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Algorithmic Administrative Decision-Making and Its Legality under the EU Artificial Intelligence Act (Regulation (EU) 2024/1689)

مشروعية القرار الإداري الخوارزمي من منظور قانون الذكاء الاصطناعي (الإتحاد الأوروبي) 1689/2024

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Abstract:

Artificial intelligence is one of the key pillars of the new technological revolution, known as the Fourth Industrial Revolution. Its use is no longer confined to the private sector, but has also expanded to the public sector, where artificial intelligence algorithms are increasingly employed to support administrative decision-making. This development has given rise to a new form of public decision-making commonly referred to as "algorithmic administrative decision-making," which has brought about a fundamental transformation in the public sector in the countries that have adopted it, due to the features and advantages resulting from its implementation, which may help enhance the efficiency and effectiveness of administrative functions.

However, this implementation raises several technical and legal challenges, which led us to address the subject of this research paper. The paper seeks, first, to highlight the technical limitations affecting the process of algorithmic decision-making, and then to examine the possible legal solutions introduced by the European Commission through the adoption of the world's

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first comprehensive regulatory framework governing artificial intelligence, namely the "Artificial Intelligence Act (European Union) 2024/1689."
Keywords: Algorithmic decision, Artificial Intelligence Act, Algorithms.

الملخص:

يُمثلالذكاءالاصطناعيأحدأهم ركائزالثورةالتكنولوجيةالجديدة.والتي عُرفت بالثورة الصناعية الرابعة، حيث لم يعد تطبيقه مقتصرا على القطاع الخاص بل امتد اليوم ليشمل القطاع العام؛ إذ تزايد استخدام خوارزميات الذكاء الاصطناعي لدعم القرارات الإدارية لتشكل بذلك نمطا جديدا من القرارات عُرف بـ"القرار الإداري الخوارزمي"الذي أحدث تحولاً جذريا في القطاع العام على مستوى الدول التي تبنته نظرا للخصائص والامتيازات التي تنجم عن تفعيله والتي من شأنها أن تُسهم في تسريع وتطوير العمل الإداري.

في المقابل يشهد هذا التفعيل العديد من التحديات التقنية منها والقانونية، الأمر الذي دفعنا للخوض في عنوان هذه الورقة البحثية والتي تهدف إلى تسليط الضوء على الثغرات التقنية التي تواجهها عملية صنع القرار الخوارزمي من جهة؛ ثم الخوض في الحلول القانونية الممكنة التي قدمتها المفوضية الأوروبية عبر طرحها لأول قانون ذكاء اصطناعي ذو طابع عالمي وهو "قانون الذكاء الاصطناعي(الاتحادالأوروبي) 1689/2024".

الكلمات المفتاحية: القرار الخوارزمي، قانون الذكاء الاصطناعي، الخوارزميات.

1/ Introduction

Over the past two decades, the world has undergone profound technological transformations driven by revolutionary developments in software and hardware. A defining feature of these transformations is the integration of the virtual and physical worlds, along with the expansion of artificial intelligence into various fields, making AI more accessible than ever before. Its use is no longer limited to the private sector, but has also extended to the public sector, as administrations seek to provide public services and make administrative decisions using artificial intelligence algorithms. This has led to the emergence and implementation of what is known as the algorithmic administrative decision, which is based on the analysis of large datasets and their programmed training in order to generate outputs that may subsequently be translated into administrative decisions.

There is no doubt that the implementation of algorithmic administrative decision-making contributes to accelerating administrative work and, consequently, to responding more quickly to individuals' needs, as demonstrated in practice. However, this process is not without technical and legal gaps, most notably concerns relating to data privacy, algorithmic bias, lack of transparency, difficulty in ensuring accountability, and the shortcomings of the relevant regulatory frameworks. The absence of a comprehensive understanding of the mechanisms on which artificial intelligence algorithms rely, as well as the challenges they raise, constitutes a major obstacle to their proper application. This highlights the importance of the topic and calls for an in-depth examination of the main challenges facing public administration in this regard, together with a deeper analysis of the relevant legal texts.

Based on the foregoing, and following several preliminary initiatives, the European Commission adopted the first comprehensive legal framework governing artificial intelligence, whose effects extend beyond the European Union through its extraterritorial scope.. This prompted us to describe and analyze it in an attempt to answer the following research problem: Can the rules of this law achieve a delicate balance between benefiting from the capabilities of artificial intelligence, on the one hand, and protecting the rights of individuals affected by algorithmic administrative decisions on the other?

To this end, we deemed it appropriate to divide this research paper into two main sections. The first is theoretical and is devoted to establishing a conceptual framework for the algorithmic administrative decision in terms of its emergence, forms, applications, and the challenges arising from its implementation. The second section provides a descriptive and analytical reading of the most prominent provisions introduced by the Artificial Intelligence Act (European Union) 2024/1689, relying on the descriptive method supported by analytical tools.

2/ The Algorithmic Administrative Decision between Foundational Idealism and the Legality of Implementation:

The adoption of artificial intelligence in public administration can be traced back to the emergence of expert systems in the 1980s, which primarily supported tax auditing, fraud detection, and basic decision-support functions in areas such as social security and municipal services. In the early 2000s, the development of AI policy frameworks gained momentum with the rise of e-government initiatives, which established the basis for data-driven public services. Over the past decade, progress in machine learning, big data analytics, natural language processing, and cloud computing has driven a new phase of AI integration, reshaping governance models in both advanced economies and emerging markets(1).

2.1. The Concept of the Algorithmic Administrative Decision:

John McCarthy was the first to coin the term artificial intelligence at the Dartmouth Summer Research Project on Artificial Intelligence, the Dartmouth Workshop, in 1956. Since then, research in the field of artificial intelligence has achieved several notable accomplishments, including machine learning, theorem proving, pattern recognition, problem solving, expert systems, and natural language processing(2).

It should be noted that the concept of artificial intelligence is not fixed and will remain so as long as its outputs continue to grow. This also inevitably applies to the concept of the algorithmic administrative decision, whose definition requires first understanding its constituent terms, namely, algorithms and artificial intelligence.

2.1.1. Definition of Artificial Intelligence:

In its broadest sense, artificial intelligence is often associated with algorithms, although algorithms existed before artificial intelligence and have been widely used beyond this field. The term “algorithm” derives from the name of the Persian mathematician Muhammad ibn Musa al-Khwarizmi, who lived in the ninth century. From this perspective, an algorithm refers to a set of a finite sequence

of instructions used to solve a problem or carry out a computational operation. From this perspective, artificial intelligence may be broadly understood as "the use of algorithms," although such a definition would also include many other activities, such as calculator operations or even instructions found in books(3).

One of the common definitions of artificial intelligence describes it as "a technology that enables machines to simulate various complex human skills." However, this definition provides limited clarification; in fact, it merely offers another formulation of the term "artificial intelligence." As long as these "complex human skills" are not clearly identified, the definition of artificial intelligence remains highly ambiguous. The same applies to the definition of artificial intelligence as "the performance of complex tasks by computers in complex environments,"(4) as well as to the view that artificial intelligence means "the study of how to make computers perform intelligent tasks that were previously limited to humans."(5)

A fixed definition of artificial intelligence as the simulation of complete human intelligence is not useful. What is needed is a definition that covers the full range of applications currently in use and those expected in the near future. In this regard, the High-Level Expert Group on Artificial Intelligence offered a broader definition, describing artificial intelligence as "systems that display intelligent behavior by analyzing their environment and taking actions—with a certain degree of autonomy—to achieve specific goals." This definition covers all applications currently classified as artificial intelligence while also allowing for future development in the field. In addition to advanced machine learning and deep learning techniques, it also accommodates other techniques, including the traditional approaches mentioned above. In brief, this definition is sufficiently precise to distinguish artificial intelligence from algorithms and digital technology in general while remaining broad enough to encompass future developments(6).

2.1.2. Definition of Algorithms:

Over the past decade, the use of artificial intelligence has increasingly become synonymous with the term algorithm. In their traditional sense, algorithms refer to "a procedure for solving a defined problem, such as finding the smallest number in a set of numbers or the shortest path between two points on a map." This concept differs significantly from the meaning of artificial intelligence, which refers to computer programs that solve problems requiring a high degree of human intelligence(7). Accordingly, algorithms existed before artificial intelligence and have been widely used outside this field. If we were to define artificial intelligence simply as the use of algorithms, this would include many other activities, such as calculator operations or even instructions contained in books(8).

Accordingly, an algorithm is considered "a coded model resulting from converting input data into outputs through the analysis of training data." It should be noted here that artificial intelligence algorithms are the ones that discover correlations between these data using their neural network in a manner similar to human cognition(9).

2.1.3. Definition of the Algorithmic Administrative Decision:

It is "a term used to describe a form of automated decision-making based on computational processes operating autonomously according to predefined rules and statistical models, producing outputs without direct human intervention."(10)

Some examples can illustrate how artificial intelligence systems may be used in public administration. For example, they may be used to manage and distribute financial subsidies allocated to help the unemployed, as well as to evaluate their records in order to identify employment opportunities matching their qualifications. A municipality may also use an artificial intelligence system to predict the risk of long-term unemployment and recommend the type of assistance needed to help individuals and integrate them into the labor market. This is done by providing specific inputs that constitute data leading to outputs represented by the algorithmic administrative decision(11).

For further clarification, we propose the following examples: a public institution performing a supervisory function in combating money laundering may use an artificial intelligence system to detect suspicious transactions in the financial market. The inputs here consist of a series of transactions carried out over a period of time, while the outputs consist of a recommendation to conduct a deeper investigation into specific transactions. Another example is a municipality that needs to prioritize notifications concerning children who may require special social support measures to address the risk of abuse or neglect at home. The inputs may consist of missed school meetings, missed medical appointments, and missed payments, in addition to the parents' social assistance records, while the outputs consist of the level of risk faced by the children, thereby establishing a priority ranking for social support allocation(12).

2.1.4. Forms and Models of the Algorithmic Administrative Decision:

Machine learning algorithms are generally divided into two main categories. The first consists of traditional machine learning models, which often rely on established statistical algorithms. The second includes deep learning algorithms, which are based on artificial neural network models composed of multiple layers of "perceptrons," largely inspired by the functioning of neurons in the human brain. Within this broad classification, machine learning algorithms are further divided into supervised learning, unsupervised learning, and reinforcement learning. Supervised learning algorithms remain the most widely used in algorithmic decision-making(13).

By contrast, advanced machine learning based on artificial neural network models, with deep learning as its most prominent form, relies on multilayer perceptrons. This increases the accuracy of artificial neural networks compared with traditional machine learning models, which tend to reach a stable level of performance even when trained on very large datasets. Another significant advantage of deep neural networks over traditional machine learning models is their ability to

extract features automatically from raw data. In addition, artificial neural networks perform particularly well in classification tasks and excel across various domains and types of input. Their inputs are not limited to tabular data but may also include unstructured data such as images, texts, and audio data. These networks use a technique known as "automatic differentiation," combining multilayer perceptron networks with modern deep neural networks in order to reduce errors in the training set(14).

Despite the accuracy of decisions based on deep learning models, they suffer from a major limitation concerning providing reasons for the decision. The resulting models are so complex that they operate as black boxes, making them unclear and impossible for any employee to understand. Indeed, even the programmer may be unable to identify the logical steps taken before the administrative decision is issued, a phenomenon known as the "AI black box."(15)

2.2. Concerns and Challenges in Developing Machine Learning-Based Policies:

As artificial intelligence continues to be integrated into administrative decision-making, critical challenges increase, preventing the full and proper application and implementation of the algorithmic administrative decision. The most prominent of these challenges and concerns are bias, and transparency, in addition to security and legal concerns.

2.2.1. Algorithmic Bias:

One of the most prominent potential concerns in this field is the existence of biases embedded in artificial intelligence algorithms, which may lead to unfair outcomes in administrative decision-making. These biases often arise from training data that does not adequately represent the diverse categories of citizens, thereby reinforcing existing social inequalities(16).

In this context, stakeholders play an important role in ensuring that decision-making algorithms are neutral and lead to representative policies, rather than producing policies that favor certain categories of

citizens and exclude others. However, developing unbiased systems represents a major challenge due to the lack of representative datasets. For example, digital data collected through social media usually does not represent the preferences and needs of categories of citizens who do not use social media platforms, such as the elderly or low-income individuals. Consequently, training machine learning algorithms to make decisions using such biased data is likely to lead to decisions that do not take into account the needs of these categories of citizens. It is also worth noting that algorithmic bias is often introduced unintentionally, which requires bias detection and mitigation processes. A prominent example is the training of machine learning-based decision-making systems based on historical datasets containing historical biases that must be addressed.(17)

2.2.2. Transparency and Accountability:

The growing reliance on artificial intelligence-based decision-making processes raises concerns regarding transparency and accountability, since algorithmic processes may conceal the rationale underlying major policy decisions(18).

In this context, the decision-maker must be able to understand the mechanisms through which the decision is issued while also explaining the reasoning behind such decisions to the affected individuals. However, this assumption is practically impossible to achieve, as many high-performance machine learning models, particularly those based on deep neural networks, operate as black boxes and provide only very limited transparency and clarity. Moreover, there are no agreed-upon and proven methods for selecting models that balance performance with interpretability in accordance with transparency requirements(19).

2.2.3. Cybersecurity:

Cybersecurity concerns are reflected in the security risks associated with artificial intelligence systems that may be vulnerable to attacks and manipulation. For instance, adversarial attacks can mislead artificial intelligence models and cause them to generate incorrect

outputs. Such attacks occur by introducing slight changes to the model's input data, in addition to privacy risks that often arise from the unauthorized use of privacy-sensitive data during the training of artificial intelligence algorithms.(20)

In the absence of strong cybersecurity frameworks, artificial intelligence-based public administration systems may become vulnerable to cyberattacks, which could undermine public trust in digital governance. Resistance to change within institutions, particularly in public administration, is often rooted in established cultural norms and practices(21).

2.2.4. Legal Regulation:

The application of artificial intelligence is not merely a technological transformation, but a profound organizational change that affects society as a whole. Moreover, understanding the various factors that influence organizational change can help reduce resistance to change by aligning artificial intelligence initiatives with the broader values and objectives of governments and society alike(22).

Since the legal framework constitutes a fundamental pillar of regulatory compliance for administrations integrating artificial intelligence into various fields in general, and into the field of administrative decision-making in particular, it was necessary to address the legal regulation of artificial intelligence.

3/ Legal Regulation of Artificial Intelligence:

In July 2024, the Artificial Intelligence Act was published in the Official Journal of the European Union, Regulation (EU) 2024/1689, hereinafter referred to as the "Artificial Intelligence Act," which entered into force on August 1, 2024. It was adopted by the institutions of the European Union. It is a regulation binding on all member states and aims to improve the internal market by establishing harmonized rules for trustworthy and human-centered artificial intelligence in the European Union(23).

3.1. Previous Initiatives Prior to the Artificial Intelligence Act (European Union) 2024/1689:

The announcement of the Artificial Intelligence Act of 2024 was preceded by several relevant regulatory initiatives, which may be summarized as follows:

3.1.1. The General Data Protection Regulation 2018 (GDPR):

This general regulation is considered an explicit response to the demand for transparency in the field of artificial intelligence. Articles 13 to 15 provide for the right of data subjects affected by automated decision-making to obtain "meaningful information about the logic involved, as well as the expected consequences." The 2018 Council of Europe Convention for the Protection of Individuals with Regard to the Processing of Personal Data also provides for a similar right, granting data subjects the right, upon request, to "know the reasons underlying data processing" in the case of fully automated decision-making. By contrast, the Data Protection Working Party, the predecessor body of the newly established European Data Protection Board (EDPB), considered that "meaningful information about the logic involved" under the General Data Protection Regulation does not necessarily mean "a complex explanation of the algorithms used or the disclosure of the full algorithm."(24)

3.1.2. Ethical Guidelines:

In 2019, the High-Level Expert Group on Artificial Intelligence issued a set of ethical guidelines. This document is intended to guide future regulatory action and promote the development of trustworthy artificial intelligence. According to these guidelines, trustworthy AI must be lawful, meaning that it complies with all applicable laws and regulations; ethical, meaning that it adheres to ethical principles and values; and robust, both from a technical perspective and in terms of considering its social environment.

In the same year, the European Commission published the Communication on Building Trust in Human-Centric Artificial

Intelligence. This communication identified several key requirements for trustworthy AI, including human agency and oversight, technical robustness and safety, privacy and data governance, transparency, and accountability. These elements are essential for developing AI systems that users can rely on and trust. The guidelines were also supplemented by an assessment list for trustworthy AI, serving as an operational tool. This list translates the key requirements of ethical AI into practical guidance, in the form of a checklist, for implementation by developers and users(25). In July 2020, the High-Level Expert Group on Artificial Intelligence presented the final assessment list for trustworthy artificial intelligence(26).

3.1.3. The White Paper on Artificial Intelligence:

In February 2020, the European Commission published the "White Paper on Artificial Intelligence: A European Approach to Excellence and Trust," in which it assumed that promoting digitalization is an essential factor in strengthening competitiveness and advancing European progress and social well-being. It also acknowledged the economic and geostrategic importance of artificial intelligence and data. For this reason, this document was accompanied by the European Data Strategy. Both documents constituted the first two pillars of the digital strategy presented in the European Data Strategy, aimed at promoting the development of a common data space in which data can circulate across all sectors, particularly the so-called "common European data spaces in strategic sectors and areas of public interest," such as industry, transport, health, finance, energy, agriculture, and public administration data. In addition to their contribution to European integration, data are of critical importance for the development of artificial intelligence in the European Union(27).

3.1.4. Proposal for a Legal Framework for Artificial Intelligence:

On April 21, 2021, the European Commission proposed the first-ever legal framework on artificial intelligence in order to establish comprehensive legal regulation of artificial intelligence. Here, and as previously stated, it should be noted that the draft law was the subject

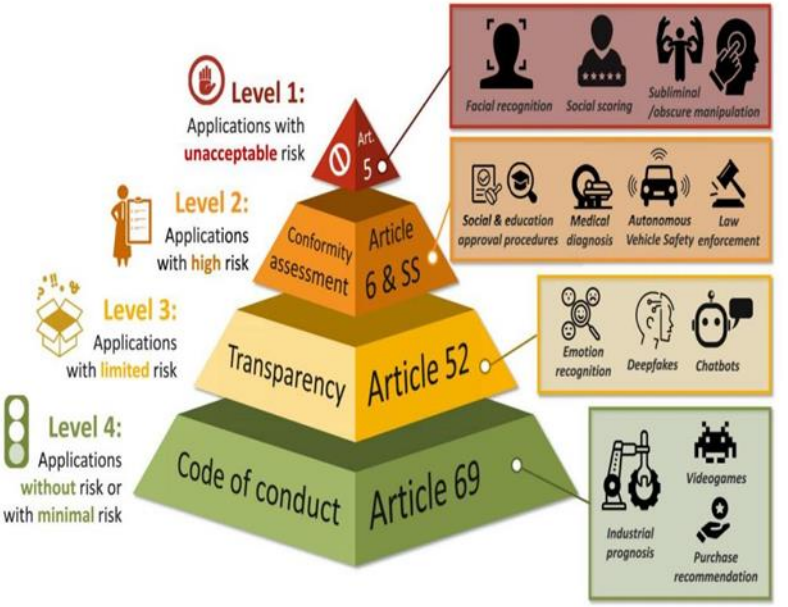
of controversial debates regarding the extent to which it used the correct regulatory technique, its scope of application, and its preventive effectiveness. This law is also described as the first legal framework for artificial intelligence (AI) to address the risks posed by this emerging technology(28).

It should also be noted that the proposed Artificial Intelligence Act is not limited to machine learning only but also includes expert systems and long-established statistical models. Under the Artificial Intelligence Act, new obligations were established to ensure transparency, legality, and fairness. These obligations aim to establish mechanisms for quality assurance throughout the entire life cycle of AI-based systems, thereby ensuring legal certainty that encourages innovation and investment in AI systems while preserving fundamental rights and values(29).

3.2. The Artificial Intelligence Act (European Union) 2024/1689:

It is the European Union's first comprehensive legal framework governing artificial intelligence based on a risk-based approach, under which certain AI systems are prohibited while others are permitted subject to regulatory requirements, under which certain AI systems are prohibited while others are permitted subject to regulatory requirements. The regulation aims to ensure Europeans' trust in the artificial intelligence they use while promoting an ecosystem of excellence in artificial intelligence and strengthening the global competitiveness of the European Union. At the same time, and for this purpose, the European Commission presented a Communication on fostering a European approach to artificial intelligence, which defines the European Union's strategy for artificial intelligence, focusing on excellence and trust, competitiveness, and ethical considerations. It also aims to ensure that Europe remains at the forefront of artificial intelligence development while protecting citizens' rights and values(30).

This act classifies uses of artificial intelligence into four levels of risk: prohibited, high-risk, limited-risk, and minimal-risk, as shown in the figure below.



The figure represents the variation in artificial intelligence risks. Source:

Díaz-Rodríguez, Natalia, et al. "Connecting the dots in trustworthy artificial intelligence: From AI principles, ethics, and key requirements to responsible AI systems and regulation." Information Fusion 99 (2023): 101896.

First Level: Prohibited AI Systems:

Under the Artificial Intelligence Act, unacceptable AI systems are those that may cause serious harm to individuals through unconscious manipulation of their awareness or the exploitation of their vulnerabilities, such as age or physical or mental disability, in a manner that distorts their behavior or weakens their decision-making capacity. This category also includes AI systems used for social scoring, which evaluate or classify natural persons or groups on the basis of their

social behavior when such scoring results in harmful or inappropriate treatment.

It further includes AI systems for biometric categorization, which classify natural persons according to sensitive or protected traits or characteristics, such as sex, race, political orientation, religion, or disability, or on the basis of inferring such traits or characteristics. It also covers AI systems used to assess the risks posed by natural persons or groups, whether to evaluate the risk of committing crimes or reoffending or to predict the occurrence or recurrence of an actual or potential offense on the basis of personal traits and characteristics, such as a person's location and the previous criminal behavior of natural persons or groups of natural persons.

In addition, this level includes AI systems used to infer a natural person's emotions in the field of law enforcement, as well as emotion-recognition technologies used in the fields of education and employment(31).

Second Level: "High-Risk" AI Systems:

They are so called because they affect the status and safety of fundamental human rights. However, their benefits may outweigh these risks, provided that the provider of the AI system fulfills several requirements, such as establishing and maintaining a quality management system that includes a documented risk management system, applying certain data governance and management practices, preparing technical documentation and registration, managing human oversight, and so on (Chapter III of the Artificial Intelligence Act). Among these systems are autonomous vehicles, surgical robots, recruitment through AI algorithms, law enforcement, migration and asylum management and border control, and arbitration (Novelli et al., 2024).

Third Level: Limited Risk AI Systems (Systemic Risks):

Chapter V of the Artificial Intelligence Act distinguishes between general-purpose artificial intelligence, whether or not it involves systemic risks, based on its capabilities and using the criteria

established by the European Commission in Annex XIII of the Artificial Intelligence Act. These systems involve "limited risks," such as AI systems that interact directly with people, including chatbots, or that generate synthetic content. This level only requires the implementation of transparency measures(32).

Fourth Level: AI Systems with Minimal Risk:

There are no binding provisions for AI systems with "minimal or no risk"; there is only the option of voluntarily applying codes of conduct under Article 95 of the Artificial Intelligence Act. These include systems for reporting threats, as well as AI systems used in video games or spam filters(33).

4/ Conclusion:

Advances in artificial intelligence have attracted considerable attention from both researchers and practitioners, revealing broad opportunities for its use in the public sector. At the same time, they have brought to light a number of technical and legal shortcomings arising from the use of algorithmic administrative decisions, particularly concerns relating to data privacy, algorithmic bias, lack of transparency, and the difficulty of accountability. This led us to examine mechanisms capable of reconciling the benefit derived from artificial intelligence capabilities, on the one hand, with the protection of the rights of individuals subject to algorithmic administrative decisions, on the other.

Accordingly, the following findings were reached:

- The Artificial Intelligence Act 2024/1689 constitutes the first European Union legal framework devoted to artificial intelligence and its risks. It is clearly based on classifying AI systems according to a risk-based approach. Under this classification, certain AI systems that pose prohibited risks are banned, while some "high-risk" AI systems are permitted, provided that they comply with a set of conditions and obligations in order to access the EU market. In addition, AI systems presenting limited and

minimal risks are subject to obligations or voluntary codes of conduct.

- 2- The Act seeks to establish approval and registration procedures that can enhance the transparency of AI systems used by public administration. Through our examination of its provisions, we concluded that several provisions deserve particular attention.

First, Article 52, which concerns transparency obligations for certain AI systems relevant to some public bodies, requires providers of AI systems to ensure that systems intended to interact with natural persons are designed and developed in a way that informs those persons that they are interacting with an AI system, unless this is clear from the circumstances and context of use. This may apply to public authorities that use, for example, interactive chatbots with citizens. Article 52 also requires users of emotion-recognition systems or biometric categorization systems to inform natural persons of the operation of such systems when they are exposed to them. This may apply to intelligent systems that make decisions concerning administrative applications, such as services related to migration applicants that seek to verify asylum seekers' information or confirm the absence of legal restrictions preventing this. However, it should be noted that the article exempts certain uses of these systems, particularly those related to crime detection and prevention, from the transparency requirement. Thus, transparency here is primarily concerned with informing affected individuals that they are interacting with AI systems rather than with procedural aspects. It also focuses more on decisions related to the granting of licenses than on other decisions, as these are less complex.

It should also be noted that the Act has taken an important step with regard to transparency and the provision of information. Article 13 states, "High-risk AI systems shall be designed and developed in such a way as to ensure that their operation is sufficiently transparent to enable providers and users to reasonably understand the system's functioning. Appropriate transparency shall be ensured in accordance with the intended purpose of the AI system, with a view to achieving

compliance with the relevant obligations of the provider and user." It is important to emphasize that this transparency requirement concerns the "operation" of the system, and that the level of transparency required is defined in relation to users. In other words, Article 13 does not address those who are subject to algorithmic decision-making but rather those who operate such systems, namely employees. This suggests the need for stronger transparency requirements benefiting individuals subject to algorithmic decisions.

Consequently, the Artificial Intelligence Act has taken an important step by offering more promising mechanisms for AI transparency and for ensuring legal accountability. However, from a technical perspective, developing the required privacy and transparency standards remains extremely difficult, especially in relation to highly complex pre-trained machine learning algorithms based on black boxes. Efforts to make black box AI systems explainable carry the risk of producing inaccurate explanations, in addition to the fact that it could potentially infringe the intellectual property rights of their developers.

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