

HOW CAN WE OPEN THE BLACK BOX OF PUBLIC ADMINISTRATION? TRANSPARENCY AND ACCOUNTABILITY IN THE USE OF ALGORITHMS*

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Abstract

Smart governance is a new governance model that is emerging as a result of the increasingly widespread use of algorithms in public administration. However, this new model is open to various risks, one of which is opacity. In this article, we examine the factors that may play a determining role in algorithms generating opacity in public administration. After identifying these factors, we describe the mechanisms for making algorithms more transparent, based on giving citizens access to and information about the actual contents of algorithms and their functioning. We also present the mechanisms that can be used to make public administrations accountable for any decisions taken using algorithms. Lastly, we suggest that an opportunity exists to establish an institutional framework for promoting good, smart governance.

Key words: smart governance; artificial intelligence; algorithm; transparency; accountability.

COM OBRIR LES CAIXES NEGRES DE LES ADMINISTRACIONS PÚBLIQUES? TRANSPARÈNCIA I RENDICIÓ DE COMPTES EN L'ÚS DELS ALGORITMES

Resum

La governança intel·ligent és un nou model de gestió pública que s'està dibuixant a mesura que l'ús dels algoritmes es va estenent entre les administracions públiques. Aquest nou model s'enfronta a diversos riscos, entre els quals destaca l'opacitat. A l'article s'analitzen els factors que poden determinar que l'ús dels algoritmes generi opacitat a les administracions públiques. A partir de la identificació d'aquests factors, s'exposen els mecanismes per canalitzar la transparència dels algoritmes a través dels quals la ciutadania pot accedir i conèixer el contingut dels algoritmes i el seu funcionament. També es presenten els mecanismes a través dels quals les administracions públiques poden rendir comptes per les decisions que es prenen a través dels algoritmes. Finalment, es proposa l'oportunitat d'impulsar un marc institucional que fomenti una bona governança intel·ligent.

Paraules clau: governança intel·ligent; intel·ligència artificial; algoritme; transparència; rendició de comptes.

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Summary

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1 Building smart governance in times of artificial intelligence

Artificial intelligence—the bedrock of the fourth industrial revolution—¹is a spreading phenomenon that is now considered to be the driving force behind the digital economy.² With the exponential growth in the computing power of computers and the volume of data available, we are witnessing how artificial intelligence and the underlying algorithms are playing an ever greater role in regulating our lives.³

Public administrations are no strangers to this process and increasingly use artificial intelligence to carry out their work and provide public services.⁴ While they are not yet using this technology as intensely as the private sector, more and more public authorities are using artificial intelligence to analyse data (e.g., predicting the risk of fires in buildings and identifying premises for inspection) as well as for other uses such as natural language processing (e.g., reviewing requests made by citizens and detecting irregularities and fraud in public tenders), image recognition (e.g., counting people in public spaces and identifying potential offenders), taking or facilitating decisions (e.g., for awarding public aid, determining which streets the police should patrol, identifying schools that may have a higher dropout rate and treating a particular disease) and offering customised utilities (e.g., for providing information services and advisory and citizen services).⁵

In fact, the widespread use of artificial intelligence among the public administration is leading to the emergence of a new model of public governance—smart governance—based on data-intensive computing through the use of algorithms and greater collaboration with citizens, made possible by employing information and communication technology to gain better results and offer greater openness and accountability to the public.⁶ As Berggruen and Gardels observe, the use of smart governance is spreading because “the new conditions created by global interdependence and the growing diversity enhanced by the new technologies of the knowledge society demand more smart governance structures while also making them possible”.⁷

Implementing smart governance has many benefits for both public administrations and citizens when dealing with complex environments and situations where many factors come into play that require large volumes of data to be taken into account for quality decision-making. However, it also has many risks.⁸ Trusting blindly in the benevolence of algorithms may lead to governments taking decisions that are erroneous, biased, discriminatory or that violate fundamental rights. We must therefore ensure that algorithm-based decision-making, and smart governance in general, is based on principles of good governance such as transparency, participation, accountability and effectiveness, all of which are required to make it legitimate and effective.⁹

In this article we analyse one of the main risks involved in smart governance—its opacity. As we will see below, there are different factors that lead to algorithm use creating opacity in public administration. After identifying these factors, we will describe the mechanisms for making algorithms more transparent based on giving citizens access and information about the actual contents of algorithms and their functioning. We will then present the mechanisms that can be used to make the public administration accountable for any

1 (Holder, Khurana, Harrison & Jacobs, 2016: 383); (Salkin, Oner, Ustundag & Cevikcan, 2017: 5).

2 (Olhede & Rodrigues, 2017: 9).

3 (Edwards & Veale, 2017: 19). This has led to concerns about whether, in the not too distant future, computers will become virtually autonomous to the point of even taking on a *life of their own*. However, as has been amply demonstrated, no part of the technology today suggests that artificial intelligence may someday become a threat to humanity. To see more on this, refer to Stanford University (2016).

4 (De Laat, 2017).

5 No studies have yet been conducted to examine the use of algorithms in our public administration. See an analysis of different experiences in the United States in Eggers, Schatsky & Viechnicki (2018: 3) and Partnership for Public Service and IBM Center for the Business of Government (2018: 1).

6 (Cerrillo i Martínez, 2018). Other authors have used other expressions to refer to this new model, such as *algorithmic governance* (Auby, 2018; Coglianese & Lehr, 2018; Danaher et al., 2017; Hassan & De Filippi, 2017), *algocracy* (Aneesh, 2016) and *algorithmic regulation* (Hoffmann-Riem, 2018: 49). However, we cannot ignore the fact that this new governance model has been born not only in response to the government’s use of algorithms, but also to the data they use. For more on this, see Doneda & Almeida (2016: 61).

7 (Berggruen & Gardels, 2012).

8 Regarding the risks that the use of algorithms may generate for the public administration and administrative law, Cerrillo i Martínez (2019) warns that “artificial intelligence is, in fact, undermining some of the guiding principles of public administration. This means that new mechanisms need to be devised to ensure that these principles are upheld”.

9 (Cerrillo i Martínez, 2017).

decisions taken using algorithms. Lastly, as a final reflection, we will suggest that an opportunity exists to establish an institutional framework for promoting good, smart governance.

2 An approach to artificial intelligence and algorithms

Artificial intelligence refers to the ability of computers to perform actions that would be considered smart if performed by people.¹⁰ Using artificial intelligence, computers can emulate the intellectual faculties of people and perform tasks usually done by humans.

Artificial intelligence is based on the use of algorithms and data.¹¹ Algorithms are procedures designed to solve problems using a data set.¹² More precisely, according to TERMCAT, an algorithm can be defined as the “calculation procedure which consists in performing an ordered and finite series of instructions with some specified data in order to find a solution to the problem posed”. So, algorithms automatically convert data into relevant results to achieve a particular goal.¹³ Algorithms use large amounts of data; this is what is known as *big data*, which has been described as the new gold or oil of the twenty-first century.¹⁴ For data to produce useful results they need to guarantee quality and ensure that there are no technical or legal constraints which may prevent their use by algorithms.

Despite the simplicity of the concept, we cannot ignore the fact that algorithms are becoming more and more complex. Initially, algorithms were based on expert systems in which programmers applied, point by point, the rules and criteria provided for decision-making.¹⁵ Today, some algorithms are based on machine learning, which gives them the ability to learn from the data and from experience in order to take decisions for themselves.¹⁶ Some algorithms can even emulate the human brain by using complex neural networks to analyse large volumes of data in what is known as *deep learning*.

Thus, designing a way for algorithms to operate is often no longer just the job of developers; the algorithms themselves generate the model based on the data available.¹⁷ In these cases, it is difficult, if not virtually impossible, to discover the relationships between data or the way in which the algorithms operate. Also, when this can be checked, we are usually faced with very complex models, operating in a way that is difficult to understand or explain.¹⁸

There is therefore something esoteric about algorithm-based decision-making.¹⁹ Indeed, algorithms extract patterns from existing data without their developers being able to intuitively or accurately know how they work. The algorithms work based on the correlation between the data and not on the basis of a causal relationship, and they therefore produce predictions rather than explanations.²⁰ In addition, the algorithms become more refined as new information appears. All of this is unintelligible to most users, since the results have a complex rather than linear relationship with the data.²¹

10 (Kaplan, 2017: 1).

11 (West & Allen, 2018). Referring to artificial intelligence, Lehr described the workflow as “playing with the data” and “the running model” (Lehr & Ohm, 2017: 655).

12 For Benítez et al., algorithms are “the procedure for finding a solution to a problem by reducing it to a set of rules” (Benítez, Escudero, Kanaan & Masip Redó, 2013: 13). Hill (2016: 47) gives a more precise definition of an algorithm, defining it as a “finite, abstract, effective, compound control structure, imperatively given, accomplishing a given purpose under given provisions”.

13 (Edwards & Veale, 2017: 24); (Yeung, 2017: 2).

14 (Mayer-Schönberger & Cukier, 2013); (The Economist, 2017).

15 As demonstrated by Zerilli, Knott, Maclaurin & Gavaghan (2018), traditional algorithms presented no problems with regard to transparency.

16 (Mateo Borge, 2017: 130).

17 (World Wide Web Foundation, 2017: 7). As pointed out by Tanz (2016) in the title of his work, “Soon we won’t program computers. We’ll train them like dogs”.

18 (Ananny & Crawford, 2018: 977); (Coglianese & Lehr, 2018: 13).

19 (Deloitte, 2018: 2).

20 (Selbst & Barocas, 2018: 1090).

21 (Federal Financial Supervisory Authority, 2018: 36).

3 The opacity of algorithms

Algorithms are considered black boxes.²² In fact, algorithms being opaque is the norm.²³ Therefore, although algorithms may make public administration more efficient, they can also make it less transparent.²⁴ In addition, the opacity of algorithms can prevent governments being held accountable for their actions.²⁵

The opacity of algorithms may come down to technical, legal or organisational reasons.

Firstly, it may be because of technical reasons. Specifically, the opacity may stem from the complexity of the algorithms or their dynamic nature. With certain algorithms it is difficult to know precisely how they work or what data they take into account in producing a particular result.²⁶ Understanding them may require devoting many resources and having particular knowledge or specific skills.²⁷ Moreover, due to their dynamic nature, even if we are able to discover how an algorithm is designed, this is based on a particular moment in time and may have subsequently changed.²⁸

From a legal standpoint, the opacity of the algorithms may be due to the existence of contractual clauses or regulations that limit access to information to protect other assets or rights, such as trade secrets, intellectual and industrial property, personal data protection and public safety. It may also be to protect the confidentiality or secrecy of the decision-making process to avoid revealing decisions still in the making.²⁹

Despite this being the field of public administration, we must be aware that the algorithms used are often not programmed by public sector staff but by others who want to protect them, for example, to avoid losing a competitive advantage or to get a return on an investment.³⁰ That is why it is common for contractors themselves to declare their algorithm codes confidential.³¹

Lastly, from an organisational perspective, opacity may be the result of a total lack of information about the algorithms. In some cases, as we have just seen, this may be because the public authorities that use the algorithms do not have the source code. In other cases, it may be because the public administrations have not formalised their decision to use a certain algorithm, the purpose behind them, the sources or the results obtained through the algorithms.³² But the opacity can also be an attempt to prevent the algorithm being circumvented.³³

The opacity of algorithms can have dire consequences for smart governance. On the one hand, the government may not know how the algorithms work and, therefore, how the decisions they adopt are made. This may have consequences with regard to compliance with the principles and regulations governing their activities, as well as in terms of monitoring administrative action.

22 See Coglianesi & Lehr (2018: 2); Diakopoulos (2014); Fink (2017), and Pasquale (2015), among others.

23 (De Laat, 2017); (Brauneis & Goodman, 2017: 128); (Burrell, 2016: 1). Mayer-Schönberger & Cukier (2013: 179) refer not only to the opacity of algorithms, but also to that of the data on which they rely.

24 (Pasquale, 2015); (Ramió Matas, 2019: 115).

25 (Brauneis & Goodman, 2017).

26 (García-Prieto Cuesta, 2018: 51); (Etzioni & Etzioni, 2016: 139); (Kroll et al., 2017: 659).

27 (Coglianesi & Lehr, 2017: 1206).

28 (Etzioni & Etzioni, 2016: 138).

29 Article 14.1.k of Law 19/2013, of 9 December, governing transparency, access to public information and good governance.

30 While the law provides that public sector service contracts designed to develop and share products protected by an intellectual or industrial property right, such as algorithms, will entail the transfer of said products to the contracting authority unless otherwise stipulated in the provisions, the reality is often different (article 308 of Law 9/2017, of 8 November, on public sector contracts). Beyond the impact that this may have on the opacity of the algorithms, we should be aware of the repercussions of acquiring algorithms from the private sector in that it shifts the responsibility of public decision-making in strategic areas onto private companies (Mulligan & Bamberger, 2018: 707).

31 Article 133.1 of Law 9/2017, of 8 November. In any case, in addition to requiring a responsible use of the statement of responsibility, clauses should include transparency provisions stating that contractors either make their algorithms public or share relevant information about how they are formed and how they work. For more on this issue, see the Consultative Committee of the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (2018: 23).

32 (Brauneis & Goodman, 2017: 152-153).

33 Regarding the circumvention of algorithms, see De Laat (2017) and Goodman & Braune (2017: 160).

On the other hand, opacity can also lead to discrimination arising from biases that the algorithms may contain that cannot be detected by public employees or the general public.³⁴ While algorithms can help public employees avoid cognitive biases that may unconsciously form part of their decisions, the opacity of algorithms may make these difficult, if not impossible, to detect.³⁵

This may also hinder the identification of errors generated by algorithms to the extent that, eventually, any decision taken by or with the intervention of an algorithm is considered correct owing to the belief that a computer works better than a human mind.³⁶

Furthermore, the use of algorithms that are designed by third parties creates the risk that the companies that develop the algorithms and have access to the data end up taking decisions on behalf of the government.³⁷

4 Transparency of algorithms

Transparency is a principle of public administration and, as such, it should underpin government use of algorithms.³⁸

To avoid the opacity of algorithms, public administrations must adopt certain measures to aid transparency.³⁹ These measures should allow not only access to algorithms, but also knowledge of their content and an understanding of how they work and the basis for any decisions taken using them.⁴⁰

First, to ensure the transparency of the algorithms, their content must be accessible to everyone. The content of the algorithm can be discovered by accessing its source code as well as by accessing documents containing a description of the algorithm, the data it uses, how it works, the models it uses and the results it produces and how it produces them.⁴¹

Public administrations can disclose the algorithms they use by sharing them. In this regard, it should be noted that article 5 of Law 19/2013, of 9 December, governing transparency, access to public information and good governance provides that the government “must periodically publish updated information which it is relevant to know in order to ensure the transparency of its activities related to the functioning and monitoring of public actions”.⁴² However, we cannot ignore the fact that transparency legislation does not provide a specific obligation to share information on algorithms, in contrast to Law 30/1992, of 26 November, on the legal provisions governing public administrations and common administrative procedure, which established that public administrations had to publicly disclose the characteristics of the computer programmes and applications that they used, which were subject to prior approval.⁴³ This provision, which

34 (Lehr & Ohm, 2017: 704).

35 (Zarsky, 2016: 122); (Executive Office of the President, 2014).

36 (Brauneis & Goodman, 2017: 126).

37 (Brauneis & Goodman, 2017: 118). Auby warns of the risks that this can generate and speaks of the emergence of a *clandestine regulatory stage* where rules are applied through devices driven by algorithms, thereby giving greater relevance to those responsible for developing the algorithms (Auby, 2018). In fact, as noted by Citron (2007: 1254), “programmers routinely change the substance of rules when translating them from human language into computer code”.

38 Article 3 of Law 40/2015, of 1 October. According to the European Parliament (2017), the principle of transparency means that “it should always be possible to supply the rationale behind any decision taken with the aid of AI that can have a substantive impact on one or more persons’ lives”.

39 However, it should be noted that not all the problems that may arise from the use of algorithms in public administration are the result of their opacity. As observed by Binns (2017: 11), the problem of opacity should not be overestimated.

40 (Mittelstadt, Allo, Taddeo, Wachter & Floridi, 2016: 6). In this regard, Coglianese & Lehr (2018: 15) distinguish between *fishbowl transparency* and *reasoned transparency*. While the first prioritises sharing information about what public administrations do, the second aims to promote understanding of why they do what they do.

41 Regarding the value of this documentation, see Selbst & Barocas (2018: 1129ff).

42 In a similar vein, Law 19/2014, of 29 December, governing transparency, access to public information and good governance provides that public administrations should publish information of public interest (article 6.1.a).

43 Article 45.4 of Law 30/1992, of 26 November. In this respect, Valero (2007: 80) regarded the requirement positively, observing that “its main aim is to offer a minimum level of transparency in the functioning of the technical instruments used to carry out administrative activities using electronic means”. More recently, Alamillo (2017: 124) proposed making algorithms transparent by pushing for “a procedure to display them publicly and receive submissions from the public before deploying any application”. Also, see Ponce (2019).

was repealed by Law 11/2007, of 22 June, on citizens' electronic access to public services, partly because public administrations were failing to comply with it, was also excluded from Law 40/2015 of 1 October, establishing legal provisions for the public sector.⁴⁴ In any case, public administrations do not currently publish information on the algorithms they use. A simple search on their transparency portals confirms this.⁴⁵

Public administrations can also disclose the algorithms they use by providing access to pertinent information. In this respect, it should be noted that Law 19/2013, of 9 December, governing transparency, access to public information and good governance recognises the right of everyone to have access to public information.⁴⁶

According to this law, any content or document, whatever its format or support, which is held by a public authority and which has been produced or acquired in the exercise of its functions, is subject to the right of access. Therefore, algorithms, as well as all the information related to them, may be subject to a request for access to public information.⁴⁷ This was also understood by the Commission to Guarantee the Right of Access to Public Information (GAIP) regarding the claim filed by a secondary school teacher who was denied access to the mathematical algorithm used to appoint the members of the assessment panels responsible for marking university entrance examinations. In its Resolution of 21 September 2016, to consider claims 123/2016 and 124/2016, the GAIP pointed out that although the algorithm could be viewed in mathematical or computer language, since it is information held by the public administration it should be considered public information for the purpose of exercising the right of access under the applicable legislation.⁴⁸

Secondly, it should be remembered that access to information can be limited when it may cause harm to various assets and rights identified by law, such as national security and public safety, commercial interests, intellectual and industrial property and confidentiality or secrecy in decision-making processes.⁴⁹ It should also be borne in mind that in cases where algorithms have been acquired by third parties, the legislation regulating public sector contracts may be applicable and, therefore, the contractor may declare it confidential.⁵⁰ In any case, an assessment should be made of the damage that access to the source code or algorithm may entail or in relation to information that may have been generated on its design and operation.⁵¹

44 This law only provides—to our understanding, for a different purpose from Law 30/1992, of 26 November—that “where administrative actions are automated, a body or bodies, if relevant, should be set up to define the specifications, programming, maintenance, supervision, quality control and, where appropriate, audit of the IT system and its source code. The body that should be considered responsible for the purposes of appeal should also be indicated” (article 41.2 of Law 40/2015, of 1 October).

45 It should be noted that in the case of the General State Administration, the transparency portal should provide structured information about documents and information resources to facilitate the identification of and search for information (article 11 of Law 19/2013, of 9 December).

More precise instructions are given in Law 19/2014, of 29 December, which states that public administrations must “organize information in a way that makes it easily accessible and understandable for people and which facilitates fast and easy access through search tools equipped with the technical characteristics to ensure this” (article 6.1.c) and “facilitate access to information with the use of computer technology in easily understandable formats” (article 6.1.e).

46 Article 12 of Law 19/2013, of 9 December. Other sources of information in this respect include Fernández and Pérez (2017).

47 Article 13 of Law 19/2013, of 9 December. Also, see the autonomous rules of transparency (such as article 2.b of Catalan Law 19/2014, of 29 December). For more on this, see Muñoz & Bermejo (2014: 204-207) and Mir (2017: 57).

48 For more on this, see Resolution 200/2017, of 21 June. From a comparative perspective, several authorities have reached the same conclusions. For example, the Regional Administrative Court of Lazio (Italy) (Third Section), in its ruling of 14 February 2017, states that the right of access to algorithms used in programmes for managing administrative procedures must be upheld, in particular in the case in question regarding the transfer of teachers between provinces, to the extent that this can be considered as an administrative act. For an analysis of this ruling, see Mancosu (2018).

Also, the Commission for Access to Administrative Documents, in several resolutions, such as 20144578, of 8 January 2015; 20161990, of 23 June 2016; and, more recently, 20183296, of 6 September 2018.

49 Article 14 of Law 19/2013, of 9 December. Even when there are no limits on providing access to a particular algorithm, according to the GAIP, limits may be applied to the sharing or use of a source code that has been accessed for purposes other than the original reasons for requesting access without the express authorisation of the public administration. Also see the Resolution of 21 September 2016 and Resolution 200/2017, of 21 June.

50 Article 133 of Law 9/2017, of 8 November. However, in these cases, the public administrations could require contractors to give sufficient information, without providing access to the source code of the algorithm, to enable citizens to monitor their operation (Coglianese & Lehr, 2018: 34).

51 (Coglianese & Lehr, 2018: 30).

However, despite recognition of the right of access to public information, according to the few empirical studies conducted on this area, this right is not currently an effective mechanism for accessing algorithms.⁵²

Access to algorithms is necessary, but not sufficient to ensure transparency. Access to the source code of the algorithm does not necessarily make it more transparent.⁵³ It is also essential to understand how an algorithm works. To ensure that algorithms can be understood, it would be useful for public administrations to provide a description of them in natural language.⁵⁴ In this regard, we must remember that transparency legislation refers to the fact that public administrations should share information in a way that can be clearly understood by the public.⁵⁵ Public information must also be intelligible.⁵⁶ To facilitate the understanding of the information, the recipients will also need to have the skills and the time to be able to understand and analyse the algorithms.⁵⁷

To make it easier to understand how algorithms operate, programmers can use programming languages and procedures that facilitate the analysis,⁵⁸ particularly in the case of open-source based algorithms.⁵⁹

5 Accountability in the use of algorithms

Smart governance requires public administrations not only to be transparent, but also to be accountable for the decisions they make using algorithms.⁶⁰ Accountability refers to the obligation to explain and justify the decisions adopted on the basis of algorithms.⁶¹ Through accountability, public administrations justify their use of algorithms in decision-making and explain how they work, what data they use, what results are expected and what results have been obtained.⁶²

52 In particular, we can refer to several studies carried out in the United States, where access to algorithms used by various public agencies was requested. One such study is Brauneis & Goodman (2017), in which the authors explained how their attempts to learn the algorithms by exercising their right of access were frustrated because the public administrations either failed to reply or denied access, claiming that the Freedom of Information Act was not applicable or that a limit, such as the protection of trade secrets, applied in this case. Another study we can refer to is that of Fink (2017), who, despite using a more complex methodology, obtained the same results.

No comparable studies have been carried out in Spain. However, we do know that it is common for public administrations to reject requests for access to algorithms. By way of illustration, it should be noted that the Ministry of Justice, through the Resolution of its Secretary General of 20 April 2016, denied access to a lawyer who had requested the source code of the computer application Lexnet, considering that the case provided for in article 14.1.j of Law 19/2013, of 9 December, was partially applicable to the extent that Lexnet is a trademark registered by the Ministry on the Industrial Property Register. This decision can be viewed at <https://goo.gl/GY4Ugh> (last accessed in January 2019).

53 (Brauneis & Goodman, 2017: 130).

54 In this respect, we must remember how the GAIP, in its Resolution of 21 September 2016, admitted the possibility that, if the Administration does not have the algorithm in mathematical language, a description of the algorithm in natural language may be provided to the person requesting the description.

The European Parliament considers that it should always be possible to reduce algorithms to a form that can be understood by humans. It also recommends using tools capable of recording every transaction carried out by algorithms to obtain results (European Parliament, 2017).

55 Article 5.4 of Law 19/2013, of 9 December.

56 Article 5.5 of Law 19/2013, of 9 December.

57 (Consultative Committee of the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, 2018: 15-16).

58 (Coglianese & Lehr, 2018: 44); (Kroll et al., 2017: 643); (Selbst & Barocas, 2018: 1117).

59 (Burrell, 2016: 4). In this regard, Alamillo (2017: 124) notes that “releasing the source code of applications contributes in an incredibly powerful way to building trust among the public in the correct functioning of these applications”. For an overview of this, see the provisions of article 157.2 of Law 40/2015, which establish that the applications developed by public administrations or that have been contracted as well as the intellectual property rights that they hold can be declared open sources when this leads to greater transparency in the functioning of public administration.

60 From a legal standpoint, we cannot ignore the fact that Law 40/2015, of 1 October, considers that public administrations are bound by the principle of responsibility over their management practices (article 3). Although this paper focuses on accountability, we must remember that the principle of responsibility is also reflected in smart governance by its monitoring of the use of artificial intelligence and State liability for damage caused by the use of algorithms by the public administration (Cerrillo i Martínez, 2019).

61 According to Bovens, Schillemans & Hart (2008: 225), accountability is “the relationship between an actor and a forum, in which the actor has an obligation to explain and justify his or her conduct, the forum can pose questions and pass judgment, and the actor may face consequences”.

62 (Binns, 2017: 2); (Doshi-Velez & Kortz, 2017); (Diakopoulos, 2014).

Accountability facilitates the monitoring of activities performed by public administrations using algorithms. It also allows errors and biases to be detected. Ultimately, accountability strengthens public trust in public administrations in relation to their use of algorithms for decision-making.⁶³

Although transparency may serve as a mechanism of accountability to inform citizens about algorithms used by public administrations and algorithm-based decisions,⁶⁴ as government use of algorithms grows, there is increasing emphasis on the need to ensure accountability through other mechanisms when algorithms are involved.

Therefore, public administrations need to go beyond just ensuring access to algorithms and their content; the design and deployment of algorithms used by government must take place within a framework that guarantees respect for the principles of transparency and participation and the rights of interested parties, in accordance with prevailing legislation regarding the drafting of general provisions and administrative acts.⁶⁵

Accountability can also be demonstrated by providing an explanation of how an algorithm operates and the reasons behind the decisions it takes.⁶⁶ However, in our opinion, both with regard to administrative acts driven by algorithms and the justifications for these acts, the explanation provided has to go beyond the legal requirements set out in Law 39/2015, of 1 October.⁶⁷ Ultimately, we must remember that the use of algorithms in public decision-making changes how decisions are made and, therefore, the motives behind any administrative act.⁶⁸ Accordingly, public administrations will also have to explain how they have reached a certain decision, what the process was, what data were taken into account and what the objectives behind it were.⁶⁹

However, there is not yet any explicit obligation in this regard.⁷⁰ For this reason, we should move towards defining a government obligation to explain the algorithms they use, their purposes and operation, as well as the data used so that public employees are aware of all these factors, and so that they can, ultimately, be monitored by citizens.⁷¹ Meanwhile, we should recognise the right to receive an explanation of how algorithms are used by the public administration.⁷²

63 (Doshi-Velez & Kortz, 2017: 2); (Lepri, Oliver, Letouzé, Pentland & Vinck, 2017: 8).

64 (Diakopoulos, 2016: 58); (Lepri et al., 2017: 7). In fact, transparency is not an end in itself but a tool for accountability (Ananny & Crawford, 2018: 982). In addition, several authors have warned about the limitations of transparency as a mechanism of accountability in relation to government use of algorithms. In particular, Ananny and Crawford identify ten limitations of transparency (Ananny & Crawford, 2018). Indeed, these limitations have also been observed with respect to other traditional mechanisms for accountability that are insufficient when dealing with public authorities' use of algorithms for decision-making (Kroll et al., 2017: 636).

65 In this regard, policy in the United States has leaned towards recognising digital due process to ensure that interested parties can participate in decisions that affect them and that these do not contain bias (Yeung, 2017: 11).

66 Accountability regarding the use of algorithms includes an obligation to report, explain or justify decisions made using algorithms. It also includes the obligation to mitigate any potential negative social impact or damage (Diakopoulos et al., 2017; Lehr & Ohm, 2017: 706). However, as demonstrated by Boyd (2017), "accountability isn't simple. In fact, one of the biggest problems right now is that we don't have the tools to do accountability well". In the same vein, Vedder & Naudts (2017: 206) observed that traditional accountability mechanisms cannot be used for algorithms.

67 In this respect, we must remember that Law 39/2015, of 1 October, establishes the obligation to give reasons, among others, for actions that limit individual rights or legitimate interests, as well as acts derived from the exercise of discretionary powers. The justification must also briefly refer to the facts and legal basis (article 35 of Law 40/2015, of 1 October).

68 As we have already seen, the decisions taken by an algorithm are based on correlations, while public decisions are traditionally based on causal logic (Auby, 2018).

69 (Binns, 2017). Accountability must be made in accordance with different parameters. The World Wide Web Foundation has identified five principles for a responsible use of algorithms: fairness, explainability, auditability, responsibility and accuracy (World Wide Web Foundation, 2017: 11). See also Diakopoulos et al. (2017).

70 In connection to this obligation, it is worth remembering the provisions of article 45.4 of Law 30/1992, of 26 November.

71 For more on this, see Lehr & Ohm (2017: 708). On this issue, we can refer to French Law 2016/1321, of 7 October 2016, for a digital republic, amending the code of relations between citizens and the government, which establishes that when an individual decision is taken using an algorithm, the interested party must be informed (article L. 311-3-1). In particular, when requested, the interested party must be informed of the rules that define the process followed by the algorithm and its main operational characteristics. It also stipulates that the government must publish online the rules defining the main processes carried out by algorithms and on which individual decisions are based during the course of its activities (article L. 312-1-3). These precepts have been developed by Decree 2017/330, of 14 March 2017, on the rights of persons subject to individual decisions taken on the basis of algorithmic processing. See also Coppolani (2017).

72 For more on this, see Ponce (2019). Ponce suggests that in the event of any violation of the standard of due diligence concerning intelligibility, an assertion could be made claiming the impossibility of complying with the relevant legislation and a request could

In this respect, with limitations, EU Regulation 2016/679 of the European Parliament and of the Council, of 27 April 2016, on the protection of individuals with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (hereinafter, the General Data Protection Regulation), recognises the right to an explanation of the automated processing in the field of personal data protection. However, a careful reading of this rule reveals some limitations to the regulation, which, in any case, is limited solely to the processing of personal data.⁷³

In addition to the explanation to which we have referred, public administrations can also be accountable for decisions taken by algorithms using empirical evidence that allows the government to measure the performance of algorithms and demonstrate the benefits and impacts with which to justify their decisions, without the need for an explanation of the algorithm.⁷⁴

6 Designing an institutional framework to promote transparency and accountability in smart governance

In view of the limitations of transparency and accountability mechanisms observed throughout this study, we consider that smart governance can be strengthened by creating an institutional framework that ensures security—both legal and technological—, transparency and responsibility in the use of algorithms by public administrations. This institutional framework should also promote technological innovation in public administration in order to transform the way it operates as well as its relations with citizens (for example, providing customised and proactive public services). Ultimately, a node of interaction needs to be established between all the actors involved in developing smart governance.

This new institutional framework could be formalised through the creation of a body to oversee the development of smart governance and, in particular, the incorporation of artificial intelligence into public administration and to ensure the transparency of algorithms and monitoring of their design, operation and deployment.⁷⁵ As a network node for smart governance, this organisation should be able to achieve broad participation of all those involved in developing artificial intelligence in public administration. Accordingly, it is important to remember that the main advances in artificial intelligence come from the private sector, both from large multinationals and small innovative companies, either by themselves or assisted by universities, and often with government support.

The aim of this organisation would be to ensure security, transparency and accountability in the use of algorithms in public administrations, and also to channel participation in their design, development and evaluation.

To achieve these aims, the organisation would need to perform various functions.⁷⁶ On the one hand, it would need to promote and facilitate the use of algorithms by government. In this regard, in addition to information,

be made to overturn the court's decision.

⁷³ Indeed, on the one hand, consideration 71 states that the safeguards to processing “should include specific information to the data subject and the right to obtain human intervention, to express his or her point of view, to obtain an explanation of the decision reached after such assessment and to challenge the decision”.

However, article 13 establishes only that the controller of the personal data processing shall provide the data subject with information concerning the existence of automated decision-making, the logic involved and the envisaged consequences of such processing for the data subject. Moreover, article 15 also establishes that the data subject shall have the right to obtain from the controller access to the existence of automated decision-making and, again, information about the logic applied and the significance and envisaged consequences of such processing for the data subject. Finally, article 22 recognises the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her, except in the situations foreseen in the regulation.

Also see Wachter, Mittelstadt & Floridi (2017) and Mittelstadt et al., (2016: 12).

⁷⁴ (Doshi-Velez & Kortz, 2017: 10-11). According to these authors, public administrations can, for example, measure whether the automated landing of aircrafts leads to fewer security incidents than landings made by pilots, or if the medical diagnosis made by an algorithm reduces mortality when compared to an unassisted doctor's diagnosis.

⁷⁵ As pointed out by Mulligan & Bamberger (2018: 759), existing governance institutions often lack the tools and substantive regulatory ability required to ensure that technology is used rationally.

⁷⁶ Any action taken by this body should be based on the precautionary principle to avoid new algorithms being deployed until proven that they do not cause any damage to persons, groups or regulations. See, particularly, Thierer & Castillo (2016: 3) with regard to

training and advice on the use of algorithms by public administrations, it could design algorithms for public decision-making and the provision of public services and facilitate their reuse.⁷⁷

On the other hand, this body should also monitor the use of algorithms by the government to ensure their safety and legality. Prior to the implementation of algorithms and their use by public administrations, the organisation would monitor them to try to avoid errors or biases and assess the impact they have on fundamental rights such as personal data protection. Once the algorithms are already in use, they would be monitored to try to assess their impact and effectiveness as well as to check the legality of any decisions taken by the government through the algorithms.⁷⁸

This proposal is in line with recommendations made by various bodies.⁷⁹ For example, the European Parliament, in its Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics, also suggests the creation of a European agency for robotics and artificial intelligence “in order to provide the technical, ethical and regulatory expertise needed to support the relevant public actors, at both Union and Member State level, in their efforts to ensure a timely, ethical and well-informed response to the new opportunities and challenges, in particular those of a cross-border nature, arising from technological developments in robotics”. Similarly, the U.S. White House Office of Science and Technology Policy has proposed the creation of a federal agency on robotics and artificial intelligence to advise on political, legal and consumer protection matters.⁸⁰

7 Conclusions

Smart governance generates new risks for public administration. In this article we have had the opportunity to analyse how opacity is one of the main problems that public administrations face when using algorithms in decision-making. We have also acknowledged the importance of the principles of transparency and accountability in tackling this issue.

However, over the previous pages we have seen some of the limitations that mechanisms for transparency and accountability have in terms of public administration use of algorithms for decision-making. While it is evident that legislation regulating these mechanisms does not address smart governance, it is also clear that public administrations are not driving change in this area to the extent required to ensure greater transparency and accountability in the use of algorithms. Furthermore, the complexity that characterises all information relating to algorithms and their operation significantly limits the role that citizens can play in monitoring public administration use of algorithms.⁸¹

In response to these limitations, an institutional framework has been proposed that would ensure security—both legal and technological—, transparency and responsibility in the use of algorithms by public administrations.

algorithms. Also, see the Code of Ethical Conduct for Robotics Engineers annex to the European Parliament Resolution, which includes, among others, the precautionary principle.

⁷⁷ The European Commission (2018) has recognised the role of the public sector in developing the artificial intelligence industry.

⁷⁸ On this issue, we cannot ignore the fact that as the use of algorithms by the government becomes more widespread, ensuring adequate monitoring of algorithm-based decisions will become a more complex task, partly because the way that decisions are taken using algorithms differs substantially from the way they are taken by public employees. In this regard, Auby (2018: 162) also argues that “the judge will usually be no better prepared than the average citizen to understand the algorithms”. Auby also notes that “the instruments commonly used to monitor the reasons behind administrative decisions and the relationship between the decision and these reasons can continue to be as effective as ever” because they are based on establishing classic and causal rationales.

⁷⁹ In addition to the institutional proposals, it is important to note that several authors have also considered the opportunity or the need for creating a special body or agency. For example, Barocas & Selbsts (2016) propose a regulatory body to monitor suppliers and detect biased results. Tutt (2017: 15) also suggests setting up a regulatory agency for algorithms. Scherer (2016) proposes the creation of a federal artificial intelligence agency. Calo (2015: 555-556), the creation of a federal robotics commission. The authors Mittelstadt (2016) and Ponce (2019) also support the idea of creating regulatory bodies. Other authors have made less ambitious recommendations, but have also recognised the opportunity to create advisory bodies to make policy recommendations (West & Allen, 2018).

⁸⁰ (Executive Office of the President National Science and Technology Council Committee on Technology, 2016).

The Science and Technology Committee of the House of Commons has also pointed out the need to set up a standing commission to take the lead on the ethical, legal and social aspects of artificial intelligence (House of Commons, 2016).

⁸¹ We need to avoid power remaining concentrated in the hands of the few who can access algorithms and understand how they work (Fink, 2017: 1454).

This framework could be formalised through the creation of a body to oversee the development of smart governance, and which would require broad participation of all those involved in developing artificial intelligence within the public administration. This body would become a node of smart governance and would be a good tool for opening the black box of algorithms so that artificial intelligence can contribute to building a new public management model that is based on a more effective and more transparent and accountable relationship between government and its citizens.⁸²

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⁸² The words of Coglianese & Lehr (2018: 49) are very illustrative here, "a government that makes use of so-called black-box algorithms need not be a black-box government".

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