

Legal Protection of Artificial Intelligence Algorithms in Algerian and Comparative Law

الحماية القانونية لخوارزميات الذكاء الاصطناعي في القانون الجزائري والقانون المقارن

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Abstract:

In the era of the Fourth Industrial Revolution, AI algorithms have emerged as strategic assets whose economic significance contrasts with their structural legal vulnerability. This study examines the inadequacy of traditional Intellectual Property regimes to protect the functional core of AI, highlighting the friction between proprietary confidentiality and transparency mandates such as the GDPR and the AI Act. This research evaluates the juridical efficacy of copyright, patents, and trade secrets within Algerian and comparative frameworks. While traditional IP offers only peripheral coverage, trade secrets have emerged as the *de facto* pragmatic standard. However, this paradigm is increasingly destabilized by new requirements for algorithmic accountability and the administration of justice. The study concludes by advocating for a hybrid governance model to balance private innovation incentives with the imperatives of public interest and fundamental rights. It further recommends that the Algerian legislator enact a specific trade secret law to address the current legal vacuum. Finally, the research anticipates the potential development of a *sui generis* legal regime capable of accommodating the evolving nature of Artificial Intelligence.

Keywords: Intellectual Property - Artificial Intelligence - Algorithm - Trade Secret - Personal Data- Algerian Law.

ملخص:

تتناول هذه الدراسة الحماية القانونية لخوارزميات الذكاء الاصطناعي، بوصفها أصولاً استراتيجية ذات قيمة اقتصادية عالية تقابلها هشاشة قانونية بنيوية. وتبحث الدراسة في قصور أنظمة الملكية الفكرية التقليدية، مثل حق المؤلف وبراءات الاختراع، في حماية الجوهر الوظيفي لهذه الخوارزميات، نظراً لاستبعاد المبادئ الرياضية من نطاق الحماية. وتبرز الدراسة كيف أضحي "السر التجاري" المعيار الواقعي الأكثر نجاعة للحفاظ على الميزة التنافسية للخوارزميات، لكونه يوفر حماية ذاتية غير مقيدة بمدة زمنية. غير أن هذا النموذج بات يواجه تحديات متصاعدة جراء موجبات الشفافية والمساءلة الخوارزمية التي تفرضها أطر تنظيمية حديثة مثل اللائحة العامة لحماية البيانات (GDPR) وقانون الذكاء الاصطناعي الأوروبي. كما تسلط الدراسة الضوء على التوتر القائم بين الحفاظ على السرية ومقتضيات قانون الإثبات لضمان حسن سير العدالة. وتخلص الدراسة إلى ضرورة إرساء نموذج حوكمة هجين يوازن بين تحفيز الابتكار وحماية الحقوق الأساسية، كما توصي بسن تشريع جزائري خاص بالأسرار التجارية لسد الفراغ القانوني الحالي، مع استشراف نظام قانوني خاص (Sui Generis) يستوعب الطبيعة المتطورة للذكاء الاصطناعي. الكلمات المفتاحية: الملكية الفكرية - الذكاء الاصطناعي - الخوارزمية - السر التجاري - البيانات ذات الطابع الشخصي - القانون الجزائري.

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Introduction:

The past decade has been defined by the advent of the Fourth Industrial Revolution, with Artificial Intelligence (AI) serving as its primary technological pillar. This innovation has profoundly transformed modes of production, communication, and complex problem-solving¹. However, this technology challenges the very foundations of law across all its branches, and most notably the traditional concepts of Intellectual Property. At the heart of this revolution lies the algorithm, which has evolved into a strategic intangible asset and a source of considerable commercial value for digital economy stakeholders.

Yet, a legal paradox persists: while the algorithm drives the digital economy, it is traditionally categorized as a mathematical principle. In accordance with intellectual property principles, notably the idea-expression dichotomy, it is considered part of the "public domain" (*libre parcours*)² and is thus ineligible for direct protection. This situation has led the World Intellectual Property Organization (WIPO) to initiate a global dialogue in 2019 on the necessity of adapting existing protection regimes to the specific nature of AI algorithms³.

The core of this study lies in the tension between the economic significance of the algorithm and its legal vulnerability. Consequently, the research problem may be formulated as follows:

How can the legal protection of AI algorithms, whose intangible and evolving nature challenges classical criteria of originality and technicality, be reconciled with the emerging requirements of transparency, explainability, and evidence mandated by contemporary regulatory frameworks?

This central inquiry leads us to examine whether current surrogate solutions provide sufficient legal certainty, or whether the insecurity arising from the interplay of heterogeneous regimes necessitates a structural legal reform.

To address this problem, we adopt an exegetical and analytical methodology. This approach is based on:

- A rigorous examination of national legislative frameworks (notably Algerian, American and French laws) and international instruments (European legislation, WIPO, etc.) to identify points of friction between the legal norm and the technological object.
- An analysis of legal doctrine and recent case law to understand how courts adapt concepts such as the "mark of intellectual contribution" or "trade secrets" to the specificities of AI.
- An assessment of the practical efficacy of protection mechanisms in the face of algorithmic transparency mandates and the fundamental rights of users.

The present work is structured into three primary axes:

- The Relationship between Artificial Intelligence and Algorithms: We shall define the key concepts and analyze the impact of Big Data technology as a catalyst that has transformed the algorithm into a strategic asset and reignited the debate over its legal protection.

- Forms of Protection under Intellectual Property Law: We shall evaluate the suitability of existing regimes to encompass algorithmic subject matter, specifically indirect protection,

via Copyright (software), the use of Patents subject to technical contribution requirements, and Trade Secrets, which are often favored for their lack of formalism and indefinite duration.

- Recent Legal Developments and the Transparency Challenge: Finally, we shall analyze the impact of new regulatory frameworks on trade secret protection. This section explores the interplay with the Law of Evidence, as well as the tensions arising from the transparency obligations imposed by the GDPR and the European AI Act.

Section I : Relationship between Artificial Intelligence and Algorithms

Since 2012, artificial intelligence has generated significant media attention due to the omnipresence of its algorithms in various areas of our daily lives⁴. However, the notion of "Artificial Intelligence" is not new; it dates back to the 1950s. This notion has evolved progressively until its boom in 2016⁵, "thanks in particular to the development of deep learning architecture, multilayer convolutional neural networks, whose learning is done from large volumes of data on intensive computing architecture, and more particularly Big Data"⁶.

But despite the role of other technologies from the fourth industrial revolution, such as Big Data, Machine Learning, and Deep Learning, in driving today's artificial intelligence, the media generally only talks about algorithms and data. Yet, the calculations are not performed by the algorithms, but by the programs that are executed on computers⁷.

This is what raises the following questions: What is artificial intelligence? What is its relationship with other digital technologies? What is an AI algorithm and what is its role? Why is the focus on algorithms and data in public and media debates on AI? And why is a dedicated legal protection for algorithms being called for?

A) Definition of Key Concepts:

It is necessary to define the two key concepts in this work, namely: artificial intelligence and algorithms. There are several definitions of these two concepts, but for the purposes of this work, we have chosen those that demonstrate the difference, if it exists, between the algorithms of today that are the basis of AI applications, and the classic algorithms that are the basis of computer programs as works of the mind protectable by Copyright since the late 1970s.

1-Definition of Artificial Intelligence:

To establish a rigorous legal analysis, it is first imperative to delineate the conceptual boundaries of Artificial Intelligence. This subsection explores the multifaceted nature of AI through a variety of authoritative lenses, moving from standard lexicographical definitions to the functional frameworks currently championed by prominent international organizations and regulatory bodies.

1-1- Lexical Definition:

From a lexicographical perspective, the Larousse dictionary defines Artificial Intelligence as: "A set of theories and techniques implemented to create machines capable of simulating human intelligence"⁸.

Similarly, the Cambridge dictionary delineates the concept as: "The use of computer programs that have some of the qualities of the human mind, such as the ability to understand language, recognize pictures, and learn from experience"⁹.

1-2-Definitions adopted by some international organizations:

- **The Council of Europe's Definition of Artificial Intelligence:**

In its AI glossary¹⁰, the Council of Europe defines AI as follows:

"A set of sciences, theories and techniques whose purpose is to reproduce by a machine the cognitive abilities of a human being. Current developments aim to be able to entrust a machine with complex tasks previously delegated to a human.

However, the term artificial intelligence is criticized by experts who distinguish between "strong" AI (who are able to contextualize very different specialized problems completely independently) and "weak" or "moderate" AI (who perform extremely well in their field of training). According to some experts, "strong" AI would require advances in basic research to be able to model the world as a whole and not just improvements in the performance of existing systems."

- **WIPO's Definition of AI in its First Conversation on IP and AI:**

In its conversation on IP and AI¹¹, launched in 2019, WIPO defines AI as follows:

"9. 'Artificial Intelligence' designates a branch of computer science that aims to design machines and systems capable of performing tasks that call upon human intelligence, with limited or no human intervention. For the purposes of this document, artificial intelligence generally equates to 'specialized artificial intelligence,' that is to say, techniques and applications programmed to perform individual tasks. Machine learning and deep learning are both part of artificial intelligence applications. Although the field of artificial intelligence is evolving rapidly, it is not certain that science will progress to higher levels of general artificial intelligence that is no longer designed to solve specific problems but to function in a wide range of contexts and tasks."

- **The Definition of an 'AI System' under the European AI Act:**

The European AI Act¹², established as the world's first binding legal text to regulate artificial intelligence, delineates an 'AI system' as follows:

'AI system' means a machine-based system that is designed to operate with varying levels of autonomy and that can, for explicit or implicit objectives, generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments;"

We note that all the texts cited above adopt a functional approach in their definition of Artificial Intelligence, and make no mention of "algorithms" out of a concern for technological neutrality required in legal drafting in the digital domain.

2-Defining the Algorithm: Lexicographical and Doctrinal Frameworks:

At the heart of the Artificial Intelligence revolution lies the algorithm, a conceptual object that requires precise delineation to distinguish it from the computer programs that ultimately execute its logic. The following analysis navigates the diverse characterizations of the algorithm, contrasting foundational lexical meanings with evolving doctrinal perspectives that increasingly recognize it as a strategic economic asset.

2-1-Lexicographical Delineation of the Algorithm

From a lexicographical perspective, the Larousse dictionary defines an algorithm as follows: "A set of operating rules whose application allows solving a stated problem by means of a finite number of operations. An algorithm can be translated, using a programming language, into a program executable by a computer"¹³.

In a complementary vein, the Cambridge Dictionary characterizes the term as: "a set of mathematical instructions or rules that, especially if given to a computer, will help to calculate an answer to a problem."¹⁴

2-2-Doctrinal Definitions of the Algorithm:

For many, "an algorithm is a set of instructions. This set is structured because the order in which the actions must be executed is fundamental"¹⁵. But for Sandvig, Hamilton, Karahalios, and Langbort¹⁶ : "An algorithm is the result of the formalization of a procedure which, once implemented in a computer program, can then be replayed indefinitely without intervention."

Furthermore, the Google portal defines algorithms as follows: "algorithms are computer programs designed to navigate through billions of pages, identify the right clues, and return the exact answer to your question."¹⁷

Finally, today, the term "algorithm" refers to a plurality of intangible creations developed by actors of the digital economy, notably the major digital platforms like Google, Meta, Amazon, TikTok, ...; whose business model is based on these algorithms.

What can be retained from all these definitions is that Artificial Intelligence is a branch of computer science; it therefore responds to the same programming paradigms; and that the algorithms at the base of this artificial intelligence, whatever their performance, can only be implemented if they are translated into programs, which are executed by computers; that is to say, with human intervention. As Ben Lorca and Mike Loukides¹⁸ would say: " it is very difficult to imagine a future where humans would no longer need to create software. But it is very easy to imagine that 'human in the loop' software development will be a large part of the future."

Also, the algorithms of Artificial Intelligence could not have known this boom without the invention of Big Data, as we will demonstrate below:

B) Artificial Intelligence and Big Data: Reassessing the Legal Imperative for Algorithmic Protection

As already highlighted, algorithms have always been at the base of computer programs, but the question of their protection by Law has never aroused so much interest. Hence the question about the causes of this renewed interest in the protection of artificial intelligence algorithms.

To answer this question, it is necessary to go back over the historical evolution of artificial intelligence and the boom it has experienced in the last ten years.

In fact, the concept of "artificial intelligence" dates back to the 1950s, but it evolved slowly until the early 2000s and more precisely in 2005, the year of the appearance of Big Data technology. It is thanks to this technology that AI has experienced a real boom, although the concept of "Machine Learning" dates back to the 1980s. The reason is that machine learning requires a large amount of data to process, and at the time, storage and processing were very expensive until recently¹⁹.

Thus, we can conclude that without Big Data technology, today's Artificial Intelligence could not have existed. These two cutting-edge technologies from the fourth industrial revolution are closely dependent on each other. They are linked by three essential elements, namely: Algorithms, Data, and Computing.

Therefore, "it is thanks to algorithms, which have developed thanks to the explosion of data and the reinforcement of IT tools induced by the Big Data revolution, that Artificial Intelligence has been able to become widespread"²⁰.

The use of the latter has also been democratized thanks to GAFAM²¹, who have made artificial intelligence algorithms the basis of their business models, before they were generalized in different fields of activity such as banking, finance, justice, security, etc.

It is clear that algorithms are no longer perceived as a simple mathematical principle, since they constitute an essential asset of considerable commercial value, especially for the dominant companies in the digital economy.

It is precisely for this reason that the debate around the need to protect algorithms has been revived, to the point of including this question in the dialogue opened by WIPO in 2019 on artificial intelligence and intellectual property.

Section II: Intellectual Property Frameworks for AI Algorithms: Navigating Copyright, Patents, and Trade Secret Protections

As a reminder, intellectual property: "is a generic expression covering, on the one hand, literary and artistic property and, on the other hand, industrial property. This traditional division essentially corresponds to the fields of action of the Paris Convention of March 20, 1883, for the protection of industrial property and the Berne Convention of September 9, 1886, for the protection of literary and artistic works."²².

This branch of Law therefore includes several types of protection for intellectual creations, such as: copyright, patents, trademarks, industrial designs, trade secrets, and geographical indications, etc.

But these different types of protection are based on a well-established principle, which consists of excluding ideas from their scope of application. Indeed, intellectual property does not protect the idea itself, but it protects the form in which the latter is expressed.

Furthermore, it is known that to this day, algorithms, as a series of elementary operations intended to solve a problem, are assimilated to mathematical principles, and that in accordance with national and international texts relating to intellectual property²³, they fall under the category of ideas of "free circulation," and therefore cannot benefit from direct protection by Intellectual Property Law.

So how do the designers of artificial intelligence algorithms, as they are conceived today, protect these assets of high commercial value?

In the absence of a specific legal regime for artificial intelligence in general, and for algorithms as an essential component of this intelligence in particular, the designers of AI algorithms and their experts have found in practice legal solutions based on the intellectual property regime, which allow for guaranteeing legal protection, albeit imperfect, for these intangible assets of high economic value²⁴.

A) Assessing the Efficacy of Copyright for AI Algorithms: Limitations of the Software Protection Model:

Even if AI algorithms seem more complex and different from the algorithms integrated into classic computer programs, they are still integrated into the source codes of computer programs intended to be executed by machines to achieve a specific result; and can thus indirectly benefit from the protection reserved for software by copyright, as established by national²⁵ and international²⁶ texts relating to copyright, provided they meet the originality criterion.

In classic copyright law, the computer program in which the algorithm is integrated must, like any other work of the mind, constitute: "an intellectual creation specific to its author," or "bear the imprint of its author's personality" to benefit from protection under copyright in accordance with the laws and early case law in the matter²⁷.

However, through its judgments rendered in 1986 and then in 2012, the French Court of Cassation proceeded to adapt the originality criterion to the specific nature of software, specifying that for the latter to benefit from protection, "its source code must bear the 'mark of the intellectual contribution' of its author"²⁸. In 2013, the same court clarified its position even further by stating that "the algorithms and functionalities of the software are elements not protected by copyright," and refused to recognize the act of infringement "in the absence of providing elements that would justify the originality of the software such as the lines of programming, the codes or the flowchart, etc."²⁹.

This case law reiterated a fundamental principle of copyright which consists of excluding ideas from the scope of protection; and it is on this basis that the algorithms and functionalities that form the basis of software are excluded from protection³⁰.

Thus, if it were possible to legally extract an algorithm from the operational core of protected software, the author of the extraction could reuse this algorithm with complete impunity, as the functionalities of the software, the programming languages, and the data files used by the software are excluded from the scope of protection by Copyright.

This is why the protection of algorithms integrated into computer programs by copyright proves to be imperfect; which has led the owners of algorithms to opt for other intellectual property protection regimes.

B) The Patentability of AI Algorithms: Assessing Indirect Protection and the Challenges of Public Disclosure

A priori, AI algorithms cannot be patented, as mathematical methods and computer programs are expressly excluded from protection by this intellectual property regime.

As stipulated in Article 7 of Ordinance 03-07 of July 19, 2003, relating to patents in Algeria³¹: "Art.7.- For the purposes of this ordinance, the following are not considered inventions: • 1° principles, theories, and discoveries of a scientific nature as well as mathematical methods; [...]"

In a similar vein, Article L.611-10 of the French Intellectual Property Code³² stipulates that 'mathematical methods' and 'computer programs' are ineligible for patenting, thereby ostensibly excluding algorithms a priori from the scope of patent protection. This principle is likewise enshrined in Article 52 of the European Patent Convention (EPC).³³

Nevertheless, international practice³⁴, largely inspired by American practice³⁵, seems to derogate from this legal principle. Today, many algorithms are indirectly patented either independently or integrated into computer programs; provided that the algorithm itself or the algorithm integrated into a computer program is integrated into a patentable invention and provides a technical contribution³⁶.

The European Patent Office has also considered that when an algorithm is integrated within a patentable invention, it can benefit from patent protection provided that it contributes to the "technical character of the patented method"³⁷.

Unlike protection under the copyright regime, when the algorithm integrated into an invention is detailed in the claims of a patent application, it is protected in the same way as the patented invention.

However, this mode of protection is also criticizable, due to its lack of adaptability to AI algorithms, which are meant to evolve based on the data provided to them, but also due to its cost, its cumbersomeness, and its limited duration of protection.

Furthermore, the patenting process necessitates the public disclosure of the algorithm, which risks exposing its internal configuration to competitors. This transparency represents a direct threat to the economic interests of major digital actors whose business models are fundamentally predicated on the proprietary performance of their algorithms. Consequently, maintaining strict confidentiality is imperative for safeguarding competitive advantages. For these reasons, proprietors of high-value algorithms increasingly rely on trade secret law as a pragmatic and efficacious legal framework to protect these strategic intangible assets.

C) Trade Secret Law Applied to AI Algorithms: Navigating the Tension Between Autonomous Protection and Regulatory Imperatives:

Today, algorithms represent for the operators of large digital platforms that pervade our daily lives, an intangible asset of very high commercial value, such as Google's search algorithms, or YouTube's recommendation algorithm, or those at the base of marketplaces like Amazon.

That is why, in the absence of specific protection for these algorithms, their owners opt for trade secrets as an alternative to intellectual property rights³⁸, even though this mode of protection is considered by WIPO as part of intellectual property³⁹.

Historically, the trade secret was first established by the American Uniform Trade Secret Act (UTSA) of 1979 (amended in 1985), which inspired the drafters of Article 39 of the WTO's TRIPS agreement in 1995⁴⁰, relating to the Protection of Undisclosed Information, and WIPO which considers it an Intellectual Property Right.

In May 2016, the "Defend Trade Secret Act" was adopted to amend the "Economic Espionage Act" of 1996⁴¹ by creating a federal right of action in case of fraudulent appropriation of trade secrets. The created right of action covers two aspects which aim to protect trade secrets both in the context of interstate commerce and in the context of foreign commerce⁴². This text has reinforced the protection of commercial secrets.

In the United States, trade secret protection encompasses a broad spectrum of information, including financial, commercial, scientific, economic, and technical data, without necessitating the disclosure of its utility. This stands in stark contrast to the patent regime, which mandates that such utility be demonstrated and disclosed within the patent application. Consequently, many inventors elect to safeguard their algorithms and other AI-related components through trade secrets to preserve their proprietary technological advancements.

Furthermore, the European Union adopted the European Directive 2016/943 of June 8, 2016, on the protection of know-how and commercial information⁴³, which was transposed into the domestic laws of the member countries, including France through law no. 2018-670 of July 30, 2018, relating to the protection of trade secrets⁴⁴.

These texts, which aim to protect strategic information for a company⁴⁵, all establish three cumulative criteria that information must meet to be protected as a trade secret. It involves: "information known by a limited number of people, which has a commercial value, effective or potential, because of its secret nature and which is subject to reasonable protection measures to maintain this secret character"⁴⁶.

In contrast to the legal frameworks previously discussed, the protection of trade secrets in Algeria lacks a dedicated legislative framework; instead, it is safeguarded through a fragmented array of legal provisions that address confidentiality indirectly. These include unfair competition law, intellectual property statutes, labor law, and contractual confidentiality covenants, as well as the Penal Code -specifically Section 7 bis- which pertains to offenses against automated data processing systems⁴⁷.

Furthermore, when compared to traditional intellectual property regimes, trade secret protection affords self-contained and autonomous legal coverage to the targeted information. It is

exempt from formal registration requirements and offers an indefinite temporal scope of protection, provided the information remains confidential.

This framework also empowers organizations to maintain the non-disclosure of strategic assets during litigation and to seek legal remedies and damages for the illicit acquisition, use, or disclosure of such information. Notably, trade secret law is unique in that it contains no statutory requirement stipulating that the protected information must be of human origin.

Within the specific context of algorithmic systems, trade secrets have emerged as the preeminent and most pragmatic protective mechanism favored by digital stakeholders. To qualify for such protection, an algorithm must satisfy three cumulative criteria:

- It must be known only to a restricted circle of individuals;
- It must possess actual or potential economic value derived specifically from its clandestine nature;
- It must be the subject of reasonable protection measures implemented to preserve its secrecy.

While the first two criteria are relatively straightforward to demonstrate in a commercial setting, the third requirement is the most demanding, as it necessitates that the algorithm's owner implement a robust technical and legal infrastructure to prevent any unauthorized or illicit use. This typically involves a combination of technical barriers to prevent reverse engineering and rigorous internal protocols regarding the access and circulation of information.

This entails a multifaceted framework integrating technical safeguards -designed to preclude third-party comprehension of the algorithm- with robust legal instruments⁴⁸. These tools include non-disclosure and non-compete agreements, alongside stringent internal protocols governing data access and circulation⁴⁹, such as confidentiality charters and comprehensive employee awareness initiatives.

While trade secret protection undeniably serves as a strategic asset for enterprises whose algorithms yield a competitive advantage, this protective paradigm simultaneously introduces substantial risks. Beyond the inherent risk of reverse-engineering -a practice expressly authorized by trade secret statutes, notably in the United States- the opacity induced by such secrecy may precipitate significant litigation risks. These include allegations of anti-competitive behavior or lawsuits concerning algorithmic manipulation, both of which can entail exorbitant costs and inflict severe reputational damage upon the firm⁵⁰.

Consequently, although the trade secret appears to be the most appropriate regime currently available for safeguarding AI algorithms, it remains an imperfect solution. This underscores the necessity of revitalizing the discourse surrounding algorithmic protection, as emphasized in the WIPO dialogue on AI and Intellectual Property, particularly in light of recent advancements in personal data protection and the evolving regulation of artificial intelligence.

Section III: Contemporary Legislative Developments and Emerging Challenges in AI Algorithmic Protection

The trade secret is, to date, the most appropriate legal regime for the protection of intangible assets of digital actors, including AI algorithms. However, this regime is neither absolute nor a shield against legal principles and obligations; such as the Law of Evidence, and the legal texts recently adopted in response to the new legal challenges related to the evolution of digital technologies from the fourth industrial revolution⁵¹. This includes in particular the legal texts relating to the protection of personal data, such as the European GDPR, and the first binding legal text on Artificial Intelligence, namely the European regulation on AI (AI Act).

A) Trade Secrets Under the Scrutiny of the Law of Evidence: Judicial Reconciliation and Proportionality

In American⁵², European⁵³, and French⁵⁴ jurisprudence, an inherent friction persists between the preservation of trade secrets and the mandates of the Law of Evidence. Evidentiary requirements may necessitate the disclosure of protected commercial information—whether an AI algorithm or other proprietary data—provided that such disclosure is deemed essential and proportionate to the objectives of the proceedings⁵⁵. Consequently, the judiciary is tasked with the complex reconciliation of trade secret confidentiality with the broader imperatives of the administration of justice⁵⁶. While structural similarities exist across these legal systems, American law often maintains a strong focus on the protection of commercial secrets, whereas European and French law place a definitive emphasis on the principles of proportionality and legitimate interest,. This distinction is vividly illustrated by recent French case law, which reaffirms the necessity of a balanced judicial approach in the digital landscape. (Court of Cassation, civil, Commercial Chamber, February 5, 2025, 23-10.953⁵⁷; and Court of Cassation, civil, Commercial Chamber, June 5, 2024, 23-10.954⁵⁸).

Regarding Algerian law, and in the absence of a specific text on trade secrets and case law on the matter. The administration of justice remains subject to the general rules of the Law of Evidence.

B) The Interplay between Trade Secrets and Emerging Digital Regulations:

Recent legal texts aimed at reducing fears of an anarchic development without ethical safeguards of Artificial Intelligence, the risks of increased algorithmic biases and infringements of privacy and reinforcement of the monopolies of Big Tech; also undermine the trade secret. This notably includes legal texts relating to the protection of personal data, such as the European GDPR, and the first binding legal text on Artificial Intelligence, namely the European regulation on AI (IA Act).

1- The Conflict between Algorithmic Confidentiality and Personal Data Protection Mandates:

The protection of AI algorithms by trade secret also clashes with new legal developments induced by the mass processing of personal data by AI systems and its impact on citizens' privacy⁵⁹. This notably includes the General Data Protection Regulation (GDPR)⁶⁰, adopted by EU members in 2016 and which came into force in 2018. This regulation, which has been transposed into the laws of European countries, and has inspired many foreign legislators, including the Chinese⁶¹ and Algerian⁶² legislators, aims to strengthen the rights of individuals over their personal data by

recognizing, in particular, rights of access and information including the provision of meaningful information about the logic involved by the controller (Art. 15 and 22 of the GDPR). And it is precisely here that the main tension between the GDPR and the trade secret on AI algorithms lies, which consists of delimiting the border between meaningful information and a disclosure prejudicial to the trade secret.

European case law has to rule on this question, through the judgment rendered by the Court of Justice of the European Union (CJEU) in February 2025 in the *Dun and Bradstreet* case. In this case, the court mentioned the necessary balance between the right to information and access recognized by the GDPR to the data subject, and the right to trade secrets. The court considers that a controller cannot invoke trade secrets to refuse to provide meaningful information that allows a person to understand the logic of the processing and to contest it. It also specifies that this does not imply imposing on the controller the disclosure of the secret formula itself (the algorithm)⁶³.

2- Transparency Obligations Under the AI Act: Toward a Reconfiguration of Industrial Secrecy

On February 2, 2024, the European Union ratified a globally unprecedented legislative framework to regulate Artificial Intelligence, known as the AI Act. By adopting a risk-based approach, the AI Act mandates transparency obligations for algorithms that scale proportionally with the risk level of the AI system and its potential impact on individuals. Consequently, as the magnitude of this impact intensifies, disclosure requirements become increasingly stringent. These requirements encompass a broad spectrum of compliance measures, ranging from fundamental information regarding AI interactions to comprehensive technical documentation and the automated generation of activity logs throughout the entire lifecycle of high-risk AI systems.

With the entry into force of the AI Act in 2026, it is probable that the EU will require the disclosure of the functioning of innovations in AI, classifying them as presenting a limited or high risk. This will have the consequence of making the protection of trade secrets inapplicable in certain cases. This will require the establishment of clear guidelines to define what constitutes a trade secret in the field of AI, and the obligations of the parties involved in the development of AI systems, in order to guarantee equitable protection for the intangible assets of companies, without hindering innovation in this domain.

Conclusion:

In conclusion, this study has addressed the central problem regarding the viability of current intellectual property regimes in the face of artificial intelligence algorithms. While AI has established itself as the engine of the Fourth Industrial Revolution, analysis demonstrates that the traditional legal framework struggles to offer direct and comprehensive protection for the strategic assets that underpin it.

The research confirms that classical forms of protection are, at best, imperfect or indirect; copyright covers only the expression of the code without protecting its internal logic, while patents impose disclosure requirements and costs that are often incompatible with the agility and confidentiality required by these technologies.

In light of these shortcomings, trade secrets have emerged as the most viable alternative, offering autonomous protection without formal requirements and an unlimited duration, provided the information remains confidential and economically valuable. However, this protection is currently undermined by new algorithmic transparency requirements dictated by recent AI

regulations and personal data protection laws, as well as the necessities of evidence administration in court.

This situation highlights significant legal uncertainty, particularly in Algeria during its state-led digital transformation era. The absence of a specific law dedicated to trade secrets forces innovation stakeholders to rely on fragmented and indirect protections.

Consequently, it is recommended that the Algerian legislator enact a specific trade secret law to establish a framework precisely defining protected information criteria and reasonable protection measures. Furthermore, the legislator should regulate the law of evidence by introducing mechanisms that allow judges to reconcile trade secret protection with trial requirements based on the principles of proportionality and legitimate interest. Finally, updating the national data protection law is essential, drawing inspiration from international case law to define the boundary between the right of access to "processing logic" and the preservation of developers' intellectual property.

On a broader scale, to mitigate the legal uncertainty arising from the difficulty of coordinating heterogeneous legal regimes while preserving both fundamental rights and innovation, a hybrid approach is advocated for developers. Stakeholders should strengthen algorithm protection by implementing strategies that reconcile protection with regulatory and technical compliance. This includes documenting algorithms, providing clear explanations of their logic, conducting periodic compliance audits, and updating contractual documents and organizational procedures to ensure the continued secrecy of these strategic assets.

It is further recommended to encourage research into algorithmic explainability methods that satisfy transparency obligations while preserving confidentiality, to standardize explainability formats in accordance with legal requirements, and to supplement existing legislation with precise criteria defining what constitutes a trade secret within the specific field of AI.

Ultimately, the outcome of the dialogue initiated by WIPO or other international bodies could lead to the creation of a *sui generis* legal regime, capable of stabilizing the inherent tensions between private innovation and the public interest.

In summary, while current mechanisms provide a transitional form of protection, the future of the field lies in regulation capable of ensuring a fair balance between the economic interests of creators and the fundamental rights of users within increasingly digitalized societies.

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