

SMART PUBLIC LAW. AUTOMATION AND DECENTRALISATION  
 OF PUBLIC POWER: SMART CONTRACTS AND THE  
 BLOCKCHAIN AS STEPPING STONES FOR A DIGITAL AND  
 POLYCENTRIC GOOD ADMINISTRATION?

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*Abstract*

This article sheds light on two blind spots of the debate on the automation of administrative decision-making: the impact of automation on the principles of good administration and the ongoing decentralization of administrative adjudication in public procurement and public services through smart contracts and blockchain. In both fields, public authorities have significant margins of power and discretion to deliver decisions and establish who is awarded a contract. We draw two main conclusions from the analysis. On the one hand, automation does not fit well with the existing principles of good administration, originally designed to ensure transparent, proportionate and fair decisions, limit human discretion, and guarantee that all relevant circumstances were taken into account. On the other, automation is inherent to the future of administrative law in any country. The use of blockchain in particular contains the promise of disrupting the monopoly of public power and addressing common concerns regarding its abuse. This article contributes to existing legal scholarship by offering solutions for a future-proof redesign of public law that is able to address the challenges of automation and decentralization.

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## 1. Introduction

Administrative decision-making and public services have faced the daunting challenge of automation for multiple years<sup>1</sup>. In the 1980s and 1990s, public authorities employed simple forms of automation to accelerate the process of making simple bulk decisions (e.g. calculation of tax returns)<sup>2</sup>. Nowadays, a growing number of fields of administrative action, requiring a greater deal of discretion, have become either partially or fully automated (e.g. eligibility for social welfare benefits, allocation of students or professors to schools and universities, evaluation of teachers, public

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<sup>1</sup> J. Sutcliffe, *Welfare Benefits Adviser: A Local Government Expert System Application*, 4 *Computer Law & Security Rev.* 22 (1989); D. Hogan-Doran, *Computer Says “No”: Automation, Algorithms and Artificial Intelligence in Government Decision-Making*, 13 *J. Jud. Commission of New South Wales* 1 (2017).

<sup>2</sup> For a thorough analysis of the wide array of uses of automation, and the benefits and limits thereof, see M. Zalnieriute, L.B. Moses & G. Williams, *The Rule of Law and Automation of Government Decision-Making*, 82 *Mod. L. Rev.* 425 (2019).

procurement)<sup>3</sup>. In the United States, a recent report revealed that 45% of the largest federal agencies in the country use or have experimented with artificial intelligence (AI) and machine-learning related tools<sup>4</sup>. While many public services are still not fully automated, automated tools are increasingly being used to support decision-making.<sup>5</sup> Government services, ranging from regulation to public procurement adjudication, are becoming 'smarter' in the way they operate. However, administrative law has not changed significantly over the last decades. This field of law remains ruled by the same laws, principles, and case law that were designed to address human flaws that could endanger the pursuit of the public interest (e.g., corruption, nepotism, abuse of power). It remains thus unclear what a 'smart public law' interpreted as a body of public law dealing with the phenomena of digitalization and automation of public decision making should look like in order to accommodate these new smart services and their underlying automation<sup>6</sup>.

The risks posed by automation have captured more the attention of scholars than its benefits<sup>7</sup>. The switch from a paper-based administration with human decision-makers to automated systems has been described in the literature as 'the algorithmic

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<sup>3</sup> A.E. Waldman, *Power, Process, and Automated Decision-Making*, 88 *Fordham L. Rev.* 613 (2019); R. Binns, *Algorithmic Decision-making: A Guide for Lawyers*, 25 *Jud. Rev.* 2 (2020). For the Italian context and debates on the use of automation, see A. Simoncini, *L'algorithmico incostituzionale: intelligenza artificiale e il futuro delle libertà*. *Biolaw J.* 63 (2019); A. Simoncini (2019). *I soggetti e l'oggetto del patto costituzionale: l'esperienza italiana*, 29 *R. General De Derecho Constitucional* 1 (2019).

<sup>4</sup> D.F. Engstrom, D.E. Ho, C.M. Sharkey & M.-F. Cuéllar, *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies, Report Submitted to the Administrative Conference of the United States* (2020), [https://www.law.ox.ac.uk/sites/files/oxlaw/government\\_by\\_algorithm\\_acus\\_report.pdf](https://www.law.ox.ac.uk/sites/files/oxlaw/government_by_algorithm_acus_report.pdf) (last visited Sep. 9, 2020).

<sup>5</sup> A. Simoncini & E. Longo, *Fundamental Rights and the Rule of Law in the Algorithmic Society* in A. Simoncini, G. Sartor, G. De Gregorio, O. Pollicino, A. Reichman & H. Micklitz. *Constitutional Challenges in the Algorithmic Society* (2021).

<sup>6</sup> See D.A. Zetzsche, R.P. Buckley, D.W. Arner & J.N. Barberis, *Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation*, 23 *Fordham J. Corp. and Fin. L.* 31 (2017) (describing 'smart regulation' as a sequenced set of 'proportionate' regulatory responses to identified fintech-driven risks, which explicit aim to promote financial innovation); C. Coglianese, *Optimizing Regulation for an Optimizing Economy*, 4 *U. Pa. J. L. Pub. Pol'y* 1, 13 (2018) (describing smart regulation as 'regulating just enough and in the right ways').

<sup>7</sup> C. Coglianese, *Administrative Law in the Automated State*, 150 *Daedalus* 104 (2021).

state': A system in which citizens are powerless before technological advancements, algorithmic biases, state surveillance, and opaque decision-making procedures<sup>8</sup>. These accounts of government decision-making in the algorithmic state rarely focus on the efficiency gains and the overall balancing of benefits of automation in the public sector. Nevertheless, in low-trust contexts, the automation of public contracts can reduce the risk of bad faith, abuse of powers, and corruption.<sup>9</sup> In addition, critical accounts of automation often focus on single values of the rule of law (transparency, due process, accountability) instead of taking into account the complete but complex framework of good administration that guides public authorities in several civil and common law jurisdictions throughout the world<sup>10</sup>. Moreover, the term 'algorithm' encompasses a wide array of more or less complex forms of automation with and without human agency that are reshaping administrative law in different ways<sup>11</sup>. This article offers a balanced perspective of automation in the public sector.

We argue that administrative law needs to be rethought to embrace and promote technical innovation while safeguarding longstanding values of good administration (efficiency, transparency, accountability, timely decisions). Automation has a paradoxical relationship with good administration, and particularly with transparency: Automation may just as well be

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<sup>8</sup> E. Kosta, *Algorithmic state surveillance: Challenging the notion of agency in human rights*, Reg. & Gov. (2020), E. Loza de Siles, *AI, on the Algorithmic State of the Nation: Artificial Intelligence Unleashed and Civil Rights*, Duq. U. Sch. L. Res. Paper No. 2020-1 (2020), <https://ssrn.com/abstract=3658630>; M. Veale, I. Brass, *Administration by Algorithm? Public Management Meets Public Sector Machine Learning*, in K. Yeung, M. Lodge (eds.), *Algorithmic Regulation* (2019), <https://ssrn.com/abstract=3375391>; H.-W. Liu, C.-F. Lin & Y.-J. Chen, *Beyond State v Loomis: Artificial Intelligence, Government Algorithmization and Accountability*, 27 Int'l J.L. & Info. Tech. 122 (2019). There is an international and comparative public law research group dedicated to the study of the 'Algorithmic State': see IAACL-AIDC, <https://blog-iacl-aidc.org/iacl-news/2018/11/4/new-research-group-algorithmic-state-society-and-market-constitutional-dimensions> (last visited Sep. 6, 2021).

<sup>9</sup> See M. Zalnieriute, L. Bennett Moses & G. Williams, *The Rule of Law 'By Design'?* 95 Tulane Law Review 1063.

<sup>10</sup> For an analysis of this issue in the Spanish context, see J.V. Torrijos, *Las Garantías Jurídicas De La Inteligencia Artificial En La Actividad Administrativa Desde La Perspectiva De La Buena Administración*, 58 Revista Catalana de Dret Públic 82 (2019).

<sup>11</sup> P. Sales, *Algorithms, Artificial Intelligence and the Law*, 25 J. Rev. 46 (2020).

transparency's best friend or worst enemy. Administrations and administrative law judges have already started building a body of case law that could help solve the paradoxical relationship between transparency and automation. The jury is out, and interpreters are already dividing themselves between supporters of transparency first and supporters of efficiency first theories. The digital transformation of government appears to conflict with the traditional perception of good administration. Also, transparency is only a means to an end. Indeed, too much transparency does not always equal to an adequate protection of procedural rights. This article shows that the relationship between the potential of automation, particularly in the context of automation of public contracts, and the protection of principles of good administration, such as transparency, is more nuanced than it seems.

This article explores different types of automation employed for administrative decision-making, including smart contracts for public procurement and energy services. This Article focuses not only on AI and automation as such but the broader use of different technologies that are comprised by the term 'GovTech' or digital technology specifically developed for government services. *GovTech*, the industry behind the development of AI, the Internet of Things (IoT), big data and predictive analytics, has revolutionized administrative law and promised greater efficiencies, fewer mistakes, and more accountability and transparency in the distribution of public services<sup>12</sup>. The automation of government encompasses a wide array of tools such as Chatbots, intelligent assistants for public engagement, Robo-advisors for civil servants, smart contracts, and real-time management of traffic information in smart cities<sup>13</sup>. Automation in public tenders, for example, allows public authorities to rank and classify individuals competing in a tender in order to issue a decision. With natural language-processing techniques, public authorities can also easily detect

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<sup>12</sup> For a broader analysis of the implications of the use of digital technology in administrative decision-making, see M. Bovens, S. Zouridis, *From Street-Level Bureaucrat to System-Level Bureaucracies: How Information and Communication Technology Is Transforming Administrative Discretion and Constitutional Control*, 62 *Pub. Admin. Rev.* 174 (2002).

<sup>13</sup> Z. Engin, P. Treleaven, *Algorithmic Government: Automating Public Services and Supporting Civil Servants in Using Data Science Technologies*, 62 *Comput. J.* 448 (2019).

irregularities in public tenders<sup>14</sup>. Smart contracts enable self-regulation by algorithms, reduce contracting costs in public procurement and public services as well as the risk of conflict of interests<sup>15</sup>. Distributed ledger technologies like blockchain reduce transaction costs, reinforce trust between parties, and create secure contractual rights.

This article aims to provide a comprehensive overview of the different ways in which automation is being used by public authorities. We argue that public law could benefit greatly from automation as this could ensure that personal interests, friendships, and animosities are less often taken into account when discretion has to be exercised. Smart public services could thus in principle be conducive to more objective and smarter public law. Public procurement and public services, in particular, are a good example of fields which can profit from enhanced transparency and accountability when automated. As smart public contracts are characterized by a high level of discretion, their use, together with other digital technologies and electronic platforms, could reduce the corruption concerns that often plague this field throughout the world.

The contribution of this article is threefold: First, it offers an innovative discussion about the potential and shortcomings of automation in public decision-making, with a specific focus on automation as a form of decentralization of decision-making. This occurs mainly when administrative decisions and contracts are automated using blockchain-based technologies and smart public contracts. Second, it advances the emerging field of public law and technology, which seeks to understand the challenges of digitizing government, employing digital government techniques, and the relationship between digital technology and the principles of good administration. More broadly, this article contributes to the advancement of the position that law should be future-proof and

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<sup>14</sup> A.C. i Martínez, *How Can We Open the Blackbox of Public Administration? Transparency and Accountability in the Use of Algorithms*, 58 *Revista Catalana de Dret Públic* 13 (2019).

<sup>15</sup> P. Sales, *Algorithms, Artificial Intelligence and the Law*, cit. at 9, 47.

innovation-friendly<sup>16</sup>, within the limits of the protection of fundamental rights<sup>17</sup>.

This article, though not comparative in its methodology, draws on the experience of several European countries (Italy, Spain, the Netherlands, the United Kingdom) with automated decision-making and smart public contracts. Considering that most Western countries share similar administrative values as regards good administration and that digital government is expanding exponentially, this article's relevance is not limited to the jurisdictions analyzed throughout it.

This article is organized as follows. Part II provides an overview of the different ways in which automation is employed in automated government decision-making. Part III focuses on decentralization as the next frontier of automation. Part IV examines two case studies in which the introduction of blockchain can exemplify the different dimensions of decentralization. Part V discusses the interaction between decentralized automation and the principles of good administration. To conclude the final part delves into the need to rethink administrative law and the skills or capabilities necessary to the administrative State so as to embrace digital and polycentric innovation in the public sector.

## 2. Automation and Public Decision-Making

This part provides a brief account of how automation is reshaping administrative decision-making<sup>18</sup>. It discusses different types of automation, providing an overview of the areas within the public sector in which automation is being embraced, and the advantages of automating public services and administrative decision-making. In this part, we consider both fully automated decisions and semi-automated decisions.

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<sup>16</sup> S. Ranchordas, M. van 't Schip, *Future-Proofing Legislation for the Digital Age* in S. Ranchordas, Y. Roznai (eds.), *Time, Law and Change* 347 (2020); S. Ranchordas, *Innovation Experimentalism in the Age of the Sharing Economy*, 19 *Lewis & Clark L. Rev.* 871 (2015).

<sup>17</sup> C. Iaione, E. De Nictolis & A.B. Suman, *The Internet of Humans (Ioh): Human Rights and Co-Governance to Achieve Tech Justice in The City*, 13 *L. Ethics Hum. Rts.* 263 (2019).

<sup>18</sup> In the Italian public law scholarship this topic has gained considerable attention in the last few years. See for instance M. Luciani, *La decisione giudiziaria robotica*, 3 *Rivista AIC* (2018) and T. Groppi, *Alle frontiere dello stato costituzionale: innovazione tecnologica e intelligenza artificiale*, *Giurcost.Org* (2020).

Automation is currently used both in the public and the private sector: from retirement funds, the banking sector to welfare benefits, automated systems have become ubiquitous in decision-making<sup>19</sup>. The automation of different fields of administrative decision-making started decades ago. Different forms of automation (from simple algorithms to AI and machine learning) have been used to grant licenses and permits in agriculture and fisheries, assign students to high schools and universities, and for traffic regulation<sup>20</sup>. The need to decide “in bulk” and within a short period of time are the common denominators of these fields where written rules and policies can easily be translated into code to determine whether an applicant fulfils all the requirements for an administrative request<sup>21</sup>. The automation of government decision-making is cost-effective, timely, and can promote consistency<sup>22</sup>. Indeed, the right to receive an administrative decision within a reasonable period of time is an important part of the right to good administration both in national and EU law contexts, (see, for example, Article 41 of the Charter for Fundamental Rights) which justifies adopting new tools<sup>23</sup>.

Automated systems refer to different information technologies that are designed either to produce measurements or assessments regarding a particular case, or to make an administrative decision in lieu of a civil servant<sup>24</sup>. While some areas of decision-making (for example, tax systems throughout the Western world) are indeed being automated thanks to AI, a large

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<sup>19</sup> See F. Pasquale, *The Black Box Society: The Secret Algorithms that Control Money and Information* (2015).

<sup>20</sup> M.K. Kołacz, A. Quintavalla & O. Yalnazov, *Who Should Regulate Disruptive Technology?*, 10 Eur. J. Risk Reg. 4 (2019).

<sup>21</sup> M. Suksi, *Administrative Due Process When Using Automated Decision-Making in Public Administration: Some Notes from a Finnish Perspective*, 29 Artificial Intelligence & L. 87 (2021).

<sup>22</sup> D. Hogan-Doran, *Computer Says “No”: Automation, Algorithms and Artificial Intelligence in Government Decision-Making*, cit. at 1, 5.

<sup>23</sup> “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”: *Consolidated Version of the Charter of Fundamental Rights of the European Union* (2016), O.J. (C202) 393, art. 41.

<sup>24</sup> M. Hong Chang, H. Choon Kuen, *Towards a Digital Government: Reflections on Automated Decision-Making and the Principles of Administrative Justice*, 31 Singapore Acad. L. J. 875, 878 (2019).

number of public services rely on more simple legal tech systems<sup>25</sup>. The majority of public authorities rely on support expert systems that provide data, rankings, indexes, and other types of preliminary analyses so as to inform a human decision-maker. ‘Human-in-the-loop-systems’ are thus made by a government employee with the support of AI. An important and common distinction refers to the difference between rules-based systems which apply sets of pre-existing rules and employ decision-trees, and systems that employ machine learning<sup>26</sup>. The latter is applied to more complex procedures, as it enables algorithms to learn from historical datasets, detect patterns, and make predictions. Contrary to expert-based systems that are written as “if-then” rules, systems powered by machine learning can result in inscrutable and non-intuitive outputs<sup>27</sup>. In the public sector, most automated systems that draw on machine learning are supervised, that is, the learning algorithm is shown what a public authority aims to predict or classify and learns thus by demonstration<sup>28</sup>. A machine-learning system can be re-trained using new data so that models can be adapted and corrected to changes. While the possibility to continue learning from data can potentially improve objective decision-making, it may be detrimental to its procedural guarantees. As Reuben Binns explains: “a constant flow of new data into a machine learning system might make it impossible to recreate the conditions necessary to interrogate an earlier decision (...) as the model [does not] stay fixed long enough to be assessed”<sup>29</sup>. Nonetheless, public sector rules require that information regarding updates of any system or logbook are archived, so that they can be made public and scrutinized.

The relationship between AI and administrative law becomes particularly complex when legal questions rely on interpreting open textured concepts (‘speech’), do not have one

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<sup>25</sup> B. Verheij, *Artificial Intelligence as Law: Presidential Address to the Seventeenth International Conference on Artificial Intelligence and Law*, 28 *Artificial Intelligence & L.* 181, 186 (2020).

<sup>26</sup> C. Hall, *Challenging Automated Decision-making by Public Bodies: Selected Case Studies from Other Jurisdictions*, 25 *Jud. Rev.* 8 (2020).

<sup>27</sup> D.F. Engstrom, D.E. Ho, C.M. Sharkey & M.-F. Cuéllar, *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies*, Report Submitted to the Administrative Conference of the United States, cit. at 4, 11.

<sup>28</sup> R. Binns, *Algorithmic Decision-making: A Guide for Lawyers*, 25 *Jud. Rev.* 2, 3 (2020).

<sup>29</sup> *ibid*, at 5.

single answer and should thus be answered in a ‘reasonable’ or ‘proportionate’ way, and are susceptible to frequent changes over time<sup>30</sup>. As laws are not static and go through complex transitions due to scholarly and judicial interpretation, it is important to understand the limits of automation when it comes to the interpretation of undetermined concepts, as these require a broader consideration of circumstances and of ongoing changes<sup>31</sup>. In the context of automated systems or risk assessments that support decision-making, we will often see or fear different interpretations of the law. The interpretation of vague and indeterminate terms will be primarily focused on data analytics, and thus bound by past events in an attempt to predict the future (*e.g.*, if someone has committed fraud once or belongs to an ethnic group that has abused the system in the past, the system may flag this individual as a potential abuser).

### **3. How Decentralization as a Further Dimension of Automation can reshape Public Power**

Automation in public administration through the use of AI is not just reshaping the way in which public administrations are adopting their decisions, but also the very nature of the way they are performing their functions. In particular, we are interested in analyzing whether the use of blockchain-based technologies applied to public contracts and public services can advance a further, less explored dimension of administrative automation: decentralization.

Blockchain or distributed ledger technologies (DLTs) are able to implement decentralization of power in public administration, allowing empowerment of users and therefore citizens, not just in terms of their greater involvement in the decision-making or monitoring/scrutiny function, but also from the implementation standpoint. The concept of decentralization has different applications in public law as well as in political economy studies. Decentralization takes different forms and has the potential

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<sup>30</sup> B. Verheij, *Artificial Intelligence as Law: Presidential Address to the Seventeenth International Conference on Artificial Intelligence and Law*, cit. at 22, 188.

<sup>31</sup> D. Hogan-Doran, *Computer Says “No”: Automation, Algorithms and Artificial Intelligence in Government Decision-Making*, cit. at 1, 10.

to modernize administrative law within a framework of open and collaborative governance<sup>32</sup>.

From a theory of the state perspective, the concept of decentralization refers to the allocation of legislative or administrative functions at the agency, local or regional level. In countries that are explicitly organized as federal states like, for example, Germany, local jurisdictions typically enjoy administrative autonomy. The French constitution mentions the fundamental principles of the free administration, the competences, and the revenues of local jurisdictions. The Italian Constitution establishes the competences of the State and the Regions as well as formally recognizing municipalities as part of the Republic<sup>33</sup>. Decentralization could also refer to organizational solutions or devolution of discretionary powers and choices, as well as implementation of administrative duties to social organizations and citizens<sup>34</sup>.

From a political economy perspective, the concept of decentralization is not merely treated as a matter of administrative

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<sup>32</sup> J. Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. Rev. 1 (1997).

<sup>33</sup> R. Schwager, *The theory of administrative federalism: an alternative to fiscal centralization and decentralization*, 27 Pub. Fin. Rev. 282, 284 (1999). On how cities use their local self-government rights to compete with each other both in a US and EU context see also C. Iaione, *Local Public Entrepreneurship and Judicial Intervention in a Euro-American and Global Perspective*, 7 Wash. U. Global Stud. L. Rev. 215 (2008).

<sup>34</sup> This is known within the EU legal framework as the so-called principle of horizontal subsidiarity: see Christian Iaione, *The Tragedy of Urban Roads: Saving Cities from Choking, Calling on Citizens to Combat Climate Change*, 37 Fordham Urb. L.J. 889 (2010); A. Estella, *The EU Principle of Subsidiarity and Its Critique* (2002); E. Arban, *Re-centralizing subsidiarity: Interpretations by the Italian Constitutional Court*, 25 Reg. & Fed. Stud. 129 (2015). In the U.S. literature, this approach towards decentralization was particularly relevant in local services, on which see G. Frug, *The City as a Legal Concept*, 93 Harv. L. Rev. 6 (1980), and the implementation of the federal urban renewal programs of the 1960s, on which see H. Hallman, *Neighbourhood Control of Public Programs* 185-86, 202-04 (1979). For a critique of the effectiveness of the participation elements in those programs, see J. Bellush, M. Hausknecht, *Urban Renewal: People, Politics and Planning* 274-311 (1967); J.H. Strange, *Citizen Participation in Community Action and Model Cities Programs*, 32 Pub. Admin. Rev. 655 (1972). For a discussion on the success of the New York City public school decentralization, see M. Gittell, *School Governance*, in C. Brecher, R.D. Horton (eds.), *Setting Municipal Priorities* (1981). On the relationship between decentralization and subsidiarity, see A. Breton, A. Cassone & A. Fraschini, *Decentralization and Subsidiarity: Toward A Theoretical Reconciliation*, 19 U. Pa. J. Int'l Econ. L. 21 (1998).

choice, but it is indeed conceived as a tool to achieve efficiency, encouraging development and innovation (especially when used to empower local authorities)<sup>35</sup>. In institutionalist-centered approaches to public economy, decentralization was conceived as the result of a polycentric organization of administration. The government is hereby envisioned as an arena in which a multiplicity of public authorities engages in a polycentric process of self-governance<sup>36</sup>. Scholars supporting this approach claim that it would resolve some of the inefficiencies that the administrative state often encounters, especially in the provision of local services, when guided by concerns of exploitation of economies of scale and internalization of externalities, that are often not taken into consideration by the allocation of functions based on administrative delineation of jurisdictional boundaries<sup>37</sup>.

The technology literature has more recently showed that there is indeed a strong connection between automation and decentralization, explaining that emerging technologies such as DLTs and blockchain can indeed lead to a new industrial standard defined as industry 4.0<sup>38</sup>.

In this part, the article will show how this further dimension of automation can take place through the use of blockchain in the public sector, and in particular through its implementation in public procurement and the provision of public services such as energy services.

### 3.1 *Blockchain and Public Law: Relevance*

To understand the legal implications of the use of decentralizing administrative functions through blockchain and DLTs, we first have to briefly introduce what they are and what their application to the public sector implies.

The blockchain utilizes DLTs to store information verified by cryptography among a group of users, which is agreed through a

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<sup>35</sup> R.C. Schragger, *Decentralization and Development*, 96 Va. L. Rev. 1837 (2010).

<sup>36</sup> R.E. Wagner, *Self-governance, polycentrism, and federalism: recurring themes in Vincent Ostrom's scholarly oeuvre*, 57 J. Econ. Behav. Organ. 173 (2005).

<sup>37</sup> V. Ostrom, *The Meaning of Democracy and the Vulnerability of Societies: A Response to Tocqueville's Challenge* (1997); see also V. Ostrom, C.M. Tiebout & R. Warren, *The organization of government in metropolitan areas: a theoretical inquiry*, 55 Am. Pol. Sci. Rev. 831 (1961).

<sup>38</sup> A. Sulkowski, *Industry 4.0 Era Technology (AI, Big Data, Blockchain, DAO): Why the Law Needs New Memes*, 29 Kan. J. L. & Pub. Pol'y Online 1 (2019-2020).

pre-defined network protocol<sup>39</sup>. The validation of the information provided and of the transactions is operated by different and independent nodes, without the control of a central authority, thus diminishing the role of intermediaries.

The blockchain can be described as a public or private database that can store and exchange tangible and intangible goods in a decentralized way, where nodes operating from different computers can send, receive, store information and value. What makes it decentralized and safe at the same time is the fact that the dataset is run and updated by a network of participants, operating from different computers, but interconnected. First of all, every transaction that is initiated on the blockchain is recorded (and then made immutable, the immutability being secured through cryptography), and can proceed only when the rest of the network ratifies the validity of the transaction, on the basis of the pact transactions taking place on the blocks<sup>40</sup>. The blockchain technology could be used as the baseline for smart contracts in the public sector, especially in public procurement and public services<sup>41</sup>.

The concept of smart contract was first introduced in 1996, before the diffusion of blockchain terminology in legal studies<sup>42</sup>. We can define a smart contract as a computer transaction protocol based on a DLT technology such as the blockchain, that executes, automatically, the terms of a contract written in a programming language (code) and embedded into the software itself. The parties define traditional contractual clauses, but the execution can happen without the need for intermediaries such as procurement officials, civil servants, strategic consultants or legal experts, and it protects

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<sup>39</sup> For a thorough introduction to blockchain and its legal implications, see A. Wright, P. De Filippi, *Blockchain and the Law: the Rule of Code* (2018); for an examination of how the blockchain can replace certain legal transactions through decentralized and disintermediated services, such as, for example, registration of marriage, see M. Swan, *Blockchain: Blueprint for a New Economy* (2015). Others have suggested that blockchain is in fact a legal institution that can function better than existing rules in certain legal domains, for instance in the case of protection of property rights in the digital realm: see G. Ishmaev, *Blockchain technology as an institution of property*, 48 *Metaphilosophy* 5 (2017).

<sup>40</sup> M. Corrales, M. Fenwick & H. Haapio, *Digital Technologies, Legal Design and the Future of the Legal Profession*, in M. Corrales, M. Fenwickhand & H. Haapio (eds.), *Legal Tech, Smart Contracts and Blockchain* 10 (2019).

<sup>41</sup> N. Fabrizi-Racine, *La blockchain: (R)évolution d'Etat?*, 49 *La Semaine Juridique: Administrations et Collectivités Territoriales* (2017).

<sup>42</sup> N. Szabo, *Smart Contracts: Building Blocks for Digital Markets*, 16 *Extropy* (1996).

both parties from the risk of malicious exceptions or other kind of abuses, which included, in the case of public smart contracts, the risk of delays, corruption, and other crimes against public administration<sup>43</sup>.

So far, blockchain has been employed mostly for its digital financial asset applications, mainly cryptocurrencies<sup>44</sup>, but public institutions all over the world are also investigating the possibility to use blockchain for the public sector<sup>45</sup>. The blockchain can be used for several legal transactions in which the government or the administration is involved, for instance to carry out voting<sup>46</sup>; to implement the provision of public services in fields such as healthcare<sup>47</sup>; to keep registry, inventory and to exchange any type of physical and intangible/digital assets.

An example is the case of Norway. The Norwegian Tax Administration Agency experimented with blockchain to secure documents and make them immutable. The Norwegian Labour and Welfare Administration also conducted a trial, applying the technology to allow social security recipients to register a new address. In both cases, the technology's limitations came to the fore: in the first instance, the immutability of the blockchain raised concerns in terms of citizens' privacy and right to be forgotten, that must be enforced by the administration. In the latter case, the administration concluded that the technology was not necessary. Blockchain responds to the need of a plurality of involved parties with limited trust between each other, but in the case where one of the parties involved (the administration) has control over the access, simpler technologies are available<sup>48</sup>. The use of blockchain

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<sup>43</sup> S.N. Sanchez, *The Implementation of Decentralised Ledger Technologies for Public Procurement: Blockchain Based Smart Public Contracts*, 14 Eur. Procurement & Pub. Priv. Partnership L. 180, 186 (2019).

<sup>44</sup> M. Finck, *Blockchains: regulating the unknown*, 19(4) German Law Journal, 665-692 (2018).

<sup>45</sup> J.B. Auby, *Le droit administratif face aux défis du numérique*, 15 Actualité Juridique Droit Administratif 835 (2018).

<sup>46</sup> F. Casino, T.K. Dasaklis & C. Patsakis, *A systematic literature review of blockchain-based applications: current status, classification and open issues*, 36 Telemat. Inform. 55, 81 (2019).

<sup>47</sup> The OECD blockchain primer, <http://www.oecd.org/finance/OECD-Blockchain-Primer.pdf> (last visited Sep. 9, 2020).

<sup>48</sup> S. Olnes, A. Janses, *Blockchain Technology as infrastructure in the public sector: an analytical framework*, Proceedings of the 19<sup>th</sup> Annual International Conference on Digital Government Research: governance in the data age, art. 77, 1-10 (May 2018).

for the public sector represents, for some, the ultimate and more advanced stage of decentralization of the State, resulting in public policies and services managed directly by citizens. However, some have highlighted the risk that the use of blockchain technology to neutralize the State brings, for example, the risk of exposing administrative functions to capture by corrupt individuals or discriminatory market rules<sup>49</sup>.

Among the public authorities that are experimenting with blockchain, the EU Commission is also taking initiative. As we will see in the following paragraph, the EU is on the one hand promoting pilot projects or research and innovation projects that generate use cases of blockchain applications to the public sector, while on the other hand directly contributing to the development of an infrastructure that can support blockchain applications that are interoperable across countries. The EU is also promoting guidance to avoid a fragmented and uncontrolled regulation of blockchain-based public services. The article will now explore the emerging academic discussion and policy practice of blockchain applications to core functions of administrative law such as public procurement and energy provision.

### 3.2 *The EU initiative to regulate and promote the blockchain*

The EU has taken the initiative to support the development of cross-border blockchain infrastructures applied to public services, and the interconnections between the blockchain and the EU legal framework<sup>50</sup>.

The EU supports the creation of a body of knowledge on blockchain and the law by funding theoretical and applied research that generates pilot projects on the legal implications of the use of blockchain for public services. Use cases of the application of the Blockchain to public services were developed through EU-funded research and pilot projects, for example in Amsterdam and Barcelona. These use cases, focused on citizen sovereignty of data enabled by Blockchain technologies, highlight the opportunities and legal challenges presented by the use of blockchain at the urban level<sup>51</sup>.

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<sup>49</sup> M. Atzori, *Blockchain technology and decentralized governance: is the State still necessary?*, 6 J. Gov. & Reg. 45, 62 (2017).

<sup>50</sup> See M. Finck, *Blockchain Regulation and Governance in Europe* (2018).

<sup>51</sup> The pilots were developed through the Horizon 2020 DECODE project.

The City of Amsterdam experimented with “*Gebiedonline*”, an open source platform to connect neighborhood residents while protecting their privacy<sup>52</sup>. The platform adopted a system of attributes-based verification that ensures a high level of data ownership<sup>53</sup>. The city of Barcelona experimented with two pilots<sup>54</sup>. The first was the “Digital Democracy and Data Commons” pilot, a participatory process designed to test a blockchain technology for improving the City’s digital participation platform, *Decidim*, by improving the user’s control over their data, as well as the transparency in citizen petitions. The pilot also had a broader policy uptake of stimulating a deliberative democracy process, wherein city residents could discuss alternative visions, networks and practices on citizens’ data.

The second pilot was focused on implementing an Internet of Things application of Citizen Science Data Governance. It would enable communities to support IoT data gathering and allow them to control the sharing of information that they produce and contribute to managing. The two pilots were connected by a platform, *BarcelonaNow*, that was built to combine crowdsourced data from city residents with City-owned open data and dataset produced by external service providers. Users have the chance to mine the data, compose and share it through user-friendly custom visualization tools, in a privacy-aware digital environment.

The EU is also directly involved in the development of a public blockchain infrastructure; within the European Blockchain Partnership (EBP) is a cooperation between the European Commission, all EU Member States and some countries of the European Economic Area<sup>55</sup>, working to deliver a European Blockchain Services Infrastructure (hereinafter: EBSI)<sup>56</sup>.

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<sup>52</sup> Gebied online, <https://gebiedonline.nl/> (last visited Sep. 8, 2020).

<sup>53</sup> DECODE, *Final Report on Pilots Amsterdam and sustainability plans* (2019), <https://decodeproject.eu/publications/final-report-pilots-amsterdam-and-sustainability-plans> (last visited Sep. 8, 2020).

<sup>54</sup> DECODE, *Final report on the Barcelona pilots, evaluations of BarcelonaNow and sustainability plans* (2019), <https://decodeproject.eu/publications/final-report-barcelona-pilots-evaluations-barcelonanow-and-sustainability-plans> (last visited Sep. 8, 2020).

<sup>55</sup> *Declaration on Cooperation on a European Blockchain Partnership* (2018), [https://ec.europa.eu/newsroom/dae/document.cfm?doc\\_id=50954](https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=50954) (last visited Sep. 8, 2020).

<sup>56</sup> CEF Digital Connecting Europe, *Introducing the European Blockchain Services Infrastructures*,

The EBSI aims to become a standard infrastructure that all EU public administrations, and potentially any business or organization, can use to launch public services or applications. The EBSI will be a completely decentralized system; every Member State will run its own set of nodes. The EBSI provides the baseline infrastructure of blockchain nodes at EBP / Member State level and the central services. The same infrastructure can be reused for different applications, namely “use cases”. The initiative started in 2019 with four use cases of blockchain-based public services: 1) notarization; 2) diplomas - user-based management and control of education credentials, reducing the verification costs for both citizens and institutions, application to generate trusted digital audit trails, automate compliance checks and data integrity proof; 3) European self-sovereign identity creating a standardized identity format that citizens can use to have their identity controlled across borders with a high level of security and privacy protection; 4) trusted data sharing using blockchain technology to store and share data among customs and tax authorities.

The use cases of blockchain-based public services tested in the first phase of implementation of the EBSI can easily be implemented in different contexts using basic blockchain technology already existing on the market. To enable the delivery of more demanding services, the development of a complex service infrastructure that is compliant with the EU legal framework is necessary. Therefore, in 2019, the EC, leveraging on the work of the EBP, has initiated a pre-commercial public procurement (PCP) process to develop a service infrastructure based on a distributed ledger or blockchain solution, that could be adopted by all countries in the EU to enable them to offer advanced and cross-border blockchain services to citizens, businesses and public administrations. The aim of the PCP is to trigger the co-creation of a novel, use-case based infrastructure compliant with the EU legal framework (the GDPR Regulation, the eIDAS Regulation, the NIS Directive)<sup>57</sup>.

Beyond the EU-level activities, EU countries are already implementing legislation to promote and regulate the use of

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<https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/ebsi> (last visited Sep. 8, 2020).

<sup>57</sup> *European Blockchain Pre-Commercial Procurement, Prior information notice, 2019/S 241-590329*, <https://ted.europa.eu/TED/notice/udl?uri=TED:NOTICE:590329-2019:TEXT:EN:HTML> (last visited Sep. 8, 2020).

technologies that enable decentralization such as Blockchain and their legal applications, in particular smart contracts. A prominent example is the Italian legislation on smart contracts, contained in a law for simplification approved in 2019 that recognizes DLTs, blockchain technology and smart contracts as valid legal tools able to produce and store valid legal documents<sup>58</sup>. The EU is willing to provide standard rules and guidance, since the proliferation of national legislations without coordination at the EU level could, of course, lead to a fragmented legal framework and potentially hamper the diffusion of blockchain-based public services, and this could, in turn, harm the implementation of good administration at the EU-level, resulting in a situation in which different countries offer different levels of good administration in terms of blockchain use<sup>59</sup>.

### *3.3 Automation and Decentralization: Using Blockchain to Rethink the Monopoly of Power of Public Administrations*

DLTs, blockchain and public smart contracts can be potentially disruptive for administrative law because they allow the principle of decentralization to be implemented at an advanced level. We argue that the use of technologies for automation are capable of pushing decentralization to the point of restructuring the power dynamics of public, private and civic actors, not just in administrative decision-making but also at the level of performing the administrative functions.

One example of the advanced application of disruptive, advanced technologies is the application of blockchain to data governance. Within this field, public policy and legal scholars have argued that decentralization technologies can and should be used to implement different ownership and governance models of data and digital infrastructures that are able to empower citizens. The creation of decentralized forms of collective ownership of digital platforms, as well as establishing a role for citizens in the definition of and data property regimes, would be critical to improve the

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<sup>58</sup> Law no 12 of Feb. 12 2019, Art. 8 [Italy].

<sup>59</sup> L. Courcelas, T. Lyons & K. Timsit, *EU Blockchain Observatory and Forum 2018-2020: Conclusions and Reflections* (2020), [https://www.eublockchainforum.eu/sites/default/files/reports/report\\_conclusion\\_book\\_v1.0.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/report_conclusion_book_v1.0.pdf) (last visited Aug. 5 2021).

democratic responsiveness of data policies<sup>60</sup>. Within this framework, blockchain technologies would be used to empower forms of commons-based peer production based on digital sovereignty<sup>61</sup>.

An attempt to implement a similar form of digital sovereignty was the Sidewalk Labs' proposal to establish an independent civic data trust which would control and govern all urban data as part of its Quayside Waterfront smart city project in Toronto. The project ultimately failed, due to privacy concerns raised about the tool and the strong resistance from the city residents<sup>62</sup>. Nevertheless, the project raised the possibility that, guided by urban authorities, urban citizens could produce, access and control their data, and exchange contextualized information in real-time through institutional co-governance platforms that could ensure confidentiality and accountability. Especially when facilitated by blockchain-based tools, a data trust has the potential to empower local communities by giving them control, not just over the privacy settings related to the access and use of the data that they provide to the platforms and that they produce by using them, but also over the use of the economic revenues and the value produced by the use of their data. Since the underlying technological infrastructure on which tech companies rely is often publicly funded, and the data that makes these businesses profitable is collectively produced, economist Mariana Mazzucato has argued for the creation of a public repository that could sell data to companies rather than the other way around<sup>63</sup>.

The risks related to lack of transparency, privacy concerns, and other potential distortions related to the technological innovations in the process resulting from the use of automation technologies to involve citizens, should be addressed by specific policies designed for this purpose. As an example, one relevant policy uptake of the pilots on blockchain for data sovereignty

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<sup>60</sup> F. Bria, *Public policies for digital sovereignty*, in T. Scholz, N. Schneider (eds.), *Ours to Hack and to Own: the Rise of Platform Cooperativism, A New Vision for the Future of Work and a Fairer Internet* 218 (2016).

<sup>61</sup> Y. Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (2006).

<sup>62</sup> M. Mazzucato, *Let's make private data into a public good*, MIT Technol. Rev. (2018), <https://www.technologyreview.com/2018/06/27/141776/lets-make-private-data-into-a-public-good/>.

<sup>63</sup> E.P. Goodman, J. Powles, *Urbanism Under Google: Lessons from Sidewalk Toronto*, 88 Fordham L. Rev. 457 (2019).

carried out by the City of Barcelona, was their impact on the ethical digital standards set up by Barcelona Chief Technology Office (CTO)<sup>64</sup>. These standards include new “data sovereignty” procurement clauses integrated in public procurement contracts. The clauses mandate the city providers to give back the data they gather to deliver the service to the city hall. This is an example of the building of a data commons as a social infrastructure. This data will enable the City to build future smart public services. The terms and conditions for data access and sharing are set by citizens themselves and they will keep control over data once shared. The data will remain open to local companies, cooperatives and NGOs that can build data-driven services<sup>65</sup>.

#### **4. Blockchain – based Public Contracts and Services**

The previous paragraph outlined data governance as a benchmark example of how blockchain technology is currently being experimented with, and used, as a tool to implement disintermediation and decentralization of data governance and privacy protection at the city level. Data governance is a broad, cross-cutting issue that involves the protection of citizens’ privacy.

The application of blockchain in sectors of public law in which decentralization and disintermediation could raise similar concerns in terms of accountability and rule of law, and would require innovations in the legal framework, is stimulating an academic discussion, although the legal and policy practice is less developed.

In the following paragraphs, we will analyze two, less advanced, applications of blockchain technologies that, by introducing the possibility for citizens/local communities to have a role in the design, implementation, provision, monitoring and revenue-sharing of public services, are potentially capable to produce a disruptive effect on administrative functions that are at the core of administrative law and of good administration: public procurement and energy provision.

At the EU level, as well as in some national governments, as the cases will show, there is a growing interest in the possibility of adopting blockchain for public procurement. We aim to highlight

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<sup>64</sup> City of Barcelona, *Ethical Digital Standard: A Policy Toolkit*, <https://www.barcelona.cat/digitalstandards/en/> (last visited Sep. 8, 2020).

<sup>65</sup> DECODE, *Final Report on Pilots Amsterdam and sustainability plans*, cit. at 49, 8.

the potentialities (especially in terms of structuring opportunities for a proactive role of citizens in the process) and limitations of the use of blockchain for public procurement, an area where significant legal restrictions and obstacles towards decentralization of power exist.

We also aim to show advanced decentralization and disintermediation features of blockchain technologies through the case of energy provision, where existing cases of renewable energy communities are able to clearly demonstrate some of these features.

#### 4.1 *Blockchain – based public contracts*

In public procurement, the use of automation is crucial, as it reduces the risk that contracting decisions will be invalidated due to conflict of interests, bad faith, or overlooking exclusion criteria<sup>66</sup>. Procurement for innovation has been thus far one of the few exceptions to an explicit legal effort in public law to facilitate innovation. The literature on urban innovation, in particular, points to innovative procurement practices overcoming the traditional public-private partnership model of long-term innovation for public infrastructures and provision of services<sup>67</sup>. A move towards partnerships that involve civic society actors, city residents, and local communities starting from the pre-procurement phase would allow the risk of investing in innovative services and infrastructures to be shared amongst multiple actors. Besides, introducing end-users in the procurement process allows the development of collaborative and innovative solutions targeting local challenges and needs. The Urban Agenda Partnership on Innovative and Responsible Procurement has tapped into the potential of these new forms of partnerships, that have been defined as public-private-people<sup>68</sup>, or public-community partnerships, by analyzing new

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<sup>66</sup> D. Hogan-Doran, *Computer Says “No”: Automation, Algorithms and Artificial Intelligence in Government Decision-Making*, cit. at 1, 5-6.

<sup>67</sup> P. Marana, L. Labaka & J.M. Sarriegi, *A Framework for Public-private-people Partnerships in the City Resilience-building Process*, 110 *Safety Sci.* 39 (2017); see also C.O. Cruz, J.M. Sarmento, *Public-Private Partnerships and Smart Cities*, 19 *Network Industries Q.* (2017).

<sup>68</sup> S.A. Ahmed, S.M. Ali, *People as partners: Facilitating people's participation in public-private partnerships for solid waste management*, 30 *Habitat International* 781 (2006); see also R. Mäntysalo, *From Public-Private-People Partnerships to Trading Zones in Urban Planning*, in G. Concilio, F. Rizzo (eds.), *Human Smart Cities* (2016); S.T. Ng, J.M.W. Wong & K.K.W. Wong, *A public private people partnerships (P4) process framework for infrastructure development in Hong Kong*, 31 *Cities* 370 (2013).

institutional, legal, and policy frameworks that could foster innovation through procurement. Innovation Partnerships constituted through these processes can extend their scope to also encompass digital social innovation initiatives<sup>69</sup>.

Within its legislative action on green and social procurement, the EU Commission is working to address the issue of how public procurement can best “integrate the demand-side function for social innovation and social entrepreneurship”<sup>70</sup>. So far, the EU has encouraged public buyers to develop opportunities for social economy enterprises. This goal was transposed in national legislations in different ways. This includes the introduction of social considerations linked to the employment of disabled people, or to the promotion of gender equality and the promotion of employment in the public procurement process<sup>71</sup>.

Although this approach stimulates innovation and the production of social impacts, it does not promote decentralization as an approach that includes citizens or city residents in general in the procurement process itself, through public smart contracts based on blockchain or DLTs. Some legal scholars argued that the use of blockchain and DLTs in procurement processes as an advancement in the process of digitalization of procurement, or e-procurement or procurement 4.0. They highlight the benefits of the use of blockchain in terms of greater transparency and accountability of procurement processes, as well as a potential protection from corruption, by reducing human intermediation in the validation of data provided by bidders<sup>72</sup>. By relying upon these technologies, in fact, NGOs and the media could implement greater monitoring on the procurement process that would leave less room

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<sup>69</sup> B. Baccarne, S. Logghe, D. Schuurman & L. De Marez, *Governing Quintuple Helix Innovation: Urban Living Labs and Socio-Ecological Entrepreneurship*, 6 *Tech. Innovation Mgmt. Rev.* 22 (2006).

<sup>70</sup> Communication from The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions, *Making Public Procurement work in and for Europe* (2017), COM(2017) 0572 final, 8.

<sup>71</sup> Executive Agency for Small and Medium-sized Enterprises (European Commission), *Buying for social impact* (2020), <https://op.europa.eu/en/publication-detail/-/publication/b09af6a5-513a-11ea-acee-01aa75ed71a1> (last visited Sep. 8, 2020).

<sup>72</sup> S.N. Sanchez, *The Implementation of Decentralised Ledger Technologies for Public Procurement: Blockchain Based Smart Public Contracts*, cit. at 40; see also M. Raskin, *The Law and Legality of Smart Contracts*, 1 *Geo. L. Tech. Rev.* 305, 309 (2017).

for civil servants to take discretionary decisions<sup>73</sup>. This control, operated by citizens, individually or organized in NGOs, is often envisaged as an ex-post intervention to verify the fairness of the tender procedure<sup>74</sup>. Such an implementation of the principle of decentralization should be accompanied by an awareness of the risks associated. Legal scholars highlighted the critical issues related to the involvement of city residents and civil society in general in public procurement procedures. They can be related to expertise, knowledge and representation. If the civil society groups involved are not representative or do not possess the necessary knowledge and experience to actively cooperate with both public and private actors, there is an inherent risk that their role within a public procurement process will be meaningless, or even produce distortive or negative effects<sup>75</sup>.

There are also examples of state level experimentations on the application of blockchain technologies to public procurement. Mexico, for instance, is experimenting with the use of a blockchain-based platform for public procurement processes as a tool to involve citizens in the monitoring and validation of documents submitted by the bidders, the evaluation of the proposals and the voting process, that will happen in an anonymous way, thus preventing inappropriate influence from interest groups<sup>76</sup>.

#### 4.2 *Blockchain – based energy services*

The academic and policy discussion on the use of blockchain to support the self-production and peer-to-peer (P2P) provision of energy is rich, and the example of the renewable energy communities, spreading in rural as well as urban areas, does show

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<sup>73</sup> C. Yang, *Is There a Role for Blockchain For Enhancing Public Procurement Integrity?* OECD Global Anti-Corruption & Integrity Forum (2019), <https://www.oecd.org/corruption/integrity-forum/academic-papers/Chan-Yang-blockchain-public-procurement-integrity.pdf> (last visited Sep. 8, 2020).

<sup>74</sup> S.N. Sanchez, *The Implementation of Decentralised Ledger Technologies for Public Procurement: Blockchain Based Smart Public Contracts*, cit. at 40.

<sup>75</sup> C. Cravero, *Rethinking the Role of Civil Society in Public Procurement*, 14 Eur. Procurement & Pub. Priv. Partnership L. 30 (2019).

<sup>76</sup> D. Floyd, *Mexico is testing blockchain to track public contract bids*, October 2017 <https://www.coindesk.com/mexico-tests-blockchain-track-public-contract-bids/> (last visited Aug. 5 2021); see also Y. Martinez Mancilla, *Blockchain HACKMX*, presentation, [https://www.unece.org/fileadmin/DAM/cefact/cf\\_forums/2017\\_Rome/PPTs/BlockChain/PM\\_05\\_Yolanda\\_Martinez\\_Mancilla\\_Mexico\\_Blockchain\\_HACKMX.pdf](https://www.unece.org/fileadmin/DAM/cefact/cf_forums/2017_Rome/PPTs/BlockChain/PM_05_Yolanda_Martinez_Mancilla_Mexico_Blockchain_HACKMX.pdf) (last visited Sep. 8, 2020).

how this model can embody the principle of decentralization by empowering communities, organized in NGOs, or social economy businesses/cooperatives, to participate in the energy market.

The energy community tool was recently incorporated into the legal framework of the European Union in the so-called "RED II" directive on promoting the use of energy from renewable sources. The Directive defines the renewable energy community as a legal entity

‘which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities, the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where they operates, rather than financial profits’<sup>77</sup>.

Even before, energy communities were recognized informally, for instance by Interreg Europe, the European Regional Development Fund (ERDF) program for cooperation between regions of the European Union. Interreg recognizes and promotes energy communities as new business models and ownership structures, emerging as a result of the increasing decentralization of the energy generation, which allows the participation of a greater number of businesses, individuals and groups to the energy system. Renewable energy communities are defined as a variety of economic and legal models that involve many actors such as citizens, local businesses, local authorities, charities, broadly defined as local communities. Organized civil society directly participates in the energy transition by investing in, producing, selling and distributing renewable energy<sup>78</sup>. The European

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<sup>77</sup> European Parliament and Council, *Directive 18/2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC - Commission Declaration* (2018), O.J. (L 328), art. 2 para. 16.

<sup>78</sup> Interreg Europe, *A Policy Brief from the Policy Learning Platform on Low-carbon economy* (2018), [https://www.interregeurope.eu/fileadmin/user\\_upload/plp\\_uploads/policy\\_briefs/2018-08-30\\_Policy\\_brief\\_Renewable\\_Energy\\_Communities\\_PB\\_TO4\\_final.pdf](https://www.interregeurope.eu/fileadmin/user_upload/plp_uploads/policy_briefs/2018-08-30_Policy_brief_Renewable_Energy_Communities_PB_TO4_final.pdf) (last visited Sep. 8, 2020).

Committee of the Regions (CoR, 132nd plenary session of 5 and 6 December 2018) also indicates this model as strongly positive and emphasizes that the main challenges for local energy communities are often related to their organizational and financial capacity, and to the fact that the regulatory framework does not address those issues. Participating in a bidding process, for example, is complicated for communities that often lack financial capacity, also because they are structured as NGOs as well as human resources<sup>79</sup>. Energy Communities might not, in fact, be able to face the procedural, legal, and economic requirements related to accessing the grid and then selling the energy. To overcome these challenges, the Committee believes that local and regional authorities can partner with energy communities or establish new ones in collaboration with city residents<sup>80</sup>. Indeed, Interreg recognized that among the benefits associated with the creation and promotion of energy communities, is that the profits and costs related to energy production do not go beyond regional borders, and can contribute to lowering the cost of energy in the long term while inducing the emergence of new local value chains. One of the major benefits is increasing acceptance and awareness of renewable energy, which also helps to overcome resistance to infrastructural development. Furthermore, if public administrations decide to play an active role in an energy community, or if they mandate the community to produce energy, they can benefit from cheaper energy for the public utilities themselves (such as street lighting or the recharging of electric means of transport)<sup>81</sup>.

The RED II Directive affirms that the planning of infrastructure necessary for energy production purposes such as electricity from renewable sources, should take into account policies relating to the participation of the people affected by the projects, in particular the local population<sup>82</sup>, and that renewable energy communities can participate in available support schemes

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<sup>79</sup> M. Gancheva, S. O'Brien, N. Crook & C. Monteiro, *Models of Local Energy Ownership and the Role of Local Energy Communities in Energy Transition in Europe* (2018), <https://cor.europa.eu/en/engage/studies/Documents/local-energy-ownership.pdf> (last visited Sep. 8, 2020).

<sup>80</sup> *ibid*, 61.

<sup>81</sup> Interreg Europe, *A Policy Brief from the Policy Learning Platform on Low-carbon economy*, cit. at 74, 4.

<sup>82</sup> European Parliament and Council, *Directive 18/2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC - Commission Declaration*, cit. at 73, art. 22, para. 7.

on an equal footing with other players, especially large scale players<sup>83</sup>. The Directive also identifies peer to peer trading as the sale of renewable energy between market participants by means of a contract with pre-determined conditions governing the automated execution and settlement of the transaction, either directly between market participants or indirectly through a certified third-party market participant, such as an aggregator: “the right to conduct peer-to-peer trading shall be without prejudice to the rights and obligations of the parties involved as final customers, producers, suppliers or aggregators”<sup>84</sup>.

In Italy we can still find few experiments in the field of energy communities based on a form of peer-to-peer trading. The first one is the case of the Melpignano energy community, where a Community Cooperative was initiated in 2011 in a rural area, the inhabitants of which offer the roofs of their homes to install photovoltaic panels and produce and sell renewable energy.

In the urban context, the implementation of an energy community cooperative has considerably complex features, however, there are cases of experimentation at the neighborhood or district level. An experiment in this sense was launched in Rome by ENEA and Luiss, which focused on creating an intelligent and collaborative energy district in the complex urban area of the South East Rome quadrant, comprising three neighborhoods, Alessandrino, Centocelle and Torre Spaccata. This experimentation led, also thanks to the support of EU funding through the Horizon 2020 program, to the creation of a neighborhood cooperative that will co-produce and co-manage collaborative neighborhood services in the energy sector as well. A digital environment was also tested through which citizens had the opportunity to share information related to energy saving, including through the installation of “smart energy boxes” in the homes of the inhabitants of a district. The goal is to facilitate energy saving and therefore improve the efficiency of the use of energy sources, through greater attention to final energy consumption.

The legal framework, as well as the first experiences of energy communities, provides for strong autonomy of energy communities, but the availability of legal tools and economic/financial tools provided through cooperation with the

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<sup>83</sup> *ibid*, point 27.

<sup>84</sup> *ibid*, art. 2, para. 18.

local authority seems vital to ensure the sustainability of these experiments. Blockchain-based infrastructures could be particularly useful when used by energy communities to implement a decentralized production and distribution of energy, especially at the urban level.

In the UK, the community energy NGO “Repowering London” is an example of an energy community that is evolving towards the experimentation of blockchain technology to facilitate self-production and P2P trading of electricity<sup>85</sup>. In 2018, in cooperation with the UK-based company Verve, Repowering London realized one of the first blockchain-based tradings of community-produced power. The power was generated through solar panels placed on private buildings roofs in the Hackney borough (London). Residents are allowed to purchase the surplus of energy produced by the solar panel that is not used to fuel the common parts of the underlying buildings, and the transaction is based on blockchain technology<sup>86</sup>.

The decentralization of key functions of administrative law and the disintermediation of legal transactions between public actors, private actors and citizens through legal tools such as renewable energy communities at the local or even sub-local level, or in public procurement procedures, is a clear example of how decentralization can empower local communities that produce value for the general interest and even provide a public service, facilitated by the use of blockchain technologies.

The cases outlined in the previous paragraph were used to introduce blockchain technologies as a way to empower single citizens or local communities within administrative procedures and/or functions. By doing so, blockchain technology would allow an extensive interpretation of good administration as a principle aimed at ensuring efficiency of public administration and broad participation of citizens<sup>87</sup>.

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<sup>85</sup> M. Gancheva, S. O’Brien, N. Crook & C. Monteiro, *Models of Local Energy Ownership and the Role of Local Energy Communities in Energy Transition in Europe*, cit. at 75, 42.

<sup>86</sup> Dentons, *Blockchain in the energy sector: evolving business models and law*, 7 Int’l Energy L. Rev. 233 (2018).

<sup>87</sup> Good administration is in fact a notion capable of protecting subjective rights of individuals and allowing them to defend themselves against abuse of their rights. See H.C.H. Hofmann, B.C. Mihaescu, *The Relation between the Charter’s Fundamental Rights and the Unwritten General Principles of EU Law: Good Administration as the Test Case*, 9 Eur. Const. L. Rev. 73 (2013).

## 5. The interaction between decentralized automation and the principle of good administration

Can the blockchain and therefore decentralized automation advance in some way or hinder the principle of good administration? This is the fundamental question that every public law scholar dealing nowadays with the issue of the use of blockchain for the realization of some public or general interest is trying to address and solve<sup>88</sup>.

If we go back to the very inner core of the principle of good administration we may recollect that its most loyal enforcement implies efficiency, transparency, accountability, timely decisions<sup>89</sup>.

Would the blockchain advance all these dimensions of the principle? On paper it seems that it can do so. We have showed here that blockchain can indeed be one of the avenues whereby the public administration can tackle the digital transition in a very effective, transparent, participatory way.

The use of blockchain technology for smart public contracts in procurement procedures could facilitate the decentralization process and help overcome the issues related to civic participation explored in this article, under certain conditions<sup>90</sup>. The case of energy shows the most advanced features of blockchain as a technology capable of triggering decentralization and self-governance in a regulated local public service. The model of energy communities, in particular, seems to be a cutting-edge tool for co-creation and co-management of energy and local and widespread energy supply chains, and blockchain could contribute to implementing them at the urban and/or neighborhood level.

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<sup>88</sup> Y Hermstrüwer, *Blockchain and public administration*, Edward Elgar Publishing (2020).

<sup>89</sup> T.P. Fortsakis, *Principles Governing Good Administration*, 11(2) *European Public Law*, 207-217(2005)

<sup>90</sup> C. Cravero, *Rethinking the Role of Civil Society in Public Procurement*, cit. at 71; see also World Bank, *Civic engagement in procurement: a review of eight international cases studies* (2009), <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/900321468041934999/civic-engagement-in-procurement-a-review-of-eight-international-case-studies> (last visited Sep. 9, 2020).

However, we should be very careful in fantasizing about the blockchain or depicting rosy scenarios<sup>91</sup>.

The blockchain does bear more some risks for public law and the principle of good administration<sup>92</sup>.

On one hand, scholars in the field of public procurement highlighted the risks related to the application of blockchain to public contracts. One of the main features of blockchain, immutability, seems to be particularly problematic. Once the smart public contract is uploaded on the infrastructure, in fact, it cannot be modified, re-negotiated, or rescinded. It ultimately does not prevent nor give the chance to amend mistakes. This feature could be problematic, especially when considering the possibility of judicial scrutiny and the potential overturn of administrative decisions<sup>93</sup>. Eventually, the use of blockchain could be inefficient and even counter-productive if the institutional design of public procurement does not change, and the control and coordination of activities remains concentrated on the public administration<sup>94</sup>.

On the other hand, blockchain-enabled energy communities could create disruption in the markets and regulatory frameworks of the energy sector. The REDII directive does set forth a very forward-looking legislative set of principles, rules and guidelines. Still the design and implementation of energy communities is in its infancy and requires a careful action of regulatory experimentation and crafting<sup>95</sup>. Both the technical and legal standards necessary to implement the rules and principles established by the new EU regulatory framework have not been tested and this creates an economic and legal uncertainty which is further increased by the use of the blockchain in this case. As everyone knows uncertainty is an enemy of both the scaling up of effective public policies, as well as the protection of fundamental rights.

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<sup>91</sup> The need to carefully analyze any economic and technical innovation from a political economy standpoint is highlighted by C. Blalock, *Neoliberalism and the Crisis of Legal Theory*, 77 *LAW AND CONTEMPORARY PROBLEMS* 71-103 (2015)

<sup>92</sup> Y. Hermstruwer, *The Limits of Blockchain Democracy*, 14 *N.Y.U. J.L. & LIBERTY* 402 (2020).

<sup>93</sup> A. Sanchez-Graells, *Data-Driven and Digital Procurement Governance: Revisiting Two Well-Known Elephant Tales*, 24 *Com. L. - J. of Computer, Media & Telecomm. L.* 107 (2019).

<sup>94</sup> *ibid.*

<sup>95</sup> S. Vanhove, *Locality in EU Energy Law*, 29(6) *European Energy and Environmental Law Review*, 220-23 (2020).

## 6. Conclusion: redesigning public power for automation

Despite the risks highlighted above, automating government and decentralizing decision-making might emerge in the future as key pathways for the evolution of public administrations and hence administrative law. If administrative law intends to keep governing effectively some of the most salient issues public administrations normally tackle (e.g., heavy bureaucracy, delayed decisions, incoherence, conflict of interests, corruption), it should dedicate sufficient energies to the study of the impacts that digital technologies and, in particular, automation will produce on the relationship between citizens and public administrations. If well construed also through the prism of traditional categories, automation can promote the modernization of administrative law and ensure that state action is equitable, efficient, and accurate<sup>96</sup>.

New institutional frameworks that promote technological innovation while safeguarding the principles of good administration and public values, are needed. Innovation in public administration is required to change the way in which public authorities operate and relate to citizens. However, automation should be used to customize decisions in a proportionate and fair way rather than to further depersonalize the system and disregard individual needs<sup>97</sup>. The creation of independent commissions that supervise the development of algorithms and audit their implementation could be a viable solution to ensure that the principles of good administration are safeguarded without stifling innovation.

Automation can also be used to decentralize. Decentralization can have different degrees of intensity. The fact that organizations as well as individuals can cooperate without an external central regulation contributed to the conception that “code is the law” and nurtured expectations in terms of the use of blockchain for public administration<sup>98</sup>. But the conception that the code is the law is more of a moral claim than an approximation of reality, since the best use for blockchain technology has to be defined through specific rules and guidelines once it enters the

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<sup>96</sup> D.F. Engstrom, D.E. Ho, C.M. Sharkey & M.-F. Cuéllar, *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies*, Report Submitted to the Administrative Conference of the United States, cit. at 4, 8.

<sup>97</sup> A.C. i Martinez, *How Can We Open the Blackbox of Public Administration? Transparency and Accountability in the Use of Algorithms*, cit. at 12, 20-21.

<sup>98</sup> M. Swan, *Blockchain: Blueprint for a New Economy*, cit. at 36, 16.

public and administrative law realm. Its compliance with human rights is still to be tested, and the negative externalities on third parties, as well as the environment, are still to be carefully evaluated<sup>99</sup>.

Further intellectual investigation and regulatory experimentation might represent a good investment though. As a matter of fact synergy between automation and true decentralization can lead to autonomisation. Literature in the technical fields is already paramount from this point of view.

The public and administrative law scholarship has devoted little attention to autonomisation as a combination of automation with decentralization<sup>100</sup>. However autonomisation could challenge the very inner core of administrative law: the monopolistic exercise by a public administration (an organization composed by public officials and civil servants who are appointed or selected) of an authoritative power over citizens. Through autonomisation, power could become more distributed, and administration would become somehow collective rather than just public.

A more participatory and decentralized administration with all the due transparency and effectiveness safeguards would enhance the principle of good administration as the administration would benefit from broader legitimacy. This of course implies interpreting the blockchain as a public infrastructure and therefore government intervention in its provision and oversight through regulatory scrutiny and public investment<sup>101</sup>. The need to govern the exchange among these distributed powers will remain, but governing these processes might require slightly different approaches and probably will partially repurpose administrative law as the law of an automated and polycentric good administration<sup>102</sup>.

It goes without saying that investment on capacity building for both civil servants and communities or single citizens contributing to an automated and polycentric good administration will become of paramount importance to enable their mastering of the tools of automation, decentralization and polycentrism. However, the recent turn and push towards third mission and

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<sup>99</sup> A.J. Kolber, *Not-So-Smart Blockchain Contracts and Artificial Responsibility*, 21 *Stan. Tech. L. Rev.* 198 (2018).

<sup>100</sup> C. Iaione, E. De Nictolis & A.B. Suman, *supra* note 17.

<sup>101</sup> G. Dimitropoulos, *The Law of Blockchain*, 95 *Wash. L. REV.* 1117 (2020).

<sup>102</sup> *Ibid.*

engagement by universities as much as other scientific and educational actors might accelerate the pace of this capacity building process in the public domain<sup>103</sup>.

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<sup>103</sup> See for instance the Erasmus+ project ENGAGE.EU (<https://engageuniversity.eu/>) which aims to enable learners to act as socially engaged European citizens and to have an impact on society at large.