in hand, and there is an urgent need to push forward a public debate on the uses and misuses of blockchain to guarantee public services, so much so that many aspects of blockchain are not compatible with citizens' expectations in relation to the public sector. Although the focus is on Europe, and the right to good administration is not technically recognized on the international level, the globalization produced by technological advancements on the one hand, and the emergence of global administrative law on the other hand, makes this debate relevant to the rest of the democratic states that want to foster human-centric technologies for the well-being of their citizens.

I. INTRODUCTION

Blockchain has not yet become a mainstream technology, and many people in Europe, the United States, and other countries still do not understand what it means and what it does.[1] Surely many have heard the term, particularly in relation to one of the most popular uses that blockchain was put to— cryptocurrencies. As a matter of fact, statistics show that more than three hundred million people in the world owned

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1. Although the most correct and representative term would perhaps be Distributed Ledger Technology, in this article, I will use the term *Blockchain*.

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cryptocurrencies in 2021.[2]

However, blockchain is not just cryptocurrencies. The public sector is exploring a variety of possibilities that blockchain offers, and this paper focuses on these possibilities: it addresses them through the lens of the right to good administration, a principle and a right established in the European Union (EU) within the framework of the Charter of the Fundamental Rights of the European Union (Charter).[3]

In particular, this article looks at the right to good administration as both a self-standing right and a guiding principle[4] as it applies not only to blockchain in particular, but to any technology that is currently emerging and could be considered useful within the public sector, such as Artificial Intelligence (AI), robotics, interfaces between human brain and digital devices (brain-computer interfaces), the metaverse, and many others. The promises that these technologies bring are not always possible to fulfill, not only because of the objective reasons, such as insufficient digitalization of public services[5] or lack of digital literacy of the population, but also because the price to fulfill these promises in terms of fundamental rights is (or, for those that may occur in the future, might be) too high. Indeed, no digital technology is possible to implement in the EU public sector if it does not comply with EU values—accountability, transparency, privacy, and personal data protection, just to name a few—and fundamental rights, established as core elements and nonnegotiable assets of the community's coexistence.

This rule, *sine qua non*, is reflected in many EU acts, among many, the most recent European Declaration on Digital Rights and Principles for the Digital Decade,[6] which, in terms of digital public services online,

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2. Jordan Tuwiner, *63+ Crytocurrency Statistics, Facts & Trends*, BUY BITCOIN WORLDWIDE (July 15, 2022), https://buybitcoinworldwide.com/cryptocurrency-statistics/.

3. Charter of Fundamental Rights of the European Union, 2000 O.J. (C364), art. 41, Dec. 18, 2000, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12012P%2FTXT [hereinafter Charter].

4. In fact, to consider the right to good administration as just a principle would be an error. Diana-Urania Galetta, *Digitalizazzione e Diritto ad una Buona Amministrazione*, 3 REV. INTERDISCIPLINARE SUL DIRITTO DELLE AMMINISTRAZIONI PUBLICHE 197, 198 (2021); *see generally* Jaime Rodríguez-Arana, *La Buena Administración Como Principio y Como Derecho Fundamental en Europa*, 6 MISIÓN JURIDICA 23 (2014); *see also* Marc Clement, *Breach of the Right to Good Administration: So What?*, 1 ELTE L.J. 19 (2018) (finding the correct qualification is to see the Right to Good Administration both as a right and also as a principle of EU law).

5. *See* Oliver Large & Hilda Barasa, *Digital Government in Europe: In Pursuit of Cross Border Functionality*, TONY BLAIR INST. GLOB. CHANGE, (Apr. 11, 2022), https://institute.global/policy/digital-government-europe-pursuit-cross-border-functionality (finding only 35% of public sector in EU had an organization-wide digital skills program).

6. *European Declaration on Digital Rights and Principles for the Digital Decade*, COM (2022) 28 final (Jan. 1, 2022) [hereinafter Declaration].

clearly establishes that:

> Everyone should have access to all key public services online across the Union. Nobody is to be asked to provide data more often than necessary when accessing and using digital public services.[7]

The various uses of technologies in the general digitalization of public administration and the application of specific technologies, such as AI, has raised many questions, hopes, doubts, litigation, uncertainties, and a loss of trust in the state and its institutions across the world. The questions range from the more theoretical ones, related to automated administrative state as such and its legitimacy, to the more specific ones related to certain applications that promised more than they delivered and, in addition, harmed the weakest social groups.[8] However, there are also voices that see AI as a tool to make a change for the better and, in relation to the topic of this article, could help make the right to good administration effective and more efficient, on condition that the human stays in the loop and does not leave the AI-based application to function without supervision.[9] But what about the blockchain?

To understand the use of blockchain in the public sector (also called

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7. *Id.* at 4 (demonstrating the EU's commitment to "ensuring that all Europeans are offered an accessible, secure and trusted digital identity that gives access to a broad range of online services, ensuring wide accessibility and re-use of government information, facilitating and supporting seamless, secure and interoperable access across the Union to digital health and care services, including health records, designed to meet people's needs.").

8. *See* Ryan Calo & Danielle Keats Citron, *The Automated Administrative State: A Crisis of Legitimacy*, 70 EMORY L.J. 797 (2021); Stephan Grimmelikhuijsen & Albert Meijer, *Legitimacy of Algorithmic Decision-Making: Six Threats and the Need for a Calibrated Institutional Response*, XX PERSPECT. PUB. MANAG. GOV. 1 (2022); Nicolas Kayser-Bril, *Spain: Legal Fight over an Algorithm's Code*, ALGO. WATCH (Aug. 12, 2019), https://algorithmwatch.org/en/spain-legal-fight-over-an-algorithms-code/ (describing the problem of algorithm that allocates electricity bonuses for the socially vulnerable families); *see generally* Sascha van Schendel, *The Challenges of Risk Profiling Used by Law Enforcement: Examining the Cases of COMPAS and SyRI*, REGULATING NEW TECHNOLOGIES IN UNCERTAIN TIMES 225 (2019), https://research.tilburguniversity.edu/en/publications/the-challenges-of-risk-profiling-used-by-law-enforcement-examinin (addressing the well-known cases of COMPAS in the US and SyRI in the Netherlands, which in both cases were systems that were proved to be discriminatory, unfair and unreliable).

9. Izabela Wrobel, *Artificial Intelligence Systems and the Right to Good Administration*, 49 REV. EUR. & COMP. L. 203, 218 (2022).

"messy world of public sector IT,")[10] and to address the different aspects of how blockchain and the right to good administration could mutually reinforce each other, the paper is organized as follows. In part 2, I focus on the right to good administration, which is established in the EU as a fundamental right, but also recognized directly or indirectly in other parts of the world, making it possible to talk about its global recognition.[11] In part 3, I succinctly explain what blockchain is and how it works, detailing how the increased levels of technological complexity challenge citizens' ability to understand and question blockchain and similar technologies. In part 4, I turn to the ways in which blockchain technology could strengthen the right to good administration, whereas in part 5, I focus on weaknesses that blockchain introduces for the achievement and realization of the right to good administration. The article finishes with concluding remarks.

Before we start, and for the purposes of contextualization, the following remark is due: we should bear in mind that although it was (also, but not only) thanks to new technologies that we started to really understand what globalization is,[12] certain areas of human knowledge—such as public law in general and administrative law in particular—have resisted globalization processes, leaving them for international law to address. International law, however, applies to specific themes, such as trade, armed conflicts, environment, or intellectual property, but does not deal with issues so dear to a sovereign state, like its internal mechanisms and procedures, that are the essence and heart of public administration. This resistance reflects the intention of states to keep certain aspects of its internal mechanisms exclusively national, but the question is for how long. The advancement of what is known as Global Administrative Law—that is, the kind of administrative law that

10. Michael Veale, Max Van Kleek, & Reuben Binns, *Fairness and Accountability Design*
Needs for Algorithmic Support in High-Stakes Public Sector Decision-Making, CHI 2018 CONFERENCE PAPER 440, 2 (2018), https://arxiv.org/abs/1802.01029.

11. In fact, the general legal principles of the EU are recognized as a global rule of law; among these principles, we can find the obligation to provide reasons for decisions and the right to be heard, which are constituent rights of the Right to Good Administration as described in the following sections of this article. *See generally* Marco Macchia, *The Rule of Law and Transparency in the Global Space*, *in* RESEARCH HANDBOOK ON GLOBAL ADMINISTRATIVE LAW 261, 269 (2016) (exploring the dynamics between the rule of law, global institutions and the state).

12. For example, one of the possible visions is that globalization depends on information technologies because the technologies enabled international trade and foreign direct investment. *See generally* JEFFREY JAMES, GLOBALIZATION, INFORMATION TECHNOLOGY AND DEVELOPMENT (1999) (arguing that globalization is mainly a technological phenomenon, driven by influences exerted on international trade and foreign investment by various forms of information technology).

through a body of basic rules mediates between states and supranational rules and rulers[13]—promises the end of an entirely national understanding of what administration of the state is all about. This article argues that the right to good administration could be one of these basic rules that should permit nations to build an international community where human rights are at the center and where technologies—Internet, AI, blockchain, metaverse, or any other—serve to achieve this goal and not to make it even more difficult to bring into being. In particular, blockchain, this "democratizing escape from the failings of territorial legal systems,"[14] has a particularly promising role in this regard.

II. RIGHT TO GOOD ADMINISTRATION

The right to good administration is established in article 41 of the Charter in the following terms:

> 1. Every 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.
> 2. This right includes:
> a. the right of every person to be heard, before any individual measure which would affect him or her adversely is taken;
> b. the right of every person to have access to his or her file, while respecting the legitimate interests of confidentiality and of professional and business secrecy;
> c. the obligation of the administration to give reasons for its decisions.
> 3. Every person has the right to have the Community make good any damage caused by its institutions or by its servants in the performance of

13. These global rules and rulers are represented by the 2,000 global regulatory regimes, 60,000 international non-governmental organizations, and over 100 international courts. *See* Sabino Cassese & Elisa D'Alterio, *Introduction: The Development of Global Administrative Law*, *in* RESEARCH HANDBOOK ON GLOBAL ADMINISTRATIVE LAW 1, 1 (Sabino Cassese ed., 2016); *see also* Benedict Kingsbury, et al., *The Emergence of Global Administrative Law*, 68 LAW & CONTEMP. PROBS. 15 (2005) (describing the field of global administrative law as a field of study).

14. Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECHNOL. L.J. 487, 489 (2018).

> their duties, in accordance with the general principles common to the laws of the Member States.
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> 4. Every person may write to the institutions of the Union in one of the languages of the Treaties and must have an answer in the same language.[15]

The first part of the article establishes a few principles—impartiality, fairness, and efficiency in terms of time necessary to address a particular matter—whereas the following parts articulate rights that compose the right to good administration, namely the: (a) right to be heard, (b) right to information broadly construed, (c) right to remedy, and (d) freedom to choose communication language, as long as this language belongs to those languages in which the EU treaties have been written in. The right to information is broadly construed because, for purposes of this article, it means not only the right of a citizen to access the information that the public administration has on them, but also the right to demand the public administration to explain its decisions.

The right to good administration is also reflected in many constitutions of EU member states, such as the Spanish Constitution (1978),[16] the Italian Constitution (1948),[17] the Lithuanian Constitution (1992),[18] and many others. That is to say, this right does not refer only and exclusively to the EU institutions, but also reverberates through the legislations of member states, where its foundations were already established constitutionally before the Charter came into force. In addition, it also reflects the general principle of good administration that belongs to EU law.[19] This right on the EU level is guaranteed by

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15. Charter, *supra* note 3, at art. 41.

16. *See* Jaime Rodríguez-Arana, *El Derecho Fundamental a la Buena Administración en la Constitución Española y en la Unión Europea*, 40 REV. GALLEGA DE ADMINISTRACIÓN PUBLICA 233 (2010) (addressing the link between the right to good administration and representative democracy); *See* CONSTITUCIÓN ESPAÑOLA, art. 103, Dec. 29, 1978 (Spain) (linking the right to good administration and Spanish Constitution).

17. COSTITUZIONE, art. 97 [COST.] (It.).

18. LIETUVOS RESPUBLIKOS KONSTITUCIJA, art. 5, Oct. 25, 1992 (Lith.).

19. Clement, *supra* note 4, at 19; *see* Consolidated Version Treaty on European Union, art. 10.3, June 7, 2016, 2016 O.J. (C202) 10.3 ("Every citizen shall have the right to participate in the democratic life of the Union. Decisions shall be taken as openly and as closely as possible to the citizen"); *see also* Consolidated Version Treaty on the Functioning of the European Union, art. 20, 24, Oct. 26, 2012, 2012 O.J. (C326) (providing the find the right to petition, applying to and addressing EU institutions such as Parliament, in "any of the Treaty languages and to obtain a reply in the same language"); *see also The Code of Good Administrative Behaviour*, THE EUROPEAN PARLIAMENT (Mar. 1, 2002); *see also* Treaty of Lisbon Amending the Treaty on European Union and the Treaty Establishing the European Community, Dec. 13, 2007, 2007 O.J. (C 306) 1; *see also Recommendation*

the European Ombudsman and by similar institutions in the member states respectively.[20]

But what is the essence of this right? Besides establishing a series of rights related to public administration and citizens' interaction with it, most importantly it places the citizen—in Rodríguez-Arana's words, "a real individual, a person, with the heap of circumstances that walk with him or her in his social environment"[21]—at the center of this interaction,[22] and requires that the discretionary powers of the public administration be used properly.[23]

Indeed, Juli Ponce describes the general idea of good administration adopted by the European Court of Justice as a procedure to follow before making a decision that has to include:

> [H]earing the people concerned; taking into account all the relevant factors and rejecting the irrelevant; weighing the interests involved; and explaining why [institutions] chose one alternative over another.[24]

No. R (80) 2 of the Committee of Ministers Concerning the Exercise of Discretionary Powers by Administrative Authorities, COUNCIL OF EUROPE (Mar. 11, 1980), https://rm.coe.int/cmrec-80-2-concerning-the-exercise-ofdiscretionary-powers-by-administ/1680a43b39.

20. EU OMBUDSMEN, https://www.ombudsman.europa.eu/en/home (last visited Dec. 12, 2022) ("The European Ombudsman works to promote good administration at EU level. The Ombudsman investigates complaints about maladministration by EU institutions and bodies, and also proactively looks into broader systemic issues,"); DEFENSOR DEL PUEBLO, https: //www.defensordelpueblo.es/el-defensor/que-es-el-defensor/ (last visited Dec. 12, 2022) (defining the same office in Spain—called The Defensor del Pueblo—as "responsible for defending the fundamental rights and civil liberties of citizens by monitoring the activity of the Administration and public authorities."); LITHUANIA OMBUDSMEN, https://www.lrski.lt/en/ (last visited Dec. 12, 2022) (explaining that, in Lithuania, the Ombudsman's functions are carried out by Seimas Ombudsman Office, whose "primary constitutional duty […] is to protect a person's right to good public administration securing human rights and freedoms, to supervise fulfilment by state authorities of their duty to serve the people properly.").

21. Rodríguez-Arana, *supra* note 4 at 256, *translated by* MIGLE LAUKYTE.

22. *See* Rodríguez-Arana, *supra* note 16, at 235–36 (arguing that the citizen has stopped being inert and defenseless individual in front of the state powers that aim to control him or her and this change of vision pushed forward the idea of the modern administrative law); *see also* Rodriguez-Arana, *supra* note 4 (developing further the idea that centricity of citizen is linked to the new idea of the administrative law as a branch of legal system).

23. *See* Juli Ponce, *Good Administration and Administrative Procedures*, 12 IND. J. GLOB. LEG. STUD. 551, 554 (2005).

24. *Id.* at 558–59; *see also* E.U. AGENCY OF FUNDAMENTAL RIGHTS, E.U. CHARTER OF FUNDAMENTAL RIGHTS, at art. 41 (last visited Dec. 12, 2022), https://fra.europa.eu/en/eu-charter/article/41-right-good-administration (providing additional context on the

And also explains that this right is related to:

> The existence of a legal duty for public authorities to be in the best position to be able to make appropriate decisions, thereby resulting in a common European inheritance.[25]

Such a vision of the right to good administration leads us to see it as a part of new administrative law, as already described by Rodríguez-Arana, and links it to the public interest as an overall objective and *raison d'être* of public administration.[26]

However, the right to good administration, as such, is known only within the European Union's frontiers. In the United States, this right has developed in a different form and can be traced back to the V and XIV Amendments of the US Constitution, which both refer to limitations of the state's powers to deprive a person "of life, liberty, or property, without due process of law."[27] It is true though that this link is weak and, for some authors, even inexistent, as due process is:

> Simply a defensive tool, intended to protect citizens. For it to work, due process needs an entitlement, that is, a right given by a legal system to an individual . . . if there is a discretionary power, there is not an entitlement: there is unfettered discretion, and consequently due process fails to work.[28]

Indeed, to have a right recognized by the US legal system would mean that this right triggers the Due Process Clause. The US Supreme Court has explained how this right—an entitlement—does so by arguing that:

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enormously rich case law of the European Court of Justice and European Court of Human Rights on the Right to Good Administration).

25. *See* Ponce, *supra* note 23, at 561–62; Rodríguez-Arana, *supra* note 4, at 239; *see also* U.S. v. South-Eastern Underwriters Ass'n, 322 U.S. 533, 591 (1944) (explaining what the Supreme Court has called "the body of institutional experience and wisdom so indispensable to good administration.").

26. Rodríguez-Arana, *supra* note 4, at 236–38.

27. *See* U.S. CONST. amends. V, XIV.

28. *See* Ponce, *supra* note 23, at 576–77; *see also* Javier Barnes, *Buena Administración, Principio Democrático y Procedimiento Administrativo* [*Good administration, democratic principle and administrative procedure*], 21 REV. DIGITAL DE DERECHO ADMINISTRATIVO 77, 79 (2019) (defining the rights that define the Right to Good Administration as "defensive rights").

> Food-stamp benefits . . . "are a matter of statutory entitlement for persons qualified to receive them" . . . Such entitlements are appropriately treated as a form of "property" protected by the Due Process Clause . . . .[29]

However, there is no right to good administration recognized in the United States and, therefore, it cannot be linked to Due Process. As a matter of fact, the Supreme Court provides a few insights on the matter that could help us to understand how the right to good administration could be understood in the United States. For example, in *United States v. L.A. Tucker Truck Lines*,[30] the Supreme Court has argued that on a variety of previous occasions, it has established that:

> [O]rderly procedure and good administration require that objections to the proceedings of an administrative agency be made while it has opportunity for correction in order to raise issues reviewable by the courts.[31]

Therefore, the *idea* (not the right!) of good administration is not unknown and has been adopted in different cases, not only by the Supreme Court but also by Congress. Therefore, according to this case, we could establish indirect references to the right to good administration, or rather, a duty of good administration inherent in the judicial and legislative understandings of the state's functioning.

Furthermore, the right to good administration—and, in particular, the right to be heard—could also be traced to the following statement by the Supreme Court in an earlier case, *N.L.R.B. v. Electric Vacuum Cleaner Co.*, where the Court confirmed that "[h]andling of complaints as quickly as is consistent with good administration is of course essential."[32]

Having seen these different interpretations of the right to good administration, could we claim that this right is a global right? If we look at the international law and focus on the most important international organizations, we will find references to the constituent rights of the right to good administration. That is the case, for instance, with the Agreement on Safeguards as part of the Annexes to the Uruguay Round Agreements of the World Trade Organization (WTO):

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29. Atkins v. Parker, 472 U.S. 115, 128 (1985).

30. 344 U.S. 33 (1952).

31. *Id.* at 37.

32. N.L.R.B. v. Electric Vacuum Cleaner Co., 315 U.S. 685, 699 (1942) (questioning the interpretation of what is understood as essential and whether any obligations are attached to it).

according to this Agreement, during the investigation, the parties have a right to be heard and the authorities have a duty to publish reports with their findings and motivated conclusions.[33]

Perhaps though, the point is to make the question on globality of the right to good administration more abstract and, therefore, reformulate the question and ask whether we can talk in general about civic values and democracy without talking about good administration?[34] Could a state be considered objectively democratic without guaranteeing its citizens this right? Of course, the guarantees have to be real and effective: that is to say, declarations of this right are not sufficient if the state does not guarantee mechanisms to bring it into being. From this perspective then, we invert the deduction of Ponce, that the right to good administration leads to a legal duty of public authorities,[35] and reach the conclusion that the duty to implement, preserve, and guarantee good administration is where the right to good administration emerges from, and its origins are as old as democratic institutions themselves.

But as old as these origins could be, the contemporary technological advancements and speed of innovation is another matter: public administrations have been dealing with digitalization issues for quite a lot of time already, and the right to good administration was not excluded from these debates.[36]

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33. *See* Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 274 ("A Member may apply a safeguard measure only following an investigation by the competent authorities of that Member pursuant to procedures previously established and made public in consonance with Article X of GATT 1994. This investigation shall include reasonable public notice to all interested parties and public hearings or other appropriate means in which importers, exporters and other interested parties could present evidence and their views, including the opportunity to respond to the presentations of other parties and to submit their views, *inter alia*, as to whether or not the application of a safeguard measure would be in the public interest. The competent authorities shall publish a report setting forth their findings and reasoned conclusions reached on all pertinent issues of fact and law.").

34. Rodríguez-Arana, *supra* note 4, at 38 (arguing that democracies do not belong to politicians nor public officers but to the public domain and citizens whose common needs (public interest) are the priority of the democratic state); Barnes, *supra* note 28, at 79.

35. Ponce, *supra* note 23, at 561–62.

36. *See* Galetta, *supra* note 4, at 198 (suggesting that the public administrations should be free to use any technologies that could be functional to improve impartiality and transparency of administrative procedures and highlights the importance of responsible officer in linking digitalization of public sector with good administration); *see also* Tuomas Pöysti, *Trust in Digital Administration and Platforms*, SCANDINAVIAN STUD. L. 321, 322 (2018), https://scandinavianlaw.se/pdf/65-19.pdf (describing the situation in Finland where good administration is a foundation for trust in digitally enhanced public administration). *See generally* Claudia Elena Marinică, *Digitalization – The Key for Adapting Good Administration to a Better Governance*, 8.2 ACAD. J.L. & GOVERNANCE 111

In what follows of this article, I address one of the most novel technologies, blockchain, that has already been tested in a variety of public sector applications. However, blockchain, unlike many other technologies, such as Internet, mobile apps, and e-payment systems, has been neither widely adopted, nor fully explored. I address this technology through the lens of the right to good administration and question its impact on this right for better—as a tool to strengthen it—and for worse—as a tool to weaken it. But let us first understand what we talk about when we talk about blockchain.

III. BLOCKCHAIN[37]

Blockchain is a relatively young, very complex, and continuously evolving technology that emerged in the financial sector.[38] Its creator, Satoshi Nakamoto, described blockchain as a technology that enables the functioning of cryptocurrencies called bitcoins.[39] Soon after Nakamoto's paper was published, the first bitcoins were released in 2009. What happened next is probably known to everyone, and the crises, crashes, booms, and collapses of cryptocurrencies are part of news programs weekly, if not daily, all over the world.

However, nowadays, to think that blockchain is just for cryptocurrencies would be a mistake: blockchain is much more than that, although cryptocurrencies remain its most famous use, at least for the time being.

According to Khandelwal, blockchain is:

> An immutable, distributed, decentralized; peer-to-peer ledger replicated across multiple nodes connected in a network, making it possible to record data about any event or transaction as it happens. It consists of blocks

(2020) (explaining the dynamics of public sector digitalization with good administration as a guiding principle carried out in Romania).

37. Because of limitations of space, I will not address Blockchain exhaustively and therefore many functionalities (mining), features, stakeholders (miners), their economic incentives and other dynamics are not described here. However, the limited explanations should help to understand the essence for those who are unfamiliar with the technology and the references of this section provide with sufficient bibliographic material for those interested to understand the "back office" of Blockchain more in detail.

38. *See generally* BLOCKCHAIN.COM, https://www.Blockchain.com/explorer (last visited Dec. 12, 2022).

39. Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008), https://bitcoin.org/bitcoin.pdf.; *see* Jonathan B. Turpin, *Bitcoin: The Economic Case for a Global, Virtual Currency Operating in an Unexplored Legal Framework*, 21 IND. J. GLOB. LEG. STUD. 335, 337–39 (2014) (viewing bitcoins from a legal perspective).

in a chain used to record as digital assets using a secure algorithm.[40]

Figure 1 explains this definition graphically.

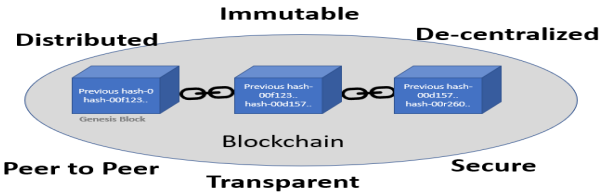

Figure 1. The essence of blockchain technology[41]

In figure 1, the blue cubicles with the writing "previous hash . . ." are data on transactions (purchases, bills, etc.), parties to the transaction (companies, public administrations, individuals under pseudonyms), and the unique code called hash (described in more detail in the following section). The chain of blocks is then a public database of transactions that keeps record of each and every transaction that has been carried out.

Put differently, blockchain is a ledger—a place where we keep trace

40. Renu Khandelwal, *A Simple Guide to Understand Blockchain*, MEDIUM (Feb. 22, 2021), https://medium.com/swlh/a-simple-guide-to-understanding-Blockchain-8dd0935 6b153. *See generally* Nakamoto, *supra* note 39 (explaining blockchain from the technological perspective); AKIRA SUMERS, UNDERSTANDING BLOCKCHAIN AND CRYPTOCURRENCIES (2022) (explaining blockchain from a more recent perspective); PRIMAVERA DE FILIPPI & AARON WRIGHT, BLOCKCHAIN AND LAW at 33 (2018) (connecting blockchain and the law); Primavera de Filippi et al., *The Alegality of Blockchain Technology*, *Policy and Society* 1 (2022) https://academic.oup.com/policyandsociety/a dvancearticle/doi/10.1093/polsoc/puac006/6529327 (providing more information on blockchain); RAJESH DHUDDU & SRINIVAS MAHANKALI, BLOCKCHAIN IN E-GOVERNANCE (2021), https://www.perlego.com/book/2661005/blockchain-in-egovernance-driving-the-next-frontier-in-g2c-services-pdf (addressing the possibilities offered by the Blockchain for public services, such as voting, healthcare, cybersecurity, smart cities, and others); Svein Ølnes et al., *Blockchain in Government: Benefits and Implications of Distributed Ledger Technology for Information Sharing*, 34 GOT INFO. Q. 355 (2017), https://www.sciencedirect.com/science/article/abs/pii/S0740624X17303155 (elaborating two perspectives—governance by Blockchain and governance of Blockchain—on how governments interact with Blockchain, bearing in mind all the benefits and promises of this technology for the public sector).

41. Khandelwal, *supra* note 40 (providing the illustration of the essence of Blockchain technology). *But see* Ølnes, et al., *supra* note 40, at 360 (noting that some authors also argue that there is no such thing as Blockchain as it is a technology that comes in a variety of shapes, forms and properties).

of records—that permits to register every transaction on a block and add that block to a chain: once added, the block cannot be altered and cannot disappear as it is shared by all nodes, and all nodes have a copy of the latest version of blockchain. Should the block disappear for any reason (cyberattack is a typical example), it can be easily retrieved as the copies are distributed among the nodes of the blockchain network and are updated with every new block added to the chain. It is visible to the rest of the people who have access to this blockchain, and what is recorded on it cannot be changed. Therefore, the transactions are visible, but cannot be altered, without the consent of all the nodes.

Practically, the functioning of blockchain is as follows: I buy a book on Amazon, and this transaction is verified by a network of computers or "nodes" that constitute the particular blockchain. That is to say, these nodes verify, for example, that I have funds to buy a book and that the marketplace where I buy it is really Amazon. Afterwards, once the verification is over, this transaction is added to the block, and the block is "locked" with the help of hash. Once it is done, the block is added to the chain, and everyone has a copy of this new version of the chain of blocks (new because it was updated with a new Amazon-book transaction block).

What is so special about this technology then? First of all, it is completely transparent for those who belong to the blockchain network, in the sense that the transaction chain (the chain of blocks) is visible to everyone who participates in it. The fact that it is also decentralized stands against the traditional vision of transactions that have to pass through the central body, for example, a bank which confirms that a buyer has funds to carry out a particular transaction. Furthermore, blockchain is also very secure: blockchain is tamper-proof because of asymmetric cryptography, digital signatures, and, in particular, hash function. It is also a multistakeholder technology in the sense that, as a decentralized ledger, its network is made of peers and not based on a hierarchical structure.[42] These peers work together to verify, register, and share the data on this ledger, while earning at the same time.

Therefore, it is no surprise that for some, "[b]lockchain re-writes trust as we know it, replacing it with a platform of shared, verifiable integrity."[43] Indeed, we no longer must trust individuals or institutions

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42. *See* Marcella Atzori, *Blockchain Technology and Decentralised Governance: Is the State Still Necessary?*, 6 J. REGUL. GOV. 45, 51 (2017), https://virtusinterpress.org/IMG /pdf/10.22495_jgr_v6_i1_p5.pdf (This position could be challenged in certain particular cases, for instance, when 51% of nodes take over the blockchain network).

43. NASCIO, *Blockchains: Moving Digital Government Forward in the States* 2 (May 16, 2017), https://www.nascio.org/wpcontent/uploads/2019/11/NASCIO20Blockchains

to transfer assets: the architecture of blockchain technology guarantees the successful outcome of a transaction. This trust could be further augmented if we are dealing with the permissioned—and not permissionless—blockchains.[44] In the case of the former, we have a network based on a group of "nodes" who can trust each other more than if they were in a permissionless blockchain because their access to form the blockchain network was monitored by a centralized authority or other entity. That is not the case with a permissionless blockchain, where anyone can enter and become a part of the network freely without identifying themselves. However, those who understand trust differently—(i.e., where loyalty and coherence play a role)—and who do not consider that decentralization, cryptography, and algorithms are enough to build it (Werbach calls it the "cryptoeconomic trust model"),[45] see the blockchain as a trustless, rather than a trustworthy, technology.[46]

In what follows in this article, I first focus on technological aspects of blockchain that explain its characteristics, and then I address some of the most promising and debated applications of blockchain in the public sector services.

A. Technology

The main technologies that blockchain are based on are: the unique code of hash and a consensus mechanism, that is, a way for all the nodes to agree on what is a valid transaction on a particular blockchain. Another key aspect of blockchain is a smart contract. Let us briefly address each of these technological aspects of blockchain that help us to understand blockchain's strengths and weaknesses.

1. Hash

Hash is an essential element of blockchain, without it, the whole blockchain technology could not exist. It is a unique code given to every block to "lock" it for good and make it very complicated to modify, change, delete, or in any other way alter the information it contains.

20in20State20Government.pdf (exploring trust in Blockchain and the role that law plays in this relationship); *see* Werbach, *supra* note 14, at 494.

44. De Filippi & Wright, *supra* note 40, at 31.

45. Werbach, *supra* note 14, at 495.

46. Primavera de Filippi & Benjamin Loveluck, *The Invisible Politics of Bitcoin: Governance Crisis of a Decentralised Infrastructure*, 5 INTERNET POL'Y REV. (2016), https://policyreview.info/articles/analysis/invisible-politics-bitcoin-governance-crisis-decentralised-infrastructure.

There are different tools to generate the hash, one of the most known is Secure Hash Algorithm (SHA) 256. Figure 2 shows how the hash of the title of this paper would look like:[47]

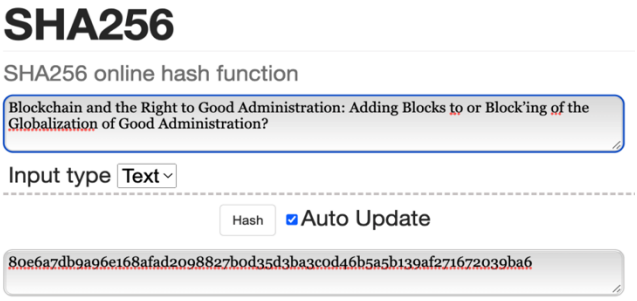

Figure 2: Example of how hash looks like if applied to the title of this article.

Once generated, hash is subsequently checked by the other nodes of the blockchain network, and once this relatively simple operation is over, the block is added to the chain of blocks.

Should there be any problems—for example, there are insufficient cryptocurrencies in a buyer's account—the blockchain network (nodes) reject the operation and the block is not created.

How does this long string of numbers and letters guarantee the safety and trustworthiness of the transactions on blockchain? The hashes on the blocks are connected, therefore, to manipulate the content of one block also means to manipulate the hash. Each block has two hashes: the hash of that particular block and the hash of the previous block. Let us say that we want to manipulate block 3: we need to change both hashes, that is, the hash of block 3 and the hash of the previous block (block 2). Even if we manipulate these two hashes, we will have to go to block 2 and manipulate its hash there as well (we cannot have the hash of block 2 in block 2 different from the hash of block 2 in block 3). This previous block 2 also has its own hash and the hash of other block (block 1) that comes before it and, therefore, manipulation of blocks means manipulation of hashes until we reach the very first block on the blockchain. This kind of backward hash-manipulation operation would require an enormous number of resources in terms of time and computational power, and it would be impossible to keep undetected.

47. ONLINE TOOLS, https://emn178.github.io/online-tools/sha256.html (last visited Dec. 12, 2022) (tool used to generate this hash); *see also* Nakamoto, *supra* note 39.

This is why it is quite an impossible (although not unfeasible) endeavor. Indeed, the majority of nodes could agree to alter the blocks, but that would be a majority's decision and not the decision of one node. The same could happen in a permissioned blockchain where the governing authority might decide to perform such an operation. However, these scenarios of block alteration are more exceptions rather than rules of how blockchain operates. Usually we take for granted that once blocks are added they are not subject to alterations, modifications, or updates.

2. Consensus Mechanism

As mentioned before, consensus mechanism is an agreement on what constitutes a valid transaction on blockchain: it is a very important feature as it defines the security and validity of data stored. It goes without saying that agreement on how the nodes establish what is the state of affairs at every moment is of fundamental importance to the functioning of the whole blockchain network.

We cannot address all the different consensus mechanisms available, but suffice to say that, as of today, the most popular consensus mechanisms are Proof of Work (PoW) and Proof of Stake (PoS).[48]

PoW is the oldest consensus mechanism and was described by Nakamoto themself.[49] It is based on a competition between the nodes in solving cryptographical riddles, and the node who solves it first is the one who has the right to process the block and add it to the blockchain, thus earning some cryptocurrencies too. The problem is that these riddles are becoming more sophisticated, and their solutions require more computational power, substantial hardware, and software resources; therefore, the alternatives for PoW started to emerge.

PoS is one of such alternatives: it means that the nodes "stake" their own cryptocurrencies in exchange for a chance to validate the new transaction, add the block to the blockchain, and consequently, earn cryptocurrency. The PoS chooses the node at random, but the amount of stake matters: the interesting point here is that should the block be invalid, the node loses the stake, and therefore, the PoS mechanism involves risk for the node to not only not be selected and lose reward but also, even if selected, lose the stake. Furthermore, the ethical question emerges if the node with the highest stake is more eligible than one

48. *See* Anastasiya Haritonova, *What Is the Difference Between Blockchain Consensus Algorithms?* PIXELPLEX (Mar. 31, 2022), https:// pixelplex.io/blog/best-Blockchain-consensus-algorithms/ (discussing the benefits and drawbacks of Proof-of-Authority and Proof-of-History, etc.).

49. *See* Nakamoto, *supra* note 39.

with less: would it mean that "rich" nodes have a higher probability to validate blocks and become richer than "less rich" nodes? But a node that stakes a higher sum also means that node has earned more than others and could be more committed to the cause of blockchain.

Leaving ethical considerations aside, one of the main critiques of blockchain technology is the environmental impact it causes because of the computational power and electric energy it needs. Energy consumption is particularly high if the PoW is adopted.[50] Blockchain communities have come up with alternative solutions where different and more environmentally friendly consensus mechanisms are being deployed, for instance, the aforementioned PoS uses less energy than PoW.[51] Other options are also available, such as Proof of Ethic (PoE) consensus mechanism, that require even less energy than PoS.[52]

3. Smart Contract

Smart contract is best understood as "an agreement in digital form that is self-executing and self-enforcing."[53] When we use the term agreement, we do not refer to an agreement of a contract in the classical sense of this term, but to a software code written in programming language and inserted in the blockchain to negotiate an agreement between the parties according to certain preestablished terms and conditions.

The code becomes active once certain conditions are met: for instance, if I am renting my house using a smart contract, I send the code of entrance to the person only once she pays the first month of rent, and the payment enters my bank account. Therefore, payment triggers sending of the code, or rather, payment triggers the execution of the smart contract of rent. Indeed, different from the legal contract as we

50. Haritonova, *supra* note 48; *see also* Marco Schletz, *Blockchain Energy Consumption: Debunking the Misperceptions of Bitcoin's and Blockchain's Climate Impact*, DATA DRIVEN ENVIROLAB (Aug. 25, 2021), https://datadrivenlab.org/climate/blockchain-energy-consumption-debunking-the-misperceptions-of-bitcoins-and-blockchains-climate-impact/.

51. *See e.g.,* Celo Foundation, *A Carbon Negative Blockchain? It's Here and it's Celo*, THE CELO BLOG (May 26, 2021), https://blog.celo.org/a-carbon-negative-blockchain-its-here-and-it-s-celo-60228de36490 (discussing Celo, a carbon negative Blockchain that besides being based on PoS is also contributing to decrease its environmental impact by daily offsets through the Celo's protocol).

52. Crypto Research, *How Helo™ is Solving Blockchain's Core Problems*, (June 15, 2022), https://cryptoresearch.report/crypto-research/how-helo-is-solving-Blockchains-core-problems/. *See generally* NUPAY, https://nupaytechnologies.com/ (providing more information on PoE and HeloTM).

53. Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 Duke L.J. 313, 314 (2017) (analyzing the smart contracts *vis à vis* contract law).

know it, the smart contract does not require human presence, even in the stage of execution. It does it all by itself, that is where its smartness comes from, besides that it also makes it possible for people who do not know and consequently cannot trust each other, to enter into agreements. The smart contract is safely and permanently stored on the blockchain, thus ensuring the contracting parties the possibility to retrieve it, launch it again, or use it to claim any kind of damages or losses.

The aforementioned example of renting a house is an example of a nondeterministic smart contract, that is, a contract that needs information from the outside to be executed. In this case, the outside information is represented by the bank, which informs the smart contract about the payment made to my account. It is a different case with deterministic smart contracts that do not need external information. This is the case of a lottery: people buy lottery tickets by sending money to a smart contract account, and the smart contract has preestablished rules on how the lottery winner is established. Once the deadline to buy tickets comes, the smart contract executes the rule of establishing a winner and sends the money to him or her.[54]

The execution of a smart contract is not possible to interfere with and, thanks to its decentralization, blockchain does not have authority that could stop the smart contract and, as we will see later on, it might be a problem for the right to good administration.

In what follows, I further explain blockchain through the most promising applications that this technology can offer in the public domain.

B. Applications in the Public Sector

The potential blockchain in businesses and governments is widely known, although public administration concerns in the public sector are still problematic. Blockchain represents a promising tool to store and keep track of legally relevant information, such as different kinds of certificates (birth, death, ownership, university degree, vote, entitlement to social benefits, marriage, etc.), licenses (for instance, to open a bar, a shop, or a gym, to convert a flat into an office or vice versa, to occupy a public parking space with a truck, to move from one neighborhood to another, and so on and so forth), decisions and regulations of governments, ministries, regional and local authorities,

54. Mary Lacity, *Crypto and Blockchain Fundamentals*, 73 ARK. L. REV. 363, 383 (2020).

and of course legislative acts of parliaments.[55]

In fact, all these applications describe different forms that the governance *by* blockchain can take, whereas a further challenge is to address the challenges of governance *of* blockchain, which is a completely different matter.[56] Governance of blockchain addresses how blockchain should work in terms of both architecture (what information is stored, how the accesses are managed, consensus reached, etc.) and interaction with citizens. For instance, if a citizen wants to register her newborn baby, depending on the choices that the public administration has taken regarding blockchain architecture, she might be able to either only see the registered data (in this particular case, the data submitted by the hospital where she gave birth) or also be able to insert the data, which means that it is the citizen and not the hospital who takes care of registering the baby. Then her data is confirmed by the blockchain nodes (hospital and registry of births).[57]

Therefore, governance by blockchain represents all that blockchain can do for public administration, whereas governance of blockchain means how blockchain should be built so that what it can do (governance by blockchain) can be carried out properly and with public interest and individual rights in mind (including the right to good administration).

The following examples in this section refer to the domain of governance by blockchain.

1. Land and Real Estate Registries

Blockchain has been used to build land registries in Sweden and some US states.[58] It is particularly useful in those countries where land ownership is difficult to detect, although it should be borne in mind that what blockchain guarantees is authenticity of the land title, not its

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55. Ølnes et al., *supra* note 40.

56. *Id*. at 359.

57. *See e.g.,* Illinois Department of Commerce & Economic Opportunity, *State of Illinois Partners with Evernym to Launch Birth Registration Pilot* (August 31, 2017), https://www2.illinois. gov/IISNews/14759-DCEO_Birth_Registration_Pilot_Release.pdf (explaining how the state of Illinois has launched an initiative on birth registries on blockchain).

58. *See generally* Anetta Proskurovska & Sabine Dörry, *Is a Blockchain-Based Conveyance System the Next Step in the Financialisation of Housing? The Case of Sweden*, 17 LISER WORKING PAPERS (2018) (describing how Sweden is using Blockchain for its Land Administration System (LAS)); NASCIO, *supra* note 43, at 6 (describing the State of Illinois Blockchain Initiative).

accuracy.[59]

Coming back to the Swedish example, which relies on ChromaWay technology,[60] the changes in the procedure to purchase a small house by a private person via a real estate agent are evident: without blockchain, the land registry, although an institution with a very high credibility, gets actively involved in the process of purchase at a very late stage. In addition, the process is lengthy; the documents are not digital; checking of buyer's and seller's identities is manual; and documents have to be stored for ten years. As these documents are paper, their storage requires space and resources—not to say what it would take to search these documents for information. Applying the blockchain technology, the situation changes: the procedures that took four months are reduced to several days; manual checks are no longer needed; property registration is automatic; digital signatures resolve the identity issue; and all the documentation is digital, searchable, and easy to store and secure.[61]

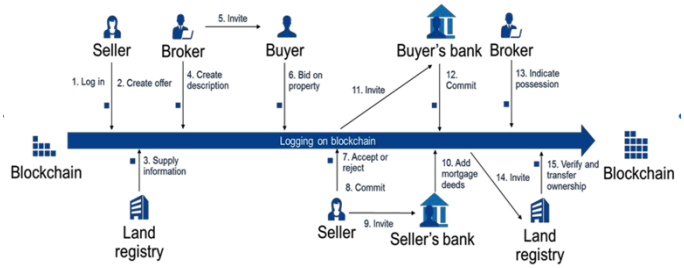

Figure 3. ChromaWay real estate transfer workflow[62]

The use of blockchain for land and real estate registries and their management opens up a wider discussion not only about how to implement blockchain into dynamics of land ownership, but more so

59. Ølnes et al., *supra* note 40, at 357. S*ee generally* Mohammed Shuaib,Shadab Alam, Salwani Mohd Daud, et al., *Improving the Authenticity of Real Estate Land Transaction Data Using Blockchain-Based Security Scheme*, in ADVANCES IN CYBER SEC., 3 (2021) (discussing authenticity issues related to real estate management).

60. CHROMAWAY, https://chromaway.com/ (last visited Sept. 29, 2022).

61. LANTMÄTERIET ET AL., THE LAND REGISTRY IN THE BLOCKCHAIN-TESTBED, 40–55 (2017), https://static1.squarespace.com/static/5e26f18cd5824c7138a9118b/t/5e3c35451c2cbb6170caa19e/1581004119677/Blockchain_Landregistry_Report_2017.pdf.

62. DAVID ALLESSIE ET AL., JRC SCIENCE FOR POLICY REPORT: BLOCKCHAIN FOR DIGITAL GOVERNMENT 27 (2019), https://joinup.ec.europa.eu/sites/default/files/document/201904/JRC115049%20blockchain%20for%20digital%20government.pdf.

about how the existing administrations and public organizations should re-arrange their tasks so as to accommodate blockchain technology within the flow of administrative procedures. This re-arrangement requires long-term strategical planning of the future public services because public services represent a network of interrelated data and information flows that continuously reverberate through different administrations and affect provision of these services. In the particular case of land and real estate registries, the importance of collaborations with third parties, such as banks or other financial institutions, becomes particularly relevant.

2. Voting

Democratic processes, in particular voting, could benefit enormously from the use of blockchain. Indeed, voting processes are particularly subject to fraud and manipulation, and the data integrity and no-repudiation that blockchain guarantees represent the strengths of this technology. Therefore, the use of blockchain for the purposes of electing representatives or making decisions in referendums seems to be a promising way to use blockchain in the public sector.

Practically, the blockchain-enabled voting would involve storage of votes on a blockchain network (distributed among the nodes) and an encrypted vote validated via a chosen consensus mechanism. Everyone could see the votes, different from classical voting, but without knowing who voted for whom or what (in the case of a referendum). The blockchain would ensure cryptographically the security and integrity of data and, therefore, reduce the possibilities to manipulate the votes. In addition, the costs of blockchain and organizing live elections are high; however, what changes in the case of blockchain-enabled voting is that the human involvement in processing votes is reduced to a minimum. This means less possibilities for human errors and discretion when interpreting unclear voting ballots, and also, in getting speedy and reliable results.[63]

To be sure, voting as a process is very complex, and in terms of blockchain architecture (the issue pertaining to the field of governance of blockchain), certain decisions, such as identity management or secrecy of one's vote, would be particularly stringent and differ substantially from the general idea of openness and transparency that is usually associated with blockchain applications. In addition to that,

63. Uzma Jafar & Mohd Juzaiddin Ab Aziz, *A State of Art Survey and Research Directions on Blockchain Based Electronic Voting System*, *in* ADVANCES IN CYBER SEC. 248, 248 (2021).

as blockchain is still not widely known and even less understood, many voters might mistrust the technology. And that is not just because blockchain is a complex technology to grasp, but rather because blockchain-enabled voting overturns the classical dynamics of the voting process, which is black-boxed, centralized, and top-down, into a transparent, decentralized, and bottom-up process.[64]

As much as blockchain's benefits for the voting systems are widely discussed in the literature, there are still few cases that could help us to assess and fully understand whether blockchain-enabled voting in state, national, regional, or autonomic elections really works. Indeed, blockchain can be used for voting in other settings, such as voting in the meetings of organizations, as it happened in Abu Dhabi's Securities Exchange.[65] But voting at meetings is not the same as voting in public elections. The state of West Virginia was the first state in 2018 to offer the possibility to use Voatz, a blockchain-based voting application, yet in 2020, decided against its use in its primary elections,[66] because of security concerns that were pointed out by MIT researchers.[67]

There is still much work that needs to be done, and not only in terms of the technical viability of blockchain projects in the public sector. There is a lack of common understanding and agreement on basic concepts of blockchain, and it reverberates on the expectations related to its uses[68] by all the stakeholders—citizens, businesses, and public administration—involved. The expectations are particularly high in voting: the margins of error are very low, technological failures are inadmissible, and stakes are very high. Therefore, the reluctance to rely on blockchain in election processes is understandably cautious.

Having seen what the right to good administration is and also what kind of technology blockchain is, the challenge now lies in combining the two and addressing this combination by looking at the positive and negative sides of this interaction respectively.

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64. *See* Philip Boucher, *What if Blockchain Technology Revolutionised Voting?*, EUROPEAN PARLIAMENT (Sept. 29, 2016), https://www.europarl.europa.eu/thinktank/en /document/ EPRS_ATA(2016)581918.

65. Karl Flinders, *Abu Dhabi Securities Exchange Uses Blockchain for E-Voting*, COMPUTER WKLY (Oct. 18, 2016, 1:00 PM), https://www.computerweekly.com/news/4504 01258/Abu-Dhabi-Securities-Exchange-uses-blockchain-for-evoting.

66. Jed Pressgrove, *West Virginia Pauses Use of Voatz Voting App, Cites Security*, GOV'T TECH. (Mar. 3, 2020), https://www.govtech.com/products/west-virginia-pauses-use-of-voatz-voting-app-cites-security.html.

67. Michael A. Specter et al., *The Ballot is Busted Before the Blockchain: A Security Analysis of Voatz, The First Internet Voting Application Used in U.S. Federal Elections*, 29TH USENIX SEC. SYMP. (2020).

68. Silvia Semenzin et al., *Blockchain-Based Application at a Governmental Level: Disruption or Illusion? The Case of Estonia*, 41 POL'Y & SOC'Y 386, 394–95 (2022).

IV. BLOCKCHAIN AS A TECHNOLOGY THAT STRENGTHENS THE RIGHT TO GOOD ADMINISTRATION

In the beginning of this paper, the right to good administration was deconstructed into a few principles and specific rights, such as the right to be heard, the right to information, and the right to remedy. Therefore, the question now is how blockchain technology could foster, strengthen, or carry out these rights in the data-driven public sector.

The potential of blockchain to boost human rights in general has been already observed:

> [Blockchains] can enable new strategies for establishing and enforcing rights that, unlike the current regimes, do not rely on the assent of military-backed nation-states. Blockchains have the potential to create a new layer of global social contracts, in which human peers, more than territorial governments, are the protagonists.[69]

In addition to the above, blockchain seems to be on a different—more advanced?—wave than governments actually are in terms of human rights:

> With distinct and diverse governance designs, blockchains can help protect the kinds of rights that states are badly suited to defending. Human rights on blockchains can and should look different from those of nations. Blockchains worth having should expand our sense of what kinds of rights are reasonable to imagine and to expect for ourselves.[70]

Therefore, the question is whether blockchain can not only make existing human rights stronger, but also create new human rights.

As interesting and appealing as the idea of new human rights might

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69. Nathan Schneider, *How We Can Encode Human Rights in the Blockchain*, NOEMA MAG. (June 7, 2022), https://www.noemamag.com/how-we-can-encode-human-rights-in-the-Blockchain/. There are many blockchains that take human rights into account, *see e.g.*, DiginexLUMEN, DIGINEX (https://www.diginex.com/lumen), that helps to trace working conditions in supply chains. What we should consider is that tracking working conditions does not mean preventing illegal labour, poor working conditions, and other problems. On human rights and blockchain, *see also* William Crumpler, *The Human Rights Risks and Opportunities in Blockchain*, A Joint Strategic Report of the CSIS Strategic Technologies Program and Human Rights Initiative (Dec. 2021), https://www.csis.org/analysis/human-rights-risks-and-opportunities-Blockchain.

70. Schneider, *supra* note 69.

be, these rights are not the object of this article: we focus on the rights that already (at least in theory and at least in some places of the world) exist and states' duties with respect to these specific rights, namely the right to good administration, and more specifically, the right to be heard, right to information broadly construed, and the right to remedy.[71]

The right to be heard—that is the right to be heard "before any individual measure which would affect him or her adversely is taken"[72]— could benefit from blockchain technology as all the actions related to a particular citizen's case could be inserted in the blockchain of public administration, and the citizen could access that blockchain. For example, if a citizen submits an application to receive an electric energy bonus, he or she not only should be able to trace where his or her application is within the administrative process of granting these bonuses, but also be able to see on this blockchain—besides being informed personally and directly—that should his application be impossible to satisfy, there is a procedure with a clearly established timeframe on when and how he or she can exercise the right to be heard. That is to say, the citizen would be enabled to explain the reasons why they qualify for this bonus although the public administration thinks that it is not the case. Therefore, and differently from the current practices in such cases, the citizen would know where his or her application is, as the blockchain would ensure the transparency of the procedure and if, for instance, the application does not advance in the administrative process, there is proof of that on the blockchain. In addition, the Ombudsman, who is in charge of making the right to good administration a reality and not a miracle, could also be aware of the processing of the application and see that the application was processed without any citizen involvement (without hearing him or her). This would ensure a double kind of auditability from both the citizen and the Ombudsman.

This way of processing of (in this particular case) applications for electricity bonuses would also ensure a higher level of control over how public administrations deal with social entitlements: to reject a citizen's application, a particular administration (its section, committee, or department) would need to add a transaction to blockchain about it.

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71. We could also speculate about the possible benefits for the right to communicate in one of the languages of the EU because blockchain should also be available in different languages and, in particular, in those languages that are of risk of extinction within the EU, such as Lithuanian, Estonian, or Hungarian. In this sense, blockchain could be an indirect way to contribute to a multi-lingual society and preserve linguistic heritage of the planet.

72. Charter, *supra* note 3, at 41.

But, in order to do that, the administration would need to have a session to allow the citizen to present his or her claims because otherwise the blockchain would both be a proof that no session took place and that the public administration ignored the citizen's right to be heard. Either way, the blockchain would register illegal activity and should set off the alarms of auditors both internal to the public administration and external (the Ombudsman).

The right to information perhaps is the easiest to satisfy. If its essence is that the citizen has a right to access the information the public administration has on him or her, and at least some of this information is available on a blockchain, it should not be difficult for the administration to retrieve it or offer the citizen a way, for instance through a digital gateway to public services, to access it anytime and from anywhere. At the same time, access to the information on blockchain would be carried out with due guarantees of privacy and personal data protection, ensuring higher data quality as any data on the citizen that is inserted in the blockchain would need to undergo consensus of different public administrations' nodes.

In addition, linking different blockchains could also ensure accessibility of information through different points of entrance to the network of public administration. The access to one's information through the tax authorities should also lead to access to one's information on social welfare and permit the citizen to update his or her data (for example, the change of residence or family status). If the tax authority blockchain could "talk" to the social welfare authority blockchain, the functionality and efficiency of the public sector blockchain would increase significantly.[73]

As to the right of public administration to give reasons that would explain why a certain decision that concerns a citizen was taken, blockchain of course would not be able to give reasons instead of the public administration, but could register and keep a trace of these reasons and keep a record that this duty was carried out and respected time limitations (right now it is difficult to understand what the time limit to react to citizens' demands for information is).

The right to remedy, that is the right to have any damage repaired should this damage emerge from the actions or inactions of the public administration or its employees, could follow a similar path as described above. Blockchain could be used to register the claim for remedy and trace its processing through the system and thus provide the citizen

73. *See also* Rafael Belchior et al., *A Survey on Blockchain Interoperability: Past, Present, and Future Trends*, ARXIV (MAR. 22, 2020), https://arxiv.org/abs/2005.14282 (providing a very detailed literature survey and analysis of the possibilities to seamlessly interconnect different blockchains).

with real time information where his or her claim is and what institution (department, section, etc.) is dealing with it, what the deadline to issue the remedy is, and other information.

We have seen that blockchain offers various ways to facilitate, expedite, and access the right to good administration. However, these opportunities do not come without a price, and dangers in using them without critically addressing their side effects would lead to citizens' subjugation rather than empowerment, which is enshrined in the very essence of the right to good administration as a fundamental right.[74]

In addition, and quite surprisingly so, there is no—to the knowledge of the author—literature on how blockchain could be used by citizens to make public administration more transparent, accountable, and better (in the sense of good administration and good governance). That is to say, the majority of debates focus on how government could use blockchain to assist citizens, yet what is lacking is how the citizens could use blockchain to understand their rights and keep public administrations accountable. Put differently, in the citizen-public administration relationship, it is always the public administration that shapes the ways of interacting with citizens, but a real citizen's empowerment and a trust-based, mature, and democratic relationship between citizens and public administration cannot evolve in only one direction (from public administration to citizen), but has to be bidirectional (from citizen to public administration and from public administration to citizen).

V. BLOCKCHAIN AS A TECHNOLOGY THAT WEAKENS THE RIGHT TO GOOD ADMINISTRATION

In what follows, I look at those applications and uses of blockchain technology that could be detrimental to the principles and rights that are covered under the umbrella of the right to good administration.

The very nature of blockchain seems to be more related to anti-government and anti-state stances which we normally link to people and social movements disengaged from democratic societies, and usually associated with extremisms.[75] The decentralization that blockchain is built upon is but one example. Its technologically-driven nature is another: as Primavera de Filippi and Benjamin Loveluck argue in their

74. Galetta, *supra* note 5; Rodríguez-Arana, *supra* note 16; Rodríguez-Arana, *supra* note 4.

75. *See generally* DAVID GOLUMBIA, THE POLITICS OF BITCOIN: SOFTWARE AS RIGHT-WING EXTREMISM (2016) (exploring how supporters of Bitcoin and its blockchain technology subscribe to a form of cyberlibertarianism that depends to a surprising extent on far-right political thought).

essay, the Bitcoin project in particular (they are not talking about blockchain as such, but are focusing on Bitcoin specifically) is an example of governance by infrastructure, which theoretically should, but practically cannot, substitute a platform that functions with and integrates institutional framework.[76]

Indeed, crypto anarchists have stated as early as 1992 that we will soon be able:

> [. . .] to communicate and interact with each other in a totally anonymous manner. Two persons may exchange messages, conduct business, and negotiate electronic contracts without ever knowing the True Name, or legal identity, of the other. Interactions over networks will be untraceable, via extensive re-routing of encrypted packets and tamper-proof boxes which implement cryptographic protocols with nearly perfect assurance against any tampering. [. . .] These developments will alter completely the nature of government regulation, the ability to tax and control economic interactions, [. . .] The State will of course try to slow or halt the spread of this technology, citing [. . .] fears of societal disintegration. Many of these concerns will be valid; [. . .] But this will not halt the spread of crypto anarchy.[77]

We can recognize an early idea of blockchain in these words, and governments are identified as sources of obstacles to blockchain's deployment. However, this is a shortsighted vision, which is built on the assumption that the state would not deploy blockchain for its purposes (purposes that include the administration of public services), and that is not the case, as we have seen in this article.

The right to good administration—an essential right to make public administration accountable to its citizens—could be violated by public administration should it implement the blockchain-based public services without creating an appropriate digital ecosystem for such services to be real; without adjusting the existing (or creating new) legal framework and procedural rules; and without creating mechanisms for citizens to ask questions, verify data, update information, and have other means to participate in these processes. So as to ensure these means of participation, citizens should have ways to interact and overcome the

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76. De Filippi & Loveluck, *supra* note 46, at 26.

77. Timothy C. May, *The Crypto Anarchist Manifesto*, https://groups.csail.mit.edu/mac/classes/6.805/articles/crypto/cypherpunks/may-crypto-manifesto.html.

digital—in this particular case, blockchain—divide that is a pending issue to solve in much lesser (in terms of technological complexity) matters.

For example, if public administration is using blockchain to process and grant electricity bonuses, it could simply not update the blockchain where a citizen could see his or her application, and the citizen—not aware of deadlines and administrative procedures—might miss important dates or re-submission requirements or simply not understand what is going on. Then the question is who is supervising the public administration blockchains and how accountable should this supervising entity be: the public supervisor of the public administration, the Ombudsman and its Office might need additional technological, human, and financial resources to undertake this enormous task.

In particular, smart contracts (described in part III of this article) could be a serious obstacle to the right to be heard: if the public administration uses smart contracts, which execute themselves once certain conditions are met, then the citizen might not have time between the decision and execution to exercise his or her right to be heard before the decision affecting him or her negatively takes place. For example, if children of a large family become of age, certain welfare bonuses awarded to large families could be affected, for instance, the aforementioned electricity bonus. However, if this procedure was automated with the smart contract, the day a child becomes of age might become a condition triggering the non-application of electricity bonus, but that would not mean that the family stopped qualifying for the electricity bonus on different grounds, such as low monthly income of its members. This process would also mean that the family would not have time to explain their situation, but would probably need time to re-present the application for the entitlement to the electricity bonus because the contract is impossible to stop from executing itself. In the meantime, and for all the time that this application would be processed, the family would pay a full price of electricity, although legally entitled to bonus.

This is of course a speculation and a hypothetical situation as the social welfare has not (yet?) been subject to smart contracting nor blockchain, but it represents an emblematic situation when the right to be heard could be seriously compromised.

In addition to that, the complexity to update information on blockchain—in particular, if it is a nationwide blockchain with many nodes from different public administrations and millions of citizens accessing it—might slow down any procedure or processing of requests, entitlements, or remedies. Perhaps this scalability problem will be solved with time and once blockchain reaches higher maturity levels.

Similar reasoning applies to the right to information and the right to remedy as well: complexity of blockchain coupled with lack of control of how the public administration is managing the information on blockchain could make citizens more powerless and increase the sense of mistrust and disillusion. Indeed, blockchain could turn into the wall between public administrations and citizens, whereas it should be a bridge bringing the two parties closer and helping them understand each other better.

VI. CONCLUSION

The aim of this article was to look at the right to good administration on the one hand, and blockchain technology on the other: are they friends or foes? The article argues that they can be none and both, as we have examples to support both claims. It is obvious though, that so as to make really substantial claims on the matter, we need to carry out a more exhaustive research on how blockchain reflects social needs and entitlements in general and set its relationship with the right to good administration within a wider framework of inquiry. However, as limited as this research is, it still permits us to realize that blockchain in itself is not an answer to all the hurdles that citizens face while interacting with public administration but could be a part of a set of technological tools that citizens could benefit from in such interactions.

In relation to the above, blockchain is usually seen as a technology that should be taken as it is—decentralized, not-hierarchical, anonymous or pseudonymous, etc.—as if all these features were written in stone and could not be subject to modifications. Instead of thinking about what blockchain in its original sense permits, the public sector should use blockchain while thinking about what citizens might need and could get thanks to the blockchain technology applied by and to public administration. Furthermore, blockchain should not be used by the public administration to deprive people of their entitlements or "datify"—turn into a code—social fragility and dependence of many citizens. On the contrary, blockchain should be a tool for citizens to make sure that they get from the public administration what is due to them, and get it fast, and the public administration is transparent, acts legally, and controls its own actions.

Furthermore, while debating the possibilities of blockchain in the public sector, we should not forget that the public sector is different from the private one: for instance, the margin for anonymity within the public sector is much more limited—if possible at all—than it is in the private sector, and implies further and additional requirements in

terms of safety, accessibility, accountability, and further legitimate and justified social expectations. Therefore, to talk about blockchain in the public sector without taking into account that the public sector is subject to higher standards and is by its very nature less flexible than the private sector, is to start with an erroneous presumption and, consequently, condemn the blockchain application to failure from the very beginning.

Moving towards the main object of this article—the interaction between the right to good administration and blockchain technology—the use of blockchain to guarantee the right to good administration is a part of the wider debate on transformation of the public sector: this transformation is a complicated endeavor and a continuous process. We know approximately when it started thanks to the advancements of information and communication technologies during the last century, but we see no end to it. In fact, on the one hand, newer technologies are emerging, and novel possibilities are taking shape, and, on the other hand, the public sector is so complex, multilayered, and dynamic that it is a never-ending task to digitally reshape and make compatible all the different ways in which the citizens, businesses, and public administrations interact with each other.

Furthermore, the discussion on blockchain and the right to good administration belongs to a broader discussion on the impact of (disruptive, emerging, new, or combined thereof) technologies on the legal systems globally, and in this particular case, on administrative law as such, which is also turning into global administrative law.[78] Within the framework of this global administrative law, such administrative tools as registries and other record-keeping mechanisms and systems could be supported by blockchain technologies by giving these registries, mechanisms, and systems internationally recognized legal solidity, recognition, and trustworthiness.

We need a common political commitment not only within the EU, where such a commitment already exists,[79] but also globally so as to build together governments, public administrations, public services, and digital skills that would empower people, meet their needs, and help

78. Cassese & D'Alterio, *supra* note 13, at 2.

79. *See, e.g.*, *Ministerial Declaration of eGovernment - the Tallinn Declaration*, EUROPEAN COMM'N (Oct. 6, 2017), https://digital-strategy.ec.europa.eu/en/news/ministerial-declaration-egovernment-tallinn-declaration; *Berlin Declaration on Digital Society and Value-Based Digital Government*, EUROPEAN COMM'N (Dec. 8, 2020), https://digital-strategy.ec.europa.eu/en/news/berlin-declaration-digital-society-and-value-based-digital-government.

them to live better lives as citizens of democratic societies.[80] These democratic societies, where human rights prosper, need to work together, and blockchain could be a powerful tool to achieve, fulfil, and protect some of these rights and ensure better public services, that with every year gains more international relevance and dimension.

There are many questions open for future research. What seems to be a promising line of research is, for example, the study of interplay of different technologies—AI, blockchain, etc.—within the public sector and how this interplay could reverberate on the quality and accessibility of public services and citizen empowerment.

In addition to that, further questions emerge, for instance, how inclusivity is guaranteed and how these technologies also affect the internal workings of public administrations that undergo a continuous re-organization in terms of financial, human, and technological resources. The right to good administration is a useful tool to guide these administrations in this never-ending, yet absolutely necessary, endeavor.

80. *See* U.N. Secretary-General, *Road Map for Digital Cooperation: Implementation of the Recommendations of the High-Level Panel on Digital Cooperation*, U.N. Doc. A/74/821 (May 29, 2020) (providing an example of governmental collaboration).