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# *Blockchain and Public Authorities: a Field Yet to Be Explored**

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**ABSTRACT The essay discusses the use of blockchain technology in the public sphere in order to redesign information systems, promote user trust and personal data protection, and help to bring about new benefits for citizens, public services and businesses. From this viewpoint, three issues are examined: the need to set up a specific regulatory model, the multiple ways in which blockchain technology is implemented in different areas of administration services, and finally the duty to guarantee the right to obtain human intervention and to challenge the truthfulness of the data used by public administrations. These aspects are crucial to include blockchain within the European Right to Good Administration.**

## 1. *The blockchain dilemmas in administrative tasks*

As in all new technologies, blockchain can have enormous potential when applied to the public sector, presenting itself as a possible remedy for chronic administrative delays and inefficiencies. This tool allows, in fact, to rethink information systems, promote user trust and create new performance opportunities[1].

At the same time, given these characteristics, the public authorities should be particularly attracted to the implementation of such a system of interoperability and data storage, since they are often stuck with outdated information technologies and seek a perennial desire for simplification, streamlining and ease in managing relations with citizens.

Think of the thorny issue of administrative coordination that has always grappled administrations paralyzed by gigantism. Through the day-to-day events, the difficulty of dialogue between the different levels of government, sharing information, exchanging data and identifying a common position between several public bodies is easily verifiable. The severe lack of coordination has become an endemic problem of administrative action. On this front, blockchain could helpful by improving interoperability, making the systems communicate with each other, despite being managed by different entities, to promote the usage of data. Based on a distributed ledger structure (i.e. a peer-to-peer inter-connected computing architecture), the blockchain is a decentralized system that reports internally to independently validate the veracity of circulating information and uniqueness with respect to system users[2].

With respect to this technology, the administration can assume an ambivalent character. That is, it can be both an active subject of the same and a passive subject. It can both make available to the community data to be shared, thus operating as an engine that, thanks to its many databases, activates and enhances the information chain, promoting collaboration between public and

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[1] Technically, the blockchain computing technology falls among those called DLT, for whose characteristics we refer to the Technical Committees ISO TC 307, in this regard, see https://www.iso.org/committee/6266604.html. The blockchain, in particular, is a distributed ledger of transactions managed on each node of the network without the need for central control and intermediary authorities. Without hierarchies of some type, the network manages to find the consensus on which is the list of transactions happened in the course of the time for a set of conditions and equilibriums. The architecture is designed to the point that consensus can be found even assuming that some of the network members - but not the majority - want to try to break the rules. This is a secure register. The blockchain is distributed on every node in the network. A block in position "n" is linked to the block in position "n-1" by its hash, and thus is a list on which it is impossible to make changes of any kind in the past blocks without creating inconsistencies. On the theme, B. Arruñada, *Blockchain's Struggle to Deliver Impersonal Exchange*, in *Minnesota Journal of Law, Science & Technology*, n. 19, 2018, 55; for an overview F. Sarzana di S. Ippolito and M. Nicotra, *Diritto della blockchain, intelligenza artificiale e IoI*, Milano, Ipsoa, 2018; M. Giaccaglia, *Considerazioni su Blockchain e smart contracts (oltre le criptovalute)*, in *Contratto e Impresa*, 2019, 941.

[2] Article 8 *ter* of law 11 February 2019, n. 12 contains the regulatory definition of "distributed registry-based technologies (DLTs)" i.e., "information technologies and protocols that use a shared, distributed, replicable, concurrently accessible, architecturally decentralized registry on a cryptographic basis, such that both plaintext and further cryptographically protected data can be recorded, validated, updated, and stored verifiably by each participant, not altered, and not modified".

private, operating as a user in turn of blockchain networks so as to provide more quickly and efficiently services to citizenship[3].

In this context, the blockchain can act as a paradigm of reference to guarantee the standardization, immutability and authenticity of data and documents, also ensuring their security, with the consequent effect of reducing disputes on transactions and perfecting the automation of processes, followed by a marked improvement in the overall productivity of the public system. There are clear advantages in terms of data security, speeding up processes and cost-effectiveness that derive from the application of this digital communication model in the public sector.

As stated, "the main and potential feature offered by this technology is to reduce, in some cases even drastically, the cost of trust required to complete a transaction, understood as an information or value exchange, while providing certainty of its execution. In those contexts where the cost of trust is a significant component of the transactional cost, these technologies can reduce inefficiencies and simplify the levels of intermediation. Reducing the cost of trust, moreover, can make the execution of micro exchanges of value between two actors economically viable, creating the basis for the development of new business models"[4].

In these brief considerations, the reference goes to what is called "closed blockchain" or permissioned, subjected to a variety of conventionally established rules. The reference is specific to rules regarding the definition of the subjects involved, how data is introduced, or how to resolve any disputes.

In contrast, the pure (or open) version of blockchain is not particularly useful for public uses. In the latter, "there are no barriers to access and the ultimate beneficiaries of legal positions directly hold the cryptographic keys that allow them to dispose of those legal positions"[5]. Consequently, anonymity is guaranteed, the control of the cryptographic key corresponds to the availability of the legal position, there is an indefinite number of nodes scattered throughout the world and it is unthinkable that a judge could order their annulment. In short, this is a technology that lends itself to escape state control, to evade the law, more than to promote the effective implementation of law.

Even with respect to permissioned blockchain, however, there is no shortage of critical issues. This information technology requires a complex architecture, defined as

[3] As reported in Ministry of Economic Development, *Proposte per la Strategia italiana in materia di tecnologie basate su registri condivisi e Blockchain. Sintesi per la consultazione pubblica,* "the expansion of the possible areas of application of these technologies has coincided with a substantial increase in experimentation, projects and initiatives that have involved both the private and public sectors. According to the Blockchain and Distributed Ledger Observatory of the Politecnico di Milano as of 2016, more than 1000 projects have been implemented. In 2019 alone, the number of new projects grew by 56% compared to the previous year. This expansion is motivated by a growing awareness of the possible applications based on this technology in areas other than those that marked its first diffusion". Especially the public authorities it is added that "Italy promotes and regulates the use of Blockchain/DLT technologies in the public administration, which in turn, when necessary, facilitates and accompanies their application by private individuals, in compliance with the law, while safeguarding their autonomy". See, F. Faini, *Il diritto nella tecnica: tecnologie emergenti e nuove forme di regolazione*, in *Federalismi*, n. 16, 2020.

[4] Mise, *Proposte per la Strategia italiana*. As E. Pezzoli points out, *Internet of things, tecnologia blockchain e diritti IP*, in *Diritto Industriale*, 2020, 113 "Since blocks are connected in succession by their hash values, any (malicious) modification of a block would require the modification of the block itself, with the determination of a new nonce. In turn, this would require the computation of a new hash in the immediately following block and then the determination of its new nonce, and so on until the end of the blockchain. However, because each node gives precedence to the longest version of the blockchain and because of the effort required to determine nonces, malicious modification would require processing power comparable to that expended by the entire network to expand the blockchain from the original version of this block to its end (so statistically this requires having more than half of the network's processing power). Blockchains allow information to be stored in an immutable and verifiable manner. This is achieved with high security and reliability (as there is no single point of vulnerability). For this reason, blockchains lend themselves to a variety of applications, for example, in finance, medical, smart contracts, certification (public administration, artistic works, anti-counterfeiting) and so on".

[5] U. Bechini, *Da Berlino a Dublino e Pechino: sulle tracce della Blockchain*, in *Rivista del Notariato*, 2018, 1181, who specifies "a pure Blockchain is therefore not an empyrean in which immutable and infallible rules protect the rights of all. Rather, it is an arena whose rules are not produced by state or supranational bodies, certainly imperfect but subject in various forms to public scrutiny but are dictated by an elite of neo-notables of uncertain pedigree, some of whom might (conditional of pure courtesy) take orders from Beijing". On this argument, J. Kaufman Winn, *The Hedgehog and the Fox: Distinguishing Public and Private Sector Ap-proaches to Managing Risk for Internet Transac-tions*, in *Administrative Law Review*, vol. 51, n. 3, 1999, 955; as well as M. Marchesi, *Blockchain pubbliche e permissioned: una questione di fiducia*, in *Federalismi*, n. 2, 2021.

"energy-intensive" as it is the source of a particularly high consumption of energy and for this reason expensive and with a high environmental impact[6]. The legislative and regulatory framework that should allow for its use is lacking, as is insufficient funding to promote its use. It also poses problems of personal data protection because of the no modifiability of the data entered, or the difficulty of deleting them and ensuring proper respect of the right to be forgotten[7]. The more data you enter, the slower their management process becomes. It may also be susceptible to cyber-attacks by those who intend to fraudulently seize the data and requires high technical skills that are currently rare in public administrations[8].

From this point of view, the question regarding the usability of blockchain by public subjects is a source of dilemmas, because depending on how the phenomenon is framed, one may be inclined to give greater weight to the protective aspect, discouraging its use in favor of other solutions, or, on the contrary, to privilege the innovative aspect and the potential that it is able to release, encouraging its use. This consequently opens up a series of doubts, as it is a technology capable of arousing both mistrust and expectations.

That said, the intention of this contribution is to try to make some considerations to shed light on three general issues. The first intercepts the broad theme of regulation and concerns "which blockchain" to employ in the uses by public structures. The second is dedicated to the doubts upon the application of this technology and the contradictory indications that the administrations themselves receive and have received in this regard. The third, in conclusion, aims to investigate what is the relationship between man and machine in the particular context of the blockchain and whether it is compatible in this hypothesis some form of replacement that implies "doing without" human intermediation with respect to what is provided by the European and national discipline.

## 2. *Blockchain as a new method of communication and information storage on the network*

To promote a higher level of adoption of this technology and indicate where to allocate financial resources for project development, it is first necessary to clarify which blockchain technology to favor in the public arena and for what purposes. In essence, it is appropriate to indicate the sectors within which this technology can be used and, above all, whether it is useful for the management of information sharing, beyond the frequent pairing that is made between this tool and the bitcoin and cryptocurrency phenomenon[9].

[6] Mise, *Proposte per la Strategia italiana,* where it is specified that "Italy is aware of the contraindications and risks of these technologies with regard to environmental policies and promotes studies for a sustainable use through the adoption of measures and initiatives". On these issues L. Casini, *Lo Stato nell'era di Google*, in *Rivista trimestrale di diritto pubblico*, 2019, 1111.

[7] On this point A.M. Gambino and C. Bomprezzi, *Blockchain e protezione dei dati personali*, in *Diritto dell'Informazione e dell'Informatica*, 2019, 619. The argument also recalls what is called the right "to be forgotten". As stated by Bankruptcy Division of the Court of Florence, 21 January 2019, n. 18, in blockchain technology "once recorded with a particular time-stamping system, the data in a given block cannot be modified retroactively without the modification of all subsequent blocks, which requires the collusion of the majority of the network". According to Art. 17 GDPR Regulation, the right to be forgotten consists of the enhanced legal claim to the deletion of one's personal data (even after withdrawal of consent to processing). Data controllers who have made the data subject's personal data public are obliged to inform other data controllers who process the erased personal data of the erasure request, including "any link, copy or reproduction". ECJ, 24 September 2019, Case C-507/17, Google LLC, stated that "the operator of a search engine is not required to carry out de-indexing in all versions of its search engine. It is, however, required to carry it out in the versions of that search engine corresponding to all Member States and to implement measures to discourage internet users from having access, from one of the Member States, to the links in question contained in the non-EU versions of that engine". On the subject also, Data Protection Supervisor, Guideline 5/2019 on the criteria for the exercise of the right to be forgotten in the case of search engines, defined according to the provisions of Regulation (EU) 2016/679, 7 July 2020.

[8] Mise, *Proposte per la strategia italiana*, where it is specified that "Blockchain/DLT technologies present risks of cyber-attacks to be countered also in the light of the new law regarding the perimeter of national cyber security and the discipline of special powers in sectors of strategic importance". On the role of the European Union in the data economy being data the indispensable raw material for the development and operation of all advanced services and technologies, L. Grozdanovski, *In search of effectiveness and fairness in proving algorithmic discrimination in EU law*, in *Common Market Law Review*, 2021, 99.

[9] In this case, bitcoins are managed through a digital wallet (e-wallet), installed on a personal computer or mobile device from which it is possible to make payment for the goods or services purchased. This is directly linked to the blockchain, i.e. a centralized accounting ledger, which keeps track of all monetary movements processed and credited to each electronic purse. On the topic, F. Annunziata, *La disciplina delle trading venues nell'era delle rivoluzioni tecnologiche: dalle criptovalute alla distributed ledger technology*, in *Orizzonti del*

Only once after defining priorities of the regulatory framework, the topic can be developed in light of the evolving scenarios of this technology. Everyone aspires to an administration with a high degree of automation and interconnection, but it is necessary to avoid an uncontrolled use of the blockchain with risks of fragmentation among individual public experiences. If the blockchain were to be used with protocols and standards that do not communicate with each other, its development would be significantly limited and to some extent end in itself. For this reason, the issue of governance of the process of incorporating this technology into the public sector becomes crucial and serves to mark the right boundary in the balance between regulation and security.

In this context, the seemingly simplest solution seems to be one in which the public authority directly provides the infrastructure and the tool. The case example is that of the blockchain of State – the Blockchain-based Service Network (BSN) – of which a first worldwide example is China's. In this system, a state platform has been created to "provide users with a real virtual store from which to take computer products based on distributed ledger technology", a permissioned blockchain restricted "only to pre-accredited parties"[10].

A blockchain of State obviously represents the most intrusive and limiting model of regulation of personal and economic freedoms, with dangerous repercussions in terms of privacy "given the need of the Chinese central government to remain the exclusive owner of the root key of the BSN and, therefore, the power to decrypt and control every single movement that occurs on the platform"[11].

The role of law, however, could be different, i.e., to build a regulatory system less inspired by uniformity criteria and directed, on the contrary, to prevent monopolization and anti-competitive practices[12]. The aim could be to build a "centralized blockchain" with constraints to guarantee the security of the system: in this sense, the distributed consensus implies that each node must know the transactions, which makes it impossible to take over the system if you do not own 51% of the nodes. On the other hand, only a centralized blockchain introduces control, however, in this way, the risk is to return to a "trust model", where one or more entities certify the transactions in the network with the related constraints and costs.

An example of use would be the UK case, which recently announced the creation of a new regulatory body, the Digital Markets Unit, to enforce a code of conduct for the digital economy. This is an approach aimed at tackling digital giants that make it challenging for other companies to enter the market and compete, while at the same time limiting consumer choice and inhibiting innovation. This regulatory approach is characterized by the promotion of competition[13]: specifically, beginning in April 2021, the UK Digital Markets Unit will have the power to enforce a code of conduct for companies that act as

*diritto commerciale*, 2018, 102; N. de Luca and M. Passaretta, *Le valute virtuali: tra nuovi strumenti di pagamento e forme alternative d'investimento*, in *Le società*, 2020, 571.

[10] P. Rubechini, *La Repubblica Popolare Cinese realizza la prima "blockchain di Stato"*, in *Osservatorio Stato digitale*, in *www.irpa.eu*, 23 June 2020, known as "during the year 2019, in China, a consortium consisting of several enterprises (China Mobile Communications Corporation Government and Enterprise Service Company, China Mobile Group Design Institute Co., Ltd., Research Institute of Electronic Payment, China Unionpay Co., LTD, China Mobile Financial Technology Co., Ltd, Beijing Red Date Technology Company Limited, China Mobile Group Zhejiang Co. Ltd) and headed by a specialized state structure - the State Information Center - Informatization and Industry Research Department - with the goal of building a global-level, public-governance network infrastructure based on blockchain technology, aimed at providing "take away" IT solutions that can remedy the inefficiencies and high entry costs resulting from the fragmentation of local "blockchains".

[11] P. Rubechini, *La Repubblica Popolare Cinese realizza la prima "blockchain di Stato"*.

[12] Until now the tech industry has become increasingly consolidated for a combination of good reasons - the network effects that occur when many people use the same products, and the economies of scale and scope - but also for bad reasons, such as a small number of companies leveraging their power in some areas to extend and protect it in others.

[13] After all, the lack of competition comes at a high cost. Although digital platforms provide seemingly free products for consumers, they come at a cost. Consumers pay higher prices on advertised products and end up with fewer choices, less privacy protection, and slower innovation. After all, the lack of competition comes at a high cost. Although digital platforms provide seemingly free products for consumers, they come at a cost. Consumers pay higher prices on advertised products and end up with fewer choices, less privacy protection, and slower innovation.

gateways or bottlenecks to platform access. The legislation aims to define such a code (to apply primarily to larger firms, leaving freedom to innovate for small and medium-sized companies) to "meet three high-level objectives of fair trading, open choices, trust and transparency." This is intended to provide greater predictability by establishing *ex ante* rules that are more easily and effectively enforced.

Taking the same approach for blockchain technologies might be helpful. It should also be considered that this infrastructure is an alternative to using centralized databases[14]. The blockchain ledger is shared and unchangeable, so that transactions do not need to be validated by intermediaries, given that consensus is reached in a peer-to-peer logic. The systems based on centralized databases require a central location from which the contents are visible. A database is read and write controlled, a blockchain is write controlled only. Although some technical problems can also be outmoded (by new technological solutions), a basic difference remains: the blockchain is more robust, but slower performing and energy intensive – as each node processes transactions, and none of the nodes are crucial to the database as a whole –, the centralized database on the opposite is more fragile, though considerably faster and efficient[15].

The complex of blockchain technologies are based on an interconnected, peer-to-peer distributed ledger structure. Being decentralized, they have low intermediation costs which are accompanied by greater freedom for the end user to manage their information and transactions with one of their "peers". The "price" of this freedom is represented by a platform in which the classic fiduciary element is replaced by powerful technologies, able to prove, support and guarantee the authenticity of the parties, the confidentiality of information, any specific and customizable contractual conditions between the subjects ("smart contract") and the consequent successful completion of the transaction.

It follows that, if the two technologies described above have different characteristics, they should not be seen as competitive, but rather complementary. This means that blockchain could offer significant advantages to the relationship between citizens and institutions in areas other than the mere sharing of databases. The fields of application are differentiated and range from notarial acts, land registry, white or green certificates issued by the GSE, information on social media and sharing economy models in public services, artistic copyrights, patents, medical records[16]. The possible developments are numerous. It is sufficient to look at the adoption of electronic invoicing, to public digital identity system (SPID) or, more generally, at the digitalization of processes and the dematerialization of negotiation documents and, on the other hand, at the widening of the fields of applicability of these tools compared to the original scope referred to the public administration. By way of example, consider the traceability of

[14] Closed and regulated blockchains can be downgraded to one of the possible implementations of interoperability and distributed data scenarios, scenarios that can be addressed with standard technologies such as Distributed Database Management Systems (DBMS) by referencing centrally established trust sources. On the organization and management of data as the exercise of an administrative function in the era of interconnected databases, G. Carullo, *Gestione, fruizione e diffusione dei dati dell'amministrazione digitale e funzione amministrativa*, Torino, Giappichelli, 2017, 81. Also see, F. Faini, *Blockchain e diritto: la "catena del valore" tra documenti informatici, smart contracts e data protection*, in *Responsabilità civile e previdenza*, 2020, 297; about the intervention of the regulator, G. D'Acquisto, *Blockchain e GDPR: verso un approccio basato sul rischio*, in *Federalismi*, n. 2, 2021.

[15] As explained by U. Bechini, *Da Berlino a Dublino e Pechino*, 1189, "a Blockchain is more expensive to manage than a centralized database. The mere need to maintain multiple nodes, i.e. multiple machines or groups of machines, coordinated with each other, makes the infrastructure technically and economically more challenging. You need a good reason to prefer it, and the most obvious one is the lack of recognized authority from all stakeholders. If, for example, a series of *shipping* operators, based in different places such as EU, USA and China, intend to launch a system to track containers, none of them can reasonably propose itself as the sole holder of the computer data destined to be trusted between the parties: Blockchain appears in such a context as an excellent solution, a sort of Geneva (in the sense of the city) of the times of the Net". On the topic, A.M. Gambino, *Vizi e virtù del diritto computazionale*, in *Diritto dell'Informazione e dell'Informatica*, 2019, 1169.

[16] Governments can also use them as applications to create "virtual cash", book or discount vouchers in local circuits, or cryptocurrencies. Or in relation to healthcare, see M. Farina, *Blockchain e tutela della salute: verso la riorganizzazione dei sistemi sanitari?*, in *Federalismi.*, n. 21, 2020, 170; as well as G. Gallone, *La pubblica amministrazione alla prova dell'auto azione contrattuale. Note in tema di smart contracts*, in *Federalismi*, n. 20, 2020, 142; or even G. Frezza, *Blockchain, autenticazioni e arte contemporanea*, in *Diritto di Famiglia e delle Persone*, 2020, 489.

certifications in the agricultural sector, the dynamics of production and sale in the energy sector, the management of image rights and fan loyalty in the sports sector, or the fractional sale in the works of art sector[17].

Another possible use of blockchain relates to combating corruption. Corruption presupposes administrative opacity and such technology on the contrary can make procedures more transparent, particularly in the area of public service contracts. Suffice it to say that "the maintenance of the bidder's anonymity, the stability of the circulating tender information and the greater efficiency in the cross-checks of legality on the participants in the procurement process – all elements that are easily ensured through the use of blockchain – allow for the realization of an effective strategy to counter the phenomenon of corruption in the specific sector of public procurement, but the real question that seems necessary to resolve is whether these initiatives, alone, can be considered sufficient to eliminate the problem"[18]. It is well known that "corruption in the public sector is a widespread global scourge that, however, reaches higher levels of intensity in certain parts of the world, certainly including the South American area and, specifically, the state of Colombia"[19], territory under WEF attention[20]. In this context, "corruption proliferates among the shortcomings affecting the public sector in terms of transparency, inadequate information management and storage, and poor accountability, all conditions that blockchain technology has the potential to solve or, at any rate, greatly reduce, due to its unique characteristics: distributed data registries, decentralization of information, traceability of operations, durability and security of the information managed"[21].

In these fields of administrative interest, in short, IT solutions could be provided that are able to remedy inefficiencies by translating user transactions into "blockchains", so, given that, an appropriate regulatory framework should be developed noting the evolutionary scenarios of this technology. After all, blockchain is "constantly evolving and needs a framework conducive to innovation that enables and encourages legal certainty and respects the principle of technological neutrality, while promoting the protection of consumers, investors and the environment, increasing the social value of the technology, reducing the digital divide and improving the digital skills of citizens"[22].

## 3. *Implementing blockchain in services and administrative function*

It is uncertain what turn the use of blockchain technology could take. If it is used in the absence of trust, i.e. when the subject with whom one deals is not trustworthy, lacking a guarantee of transparency and integrity or regarding the temporal collocation of data, the question arises as to whether it is useful when dealing with an administration, where the database constitutes an authoritative source of information in the reference domains. One fact is that there are at least mixed indications that have the ultimate effect of discouraging the use of this technical solution.

In the Three-Year Plan drawn up by the Team for Digital Transformation and the Digital Italy Agency, the use of blockchain is discouraged for public authorities, particularly when compared with centralized databases. In this scenario, the guidelines on the model of interoperability between public

[17] In Lombardy, for example, experimentation has begun on a digital traceability model for the beef and dairy supply chains. Data are thus organized and recorded in a way that can no longer be modified through blockchain technology and made available to the final consumer, who benefits in terms of transparency. So in P. Rubechini, *Blockchain e pubblica amministrazione italiana: i primi passi di un cammino ancora lungo*, in *Giornale di diritto amministrativo*, 2021, 300. On degrees R. Trainito, M. Monaco, G. Galasso, *Blockchain e mutuo riconoscimento dei titoli di studio nell'UE*, in *Federalismi*, n. 2, 2021.

[18] P. Rubechini, *Il World Economic Forum studia la blockchain colombiana per prevenire la corruzione amministrativa. Ma in Italia a che punto siamo?*, in *Osservatorio Stato digitale*, in *www.irpa.eu*, 9 July 2020.

[19] P. Rubechini, *Il World Economic Forum*.

[20] This is the report "Exploring Blockchain Technology for Government Transparency: Blockchain-Based Public Procurement to Reduce Corruption" published by the WEF in June 2020. With the support of the Inter-American Development Bank (IADB) and the Attorney General's Office of Colombia, the World Economic Forum has thus launched a project entitled "Unlocking Government Transparency with Blockchain Technology", which aims to manage the meal procurement procedures of the Programa de Alimentación Escolar (PAE) for schoolchildren in poor conditions, a sector of the Colombian administration that is particularly susceptible to corruption.

[21] P. Rubechini, *Il World Economic Forum*.

[22] Thus in European Parliament resolution of 3 October 2018, about *Distributed ledger technologies and blockchain: building trust through disintermediation* [2017/2772(RSP)].

administrations – preordained to make systems talk to each other and to spread a wide usability of databases of national importance – prefer interchange systems based on technologies and protocols different from blockchains, which are faster, more efficient and offer greater security[23].

In contrast, the European initiative is moving in a different direction. The European Blockchain Service Infrastructure (EBSI) has been established[24] – as part of the European Blockchain partnership – with the aim of realizing Europe-wide public services based on blockchain technologies, characterized by high levels of security and privacy, even though they have low storage capacity and are high environmental impact.

The development of a European blockchain infrastructure makes it possible to securely share certain information, such as those on customs and tax data from EU countries, or audit documents from projects funded by European agencies, or even cross-border certifications of diplomas and on professional qualifications and digital identities (eIDAS).

The main areas of application are notary certification[25], training credentials, self-sovereign identity, and data sharing[26]. Blockchain technology, in fact, reduces verification costs and improves confidence in the authenticity of the data used. In terms of self-sovereign identity, the European project is to implement an autonomous identity service, which allows users to create and control their own identity in cross-border contexts without having to rely on central authorities. The blockchain system lends itself to validate information exchanges on the basis of widespread cross-checks by decentralizing the control function in favor of the participants that make up the network itself, according to a mechanism of trust and consensus.

These projects aim to automate compliance checks. Citizens can manage their own credentials and monitor the integrity of the data, significantly reducing verification costs. Along the same lines, there are interesting international initiatives, such as the World Food Programme (WFP) of the United Nations, which has activated an initiative called "Building Blocks", i.e., a refugee identification campaign based on blockchain technology and biometrics with an iris scan to provide each person with a substitute and unique digital identity in order to certify and authorize their movements[27].

A more precise indication seems to come from the latest decree '*semplificazioni'*, in which blockchain technology is identified as the technological basis as a way to improve communication between public administration and users, where it refers to "technologies based on distributed registers"[28].

In particular, Article 26 specifies that – for the purposes of notifying acts, measures, notices and communications – as an alternative to the methods provided for by other provisions of the law, including those

[23] However, the more complex the distributed register becomes, the slower it becomes. Nor should we overlook the risks of possible cyber attacks to seize the data, or the impossibility of deleting the data and non-compliance with the right to be forgotten. For foreign experiences, J. Lindman, J. Berryhill, B. welby and M. Barbieri, *The uncertain promise of blockchain for government*, in *www.researchgate.net,* 2020.

[24] With this project, the European Union aims to lay the foundations for the European-wide implementation of public services based on blockchain technologies, characterized by high levels of security and privacy. Underlying the launch of the EBSI project is the European Blockchain Partnership (promoted in 2018), an initiative desired by the European Union that aims to foster collaboration among member states to exchange experiences and expertise, both on the technical and regulatory levels. Italy joined the partnership on September 27th of last year and since last July shares the period of presidency with Sweden and the Czech Republic. From a purely operational point of view, the EBSI foresees that the individual Member States will be called upon to manage the EBSI nodes at national level, which will be able to create and transmit transactions. The architecture of each node will then be made up of two main "layers": a level of APIs (programmable application interfaces) for each of the identified use cases, to allow business applications to interface with the node; an infrastructural level with common functions for all use cases. On the issue, D. Alessie, M. Sobolewski, L. Vaccari and F. Pignatelli (eds.), *Blockchain for digital government*, EUR 29677 EN, Luxembourg, 2019, 31.

[25] For notary certification, the EU's aim is to exploit blockchain technology to create reliable digital audit logs, automate compliance checks in high-priority processes, and make data integrity demonstrable. As an example see P. Rubechini, *Il Catasto inglese corre veloce con la blockchain e riduce gli sprechi*, in *Osservatorio Stato digitale*, in *www.irpa.eu*, 23 April 2020.

[26] It aims to leverage blockchain to securely share data between customs and tax authorities in the European Union.

[27] P. Rubechini, *Non solo criptovalute: la gestione dell'immigrazione clandestina passa anche attraverso la blockchain*, in *Osservatorio Stato digitale*, in *www.irpa.eu*, 24 September 2020.

[28] The reference is to Decree Law no. 76/2020 converted into Law no. 120 of 11 September 2020, entitled "*Misure urgenti per la semplificazione e l'innovazione digitale*". With regard to the specific issue of the process of technological simplification, P. Clarizia, *La digitalizzazione della pubblica amministrazione*, in *Giornale di diritto amministrativo*, 2020, 768.

relating to taxation, the government may make the corresponding IT documents available electronically on the platform, [...] possibly also with the application of "technologies based on distributed registers"[29].

This is not new in absolute terms. Already Article 8 *ter* of Law. n. 12/2019 provides a useful definition of blockchain aimed at circumscribing its scope of application[30]. Law n. 160/2019 then planned to develop a digital platform for notifications, on grounds that this technology contains enormous potential in terms of certification security. In this way, the legislator laid the foundations for the notification with legal value through blockchain of acts, measures, notices and communications of the public administration, leading to savings in public spending and lower burdens for citizens, by allocating specific economic resources for its implementation. However, this initiative was not followed up immediately, also due to the pandemic emergency. Poste Italiane in turn replaced SOGEI as the "designated manager of the digital notification platform"[31].

A Fund (referred to in Article 1, paragraph 226, Law n. 145 of 30 December 2018, Budget Law 2019) had also been established in the estimate of the Ministry of Economic Development to encourage the development of artificial intelligence, blockchain and internet of things technologies and applications. However, the rules relating to this fund were subsequently amended by Article 39 *ter*, of Decree Law no. 76/2020. The current regime provides for the issuance of a decree by the Minister of Economic Development in agreement with the Minister of Economy and Finance for the issuance of the implementing rules. To this end, the Minister of Economic Development may make use of the company Infratel Italia s.p.a.. In other words, "a procedural simplification in the implementation phase and direct and immediate responsibility for the management of the measure by the Minister of Economic Development, through the Ministry's in-house company, Infratel Italia S.p.a. of the Invitalia group" is established[32].

Although the legislator's recognition regarding the importance of these techniques is evident, some critical issues nevertheless remain. Firstly, there seems to be a lack of a reference infrastructure architecture within which to implement blockchain technology. Secondly, there is a lack of legal regulation, incurring the risk of neglecting the objective of interoperability, considered one of the key factors in ensuring effective digitalization. Thirdly, the current regulatory regime leaves public authorities free to do available on the digital platform their acts intended for notification, with the threat "of curbing innovation through laziness to revolutionize a set-up that is certainly consolidated but clearly inefficient, which is that of postal notifications or by means of municipal messenger, as well as to relegate the use of a technology with enormous potential in terms of security certification and advantageous scalar costs – which is the blockchain – to an exercise of style of a few virtuous sectoral or local projects"[33].

## 4. *Blockchain, public authorities and human mediation*

Blockchain technology improves security and functionality in the context of a collaborative and open innovation ecosystem, bringing greater transparency and traceability. However – while it relies on eliminating middlemen and intermediary costs, increasing transaction transparency, redesigning value

[29] The platform operator ensures the authenticity, integrity, immutability, readability and retrievability of the electronic documents made available by the administrations and, in turn, makes them available to the recipients, to whom he ensures access to the platform, personally or through delegates, for the retrieval, consultation and acquisition of electronic documents subject to notification. On this see P. Rubechini, *Il d.l. 76/2020 e le notifiche digitali della pubblica amministrazione: basta scrivere "blockchain" per semplificare?*, in *Osservatorio Stato digitale*, in *www.irpa.*eu, 13 October 2020.

[30] Article 8 *ter*, paragraph 1, of Law 11 February 2019, n. 12 (converting Decree Law 14 December 2018, n. 135, containing urgent provisions on support and simplification for businesses and public administration) provides a definition of "distributed ledger-based technologies" as "information technologies and protocols that use a shared, distributed, replicable, simultaneously accessible, architecturally decentralized ledger on a cryptographic basis, such as to enable the recording, validation, updating and storage of both plaintext and further cryptographically protected data verifiable by each participant, not alterable and not modifiable".

[31] P. Rubechini, *Il d.l. 76/2020 e le notifiche digitali della pubblica amministrazione: basta scrivere "blockchain" per semplificare?*.

[32] G. Urbano, *L'attività di impresa*, in *Giornale di diritto amministrativo*, 2020, 783.

[33] P. Rubechini, *Il d.l. 76/2020 e le notifiche digitali della pubblica amministrazione: basta scrivere "blockchain" per semplificare?*; M. Giaccaglia, *Considerazioni su Blockchain e smart contracts (oltre le criptovalute)*, in *Contratto e impresa*, n. 3, 2019, 941.

chains, and improving organizational efficiency through reliable decentralization – it can be used as a support, but cannot be a replacement for the chief administrative officer.

The issue is the necessity of intermediation to ensure the certainty of legal transactions. It is true that the blockchain is little used in the field of strictly decision-making, being greater its application in the administration of performance according to the objective of conveying digital services to citizens, however, the underlying process of ascertaining the factual truth of the data and its traceability to the person concerned are an essential element of any deliberative process. The circulation of government documents presupposes their non-falsification and non-interpolation.

Concerning personal data, Regulation No. 679/2016 GDPR distinguishes between *"fully automated decisions*", on the one hand, and "*'not fully' automated decisions"*, on the other hand, with specific regard to the regulation of automated decision-making relating to natural persons including profiling. While the first are, in principle, prohibited, the latter are generally permitted.

Article 22, in particular, provides for the right of the data subject not to be subjected to a decision based solely on automated data processing. The exclusive use of digital technologies in public decision-making, i.e., without human involvement, is permitted only under three conditions: *i)* if it is necessary for the conclusion or performance of a contract between the data subject and a data controller; *ii)* if it is authorized by the law of the European Union or the Member State to which the data controller is subject; and *iii)* if there is explicit consent from the data subject.

In order to prevent an excessive delegation to the computer technology, some guarantees are expressly provided for, such as: *i)* the right to receive – from the data controller – meaningful information on the reasoning behind the decision, on its importance and the expected consequences for the data subject; *ii)* the right to obtain human intervention; *iii)* the right to express one's opinion; *iv)* the right to contest the computer's decision.

By means of blockchain technology, the authenticity of a document, of its procedural phase, can be transmitted and certified, being able to rely on the nodes of the network that could coincide with the public connectivity system and with the individual interconnected administrative offices. A network of this type can also be open towards the outside and allow the exchange of information already authenticated by the system itself with third parties (private individuals or companies)[34].

The European Parliament Resolution of February 16th, 2017 on robotics also promotes a well-balanced stability between machine and human intervention, behind needing humans to maintain "at all times control over intelligent machines": a necessity that, in the case of automated and algorithmic decision-making processes, is declined with the possibility of human verification and control to protect the principles of equality, due process, transparency, accountability as well as the comprehensibility of decision-making processes. It is necessary, in short, to put humans before the blockchain machine[35].The right not to be subjected to a fully automated treatment is part of the specific discipline on the protection of personal data, obviously aspiring to a broader recognition, which emancipates it from the dimension of data protection[36].

Even where they reach their highest degree of precision and even perfection, computer procedures can never replace, substituting it really fully, the cognitive activity, acquisitive and judgment that only a preliminary investigation entrusted to an official person is able to play and that therefore, in order to ensure compliance with the institutions of participation, interlocution procedural, of acquisition of the collaborative contributions of the private one and of the interests involved in the procedure, must continue to be the dominus of the same procedure, to the purpose dominating the same computer science procedures predisposed in servant function and to which it goes therefore reserved still today an instrumental role and merely auxiliary within the administrative procedure and never dominant or surrogate of the



[34] S. Olnes and A. Jansen, *Blockchain technology as infrastructure in public sector: an analytical framework*, in *www.researchgate.net,* 2018.

[35] In this regard, A. Pajno, M. Bassini, G. De Gregorio, M. Macchia, F.P. Patti, O. Pollicino, S. Quattrocolo, D. Simeoli and P. Sirena, *AI: profili giuridici Intelligenza Artificiale: criticità emergenti e sfide per il giurista*, in *BioLaw Journal - Rivista di BioDiritto*, n. 3, 2019, 218.

[36] In this regard, M. Macchia, *Pubblica amministrazione e tecniche algoritmiche*, in *Diritto pubblico comparato europeo*, 2022, currently being published.

activity of the man[37].

## 5. *A few concluding remarks*

IT travels three times faster than traditional industry, which in turn would be three times faster than the public sector[38]. If catching up is therefore impossible, at least an attempt can be made to close the gap. On the road to innovation based on information technologies – which are the foundation of all modern innovative economic systems – blockchain also makes a contribution. For this reason, it is seen by Brussels as "a great opportunity for Europe and the Member States to rethink their information systems, promote user trust and personal data protection, help create new business opportunities and establish new areas of leadership, to the benefit of citizens, public services and companies". Italy, as a country in digital transition, cannot miss this appointment.

With respect to this goal, the first objective is the preparation of a specific regulatory model, which serves to initiate management and administrative organization policies that can serve as a solid foundation for computerized procedures, guaranteeing interoperability. It is insufficient to enable the authorities to make use of this technology by means of a legitimizing regulation; rather, it is necessary to provide a regulatory framework for the promotion and implementation of this technological development and data standardization, with precise rules. Norms managing access to information, ensuring the fulfillment of the obligations and imposed by the GDPR, according to which there must be total transparency on the processing of personal data of users[39]. Only with a clear and certain regulation, primarily aimed at protecting the fundamental rights of the individual and based on the principles of transparency and accountability, is a wide use of this innovative instrument possible.

The second aim is to shed light on the many applications of blockchain to different areas of performance administration. The impression is that many fields are still unexplored, in the sense that by enabling decentralized controls on individual nodes, this technology could also facilitate novel forms of civic monitoring or be a valuable tool for democratic support in this direction. In this view, information systems could be rethought for reliable data sharing between authorities and with citizen users. Or "exponential technologies, and especially Blockchain/DLT, can play an important role in the circular economy for the definition and enablement of sustainable production and consumption models capable of directing the interests of all actors in the ecosystem, and in particular the citizen/consumer, towards their environmentally friendly introduction"[40].

Lastly, the third objective is to reconcile information and data management activities with the regulatory limitation of prohibiting solely automated data processing. Although

[37] TAR Lazio, Rome, sec. III *bis*, 10 September 2018, n. 9230; TAR Lazio, Rome, sec. III *bis*, 25 March 2019, n. 3985; TAR Lazio, Rome, sec. III *bis*, 19 April 2019, n. 5134.

[38] According to the well-known statement, named *"The Debriefing"*, addressed by Bill Gates to then-president of the United States Bill Clinton, concluding so "you and I are out of sync by a factor of nine", in *Wired*, December 2000, https://www.wired.com/2000/12/clinton-2.

[39] In this logic is widely shared the recommendation of Mise, *Proposte per la Strategia italiana*, "the activation of a unitary structure, with the modalities identified by the Government, for a National Governance for innovative technologies with the purpose of (i) contributing to define in coordinated terms policies and concrete interventions, also through public consultations, in the field of new technologies, in respect of the principle of technological neutrality; (ii) coordinating investments in a design of unitary and synergic interventions (iii) activate and encourage, if necessary, collaboration between institutions, committees and public offices with competences and tasks in the field, also signaling the opportunity for joint regulations of the sector Authorities; (iv) dialogue with institutions and competent offices of the EU and other countries; (v) monitor the impact of the interventions made; (vi) express opinions in the phases of formation of primary and secondary legislation and in the phases of transposition of European legislation into Italian law". On the relationship between blockchain and efficiency of the administrative system, S. Caldarelli, *L'uso della tecnologia blockchain nel settore delle pubbliche amministrazioni: tra "mito" e realtà giuridica*, in *Diritto dell'Informazione e dell'Informatica*, 2020, 878.

[40] Mise, *Proposte per la Strategia italiana*. On the relationship between administrative procedure and blockchain, S. Crisci, *Intelligenza artificiale ed etica dell'algoritmo*, in *Foro amministrativo*, 2018, 1787. As highlighted by D.U. Galetta, *Algoritmi, procedimento amministrativo e garanzie: brevi riflessioni, anche alla luce degli ultimi arresti giurisprudenziali in materia*, in *Rivista italiana diritto pubblico comunitario*, 2020, 501, "through the use of Artificial Intelligence systems it is in fact possible not only to better manage all the data and information in the possession of the Public Administrations, but it is also possible a relatively easy automation of part of the decision-making process, applying Artificial Intelligence to vast areas of routine, repetitive and standardized activities".

the data may be standardized, the right to obtain human intervention and to challenge the factual truth of the data and its traceability to the data subject must be guaranteed. Only by respecting such a path, the use of blockchain technology can be fully connected to "one of the most important rights in the citizen-public administration relationship of the 21st century: the right to a good administration"[41], provided for in Article 41 of the Charter of Rights of the European Union, as an effective synthesis of procedural rights of the citizen.



[41] D.U. Galetta and J.G. Corvalán, *Intelligenza Artificiale per una Pubblica Amministrazione 4.0? Potenzialità, rischi e sfide della rivoluzione tecnologica in atto*, in *Federalismi.it*, n. 6, 2019.