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Intellectual Property Rights Crises in the Light of Digital Technology

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Abstract:

Due to the rapid technological development that the world is witnessing today, all areas of human activity, including law, have been affected, leading to the creation of a virtual space parallel to the real space. Therefore, intellectual property legal systems have undergone several changes to face the outcomes of technology implementation. Current theoretical research seeks to determine the extent to which current intellectual property systems are sufficient to ensure effective legal protection for digital works. It addresses two aspects of the crises in this digital era: the inability of copyright law to effectively and seriously protect digital works, and the inadequacy of the copyright system to protect software. This paper discusses the effectiveness of granting a patent for software by presenting the experiences of many leading countries in the field.

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Introduction

The primary safeguard and framework for human intellectual creativity in all of its manifestations, as well as a safety valve against all forms of aggression, are intellectual property rights. Rights serve as a catalyst for innovation and creativity, which are essential to the advancement of technology. They essentially consist of an influence relationship between them. The fact that new legal branches appear in response to each technological advancement does not, in any way, support the claim that technology is neutral and has no bearing on the law.

It is essential for nations to carefully craft laws regulating intellectual property rights, balancing the interests of the innovator or creator on the one hand and the interest of society on the other, if the primary goal of intellectual property rights is to protect human intellectual creativity, but it also has significant economic dimensions, especially with the orientation to the knowledge economy as an alternative to the physical economy.

According to their current provisions, these technical circumstances have caused a crisis for intellectual property rights because they are no longer able to organize and frame the entanglement of modern technology. As a result, the following forms are available:

To what extent are the current intellectual property systems sufficient to ensure effective legal protection for digital technology development?

This study's main goal is to highlight the shortcomings in copyright legislation that prevent it from providing adequate legal protection for digital works, one of the types of intellectual production brought about by digital technology. In addition to discussing a crucial issue, which is regarded as a new legal crisis for intellectual property rights, related to the copyright system's exclusive use to protect computer programs, which has limited innovation in this field at the national level, Algeria, as well as the Arab level, has drawn a conclusion regarding the requirement to approve, When the requirements for a patentable invention are satisfied, it is also covered by a patent.

We attempt to address the forms that are presented in two parts in order to accomplish these goals. In the first section, we examined the copyright system and digital works, weighing the necessity of modernization against the sufficiency of existing regulation. In the second section, we talked about the debate surrounding the invention's claim that computer programs should be protected and how slowly lawmakers have responded to this trend.

1. The Copyright System and Digital Works: Between the Adequacy of Regulation and the Need for Modernization

The emergence of the digital information environment, which was bolstered and expanded by the Internet, had a significant impact on the scientific and cultural fields, as authors have a strong tendency to publish their works in digital form due to two basic characteristics: ease of publication and rapid spread, which earn the author as well as his work wide fame and lower costs, but these privileges and benefits come at a cost. As a result, voices have emerged calling for the protection of intellectual property in the digital environment. However, how is this protection accomplished? Is it through an independent legal system or in accordance with laws governing copyright and neighboring rights?

Based on this trend, digital works are transformed into literary and artistic works. The copyright umbrella was chosen to protect these rights both nationally and internationally. Based on these facts and the unique technical characteristics of these pieces, we propose the following forms: Is the copyright system, as it currently stands, adequate to offer protection for digital works, or does it require updating?

We will try to answer this question through the following two elements, by defining digital works first, and clarifying the shortcomings in the copyright law regarding the protection of digital works in the second part.

1.1. The Concept of Digital Works

To assist with the discussion of the suggested forms, we briefly discuss the idea of digital works in this section of the study before moving on to demonstrate the divisions of these classifications that have been approved.

1.1.1. Definition of "Digital Works"

Technology has led to the emergence of what are known as "digital formats," and the definitions given to them have varied. This is due, in part, to the topic's novelty as well as its technical nature, there is no legal definition of it at the level of pertinent national legislation. Among the definitions chosen are those from the field of law, which classify it as any creative work of literature,

art, or science that is written in what is referred to as the binary or dual language (Rami, 2013). It is also known as "a mental product characterized by creativity and originality resulting from a digital environment formed by information technology," (Djilali, 2012) it can also be described in this way. As a result, the only distinction between digital work and traditional physical work is how it is shared with the public through the use of contemporary technological means. Or it could be that a digital language is used to express all types of intellectual innovation.

1.1.2. Types of Digital Works:

Different suggested divisions of digital works were made. Another juristic trend divided them according to the extent of their connection to the computer, into works linked to the computer so they could not be exploited in isolation from it and works that appeared with the advent of the Internet (Djilali, 2012). Some scholars categorize them according to their source into original and derived works.

Computer Programs: they have received more legal attention than other digital works because they are considered the first and most significant digital works. The Algerian legislator has also recognized computer programs as digital works covered by copyright protection under Article 4 of Order No. 03-05, related to copyright and related rights. But he made no attempt to get to know him. While the May 14, 1990 European Union directive on the protection of computer programs defined it as "a set of instructions directed to be executed by a computer by means of a computer, but it also includes elements that allow writing the instructions that make up the program," it also included elements that allowed writing the instructions that made up the program. While some legal theory attempts to define it as "a set of innovative ideas that take the form of data and instructions directed at the computer that lead to specific results that help the customer to implement the program," this definition is not entirely accurate. It is separated into transformational, source, and machine programs.

Databases: The Egyptian legislator defined databases in Article 1 of the Executive Regulations of the Third Book of Egyptian Intellectual Property Rights No. 28-8111 as "any data collection characterized by innovation in "Whether this data collection is a database or not, it reflects a personal effort worthy of protection, whether this data collection is a database or not." The Algerian

legislator did not provide an explicit definition of "databases". The compilation may be in language, code, or any other form as long as it can be stored on or retrieved by a computer or other electronic device. The American legislator section 101, on the other hand, defined it as "a work created by compiling and coordinating selected, prepared, or organized materials or data in a manner that renders the entire resulting work an innovative work. " In contrast, some legal doctrine describes it as "a method of organizing data in the form of a huge main file that allows dealing with data in a holistic manner that meets the different needs of the decision maker". (Taiseer Kilani, 2001)

Website or Multimedia Content (Douhaji, 2021): Websites are considered an "information system" by definition. A name or address that is familiar to it and contains data or services that can be accessed via a network, particularly the Internet (Abu Al-Ayal, 2014). As a result, the "content" of websites refers to the literary and artistic works that are contained therein and are capable of being protected by copyright. These works are essentially either physical works that have been converted to digital form or digital works by origin, such as books and electronic articles.

1.2. Deficiencies in the Copyright Law on the Protection of Digital Works

Websites are considered a "information system" by definition. Because these provisions are incompatible with the technical nature of these works, the Algerian legislator's attempt to subject digital works to the same legal protection established for physical works in terms of conditions and effects was unsuccessful and may result in numerous violations of the authors' rights to these works. Without addressing all of the provisions related to the terms of protection and their effects, we will attempt to pinpoint the weaknesses in the copyright law regarding the framing of digital works, which have grown to be of significant importance in the modern world, through this portion of the study. Regarding the protection of digital works under Algerian law.

1.2.1. Difficulty Applying Copyright Requirements to Digital Works:

Although it made reference to digital works' ability to be protected and subjected them to the same rules as physical works covered by copyright and related rights law, the Algerian legislator did not provide specific legal provisions for them. Therefore, unless two fundamental requirements—the condition of originality and

the condition of form, also known as the physical embodiment of the work—are satisfied, digital works are not protected. According to the legislative approach taken in Algeria, dropping these conditions in accordance with what is stated in the Law of Copyright and Neighboring Rights, which is subject to great difficulty, may strike at the core of the fundamental concepts of these two conditions. This will be demonstrated by the following two elements:

The Requirement for Originality in Digital Works:

It is necessary for a digital work to be original in order for it to be protected. The term "condition of originality" refers to the unique personality the author gives his or her work, which allows the work to stand out from other works of the same type (Mazouni, 2008).

In other words, even if it is simple, the work should demonstrate the author's effort and taste. The French judiciary took this stance in one of its decisions when it abandoned the idea of intellectual effort in favor of the concept of intellectual contribution. However, because digital works are machine-made, they cannot be subjected to a personal criterion. (Muhammad, 2018)

As for the position of the Algerian legislator, he considered, article 8 of ordonnance 03-05, that "the originality condition for digital works stems from the selection of their materials or the way they are arranged." As a result, creativity in digital works is expressed through the coordination, arrangement, and organization of information or data rather than through the content of these works, and this innovation must be the result of the database's creator (Muhammad, 2018). The objective standard that ensures the protection of the work itself "whatever the factors of its creation, whether material, subjective, or mental" can be said to have replaced the subjective standard used by the legislator to determine the originality of the work in this case (According to the objective criterion, a work is considered innovative if the author independently creates it and if certain amount of creativity is present. According to this perspective, the existence of two conditions—namely, that the work is not transferred and the minimum amount of creativity—enables the condition of originality to be met).

Requirement for the Physical Embodiment of the Digital Work:

The Algerian legislator, under Article 8 of Ordinance No. 03-05, stipulated the requirement for the physical embodiment of works by saying: "... and databases, whether they are reproduced on a support that can be exploited by a machine or any other form of exploitation."

Physical embodiment entails the work's being perceptible through touch or senses, breaking the protection circle for ideas. The form that the digital work takes is irrelevant because it only serves as proof of the work's existence. Even Although there is a difference between it and traditional physical works, the requirement of physical embodiment does not present any issues with regard to digital works.

1.2.2. The Difficulty of Projecting the Effects of Copyright Protection on Digital Works:

The author enjoys financial and moral rights over his creation for the duration of his life and for fifty years after his death, provided that the legal requirements outlined by the Law of Copyright and Related Rights in the Work are satisfied. However, given the technical nature of these digital works, this protection period is illogical because it is not consistent with the nature of digital works, which is characterized by rapid change, so it is desirable for the legislator to intervene by approving a protection period for these works that differs from that prescribed for traditional physical works.

Also of note is the fact that the Algerian legislator, despite the significant significance of this type of protection, which may outweigh the function of judicial protection, is content with civil as well as criminal protection for digital works, similar to that for physical works. Technical protection refers to any method, measure, tool, or element that attempts to prevent or restrict the unauthorized use of digital work while operating normally. There are two categories of methods:

- Methods that give the author the right to control his intellectual works and prevent others from accessing them
- Methods that allow the author to impose censorship on the uses that fall on his work.

This has led to the emergence of what is known as digital copyright piracy, which involves uploading or downloading activities done with the intent of using books of any kind for personal or commercial purposes without the author's permission and violating related rights, (Fatima, 2014). If the Algerian legislator has dedicated Article 12 of Law No. 09-04, which includes special rules for the prevention and control of crimes related to information and communication technologies, under the heading "Obligations of Internet Service Providers as an Aspect of Technical Protection," by stipulating that "In addition to the Obligations Stipulated in Article 11 Above, Internet Service Providers Must Do the Following:

1-As soon as they become aware, whether directly or indirectly, of their violation of the law, they must take immediate action to store or make access to the contents they have made available for viewing impossible.

2-Putting in Place Technical Measures that Permit Limiting Access to Information Distributors that Contain Content Offensive to Morals and Public Order while Also Alerting their Subscribers to its Presence:

If the Algerian legislator did not permit the private copy in digital works (computer programs, databases, etc.) and was content with approving the preservation of copy by the legal money of the work, which must destroy it, then other forms of significant import in relation to the special copy in digital works may be advanced. According to the European directive published in March 8109, each copy after the expiration of the exploitation period granted to it, and the legislator was the first to include an exception that would allow educational bodies, scientific research bodies, and cultural heritage bodies to use a special copy.

This is done to ensure that the public interest in empowering the general public with knowledge and technology and the private interest in knowledge are compatible.

2. The Dialectic of Protecting Computer Programs with Patents: The Legislator has Failed to Keep Pace with the Global Trend

To start, a computer program is defined as "an electronic system designed by a person called a programmer, associated with a broad base of knowledge in a field, and is used to carry out tasks typically performed by an expert using deductive reasoning " (Wasel, 2011) Through the data that was taught to him by the human being, and in light of the questions asked to him, he can give the solution or the answer in a rudimentary way.

2. 1. Diagnosing the Manifestations of the Software Pprotection Crisis in Algerian Legislation:

It was challenging to adapt computer programs in a specific legal way because of their dual nature (Ali, 2011), which places them at the nexus of literary and artistic property in terms of preparation and construction and the patent system in terms of their physical performance. Computer programs begin with text or a blueprint and end as a tool with a clear material impact. Due to this dual nature, there are conflicting legislative, judicial, and jurisprudential views on whether or not to subject computer programs to a particular legal system. While the majority of laws governing intellectual property rights, including Algerian law, subject computer programs to the system of literary and artistic property, some of them, like those in the United States and Europe, permit the possibility of further protection under a patent.

Under pressure from businesses involved in the software industry, developed nations' legislation, including that of the United States of America, they, along with the European Union, sought to approve protection for computer programs through the patent system. These businesses were primarily motivated by economic considerations when they demanded that the patent system apply to their innovations. The patent enables the inventor to monopolize the commercialization of his invention and grants him a defense against imitation as a way to maintain his exclusive right, which earns him financial rewards and makes up for the losses and expenses he incurred while putting this innovation into practice.

At the national level, the explicit exclusion of software from the purview of patentability under Article 8 of Ordinance No. 03-05 relating to patents has led to a crisis in software protection under Algerian law. This places it in the authorship category, which is an accepted practice based on the Berne Convention on Copyright, and as a result, these programs cannot take the description of the

invention even if its requirements are met. This could be a violation of the program's creator's rights, given that these programs enabled the accomplishment of many inventions as a result of the reduction in costs, effort, and time required to complete numerous tasks. In addition to the natural person, the human, and the legal person, we are now discussing artificial intelligence as a new category of legal person. Software releases have thus been forced into existence.

The demand to subject computer programs to the patent system and the copyright system, whenever the requirements for an invention are satisfied, results from the disparities between the two systems' differing levels of protection. As was discussed in the first section of this study on the protection of digital works, the author of a computer program is able to enjoy a set of material and moral rights over his work by fulfilling the requirements set forth by copyright law, those who the literary author, generally, enjoys.

According to European Directive, issued on May 14, 1991, related to the legal protection of computer programs, the Algerian legislator could have chosen to validate the rights enjoyed by the author of the computer program because of this author's unique characteristics. It was predetermined in establishing the exclusive rights given to the holder of the right to display or publish, and in governing contractual arrangements relating to the use of computer programs.

The legislator's strong interest in the moral rights of the author as opposed to financial rights is the primary contradiction between the rights granted to the owner of the program under the copyright system and those established by the patent. The situation changes, though, if this program is patent-protected, and this distinction is brought about by the fact that the patent relates to a physical object separate from the personality of the inventor embodied in the invention. In addition, the legislator places a strong emphasis on defending both the interests of the inventor and society, and this interest is embodied in the exploitation of the inventor. To create it by utilizing it, creating a new version of it, putting it on the market, and allowing everyone to profit from it. The close justification between the work and the author's personality, which gives the work a unique and special character, is what justifies the transcendence of the moral right over the material right in relation to literary and artistic ownership, which is not the case with other types of works. (Saleh, 2006)

As a result, the programmer has a moral claim to his creation, and some Algerian legal doctrine holds that this claim "has a prominent position in copyright, as it falls within the public's personal rights, and grants its owner significant powers." One of the privileges given to the author, the computer program, is the authority to claim authorship of the work, or the right to paternity, which gives the author the authority to demand that his name or a pseudonym, along with his position, be mentioned on the works' foundations (Kheira, 2016). Additionally, if changing, corrupting, or distorting the program would harm his reputation, honor, and legitimate interests, the legislator gave him the right to protect himself. The second authority given to the author is the right to make his work publicly available. This right is waived for the benefit of others, and it is given to the author's heirs after his passing (Art. 22 of Ord. N° 03-05). The right to repent (Art. 24 of Ord. N° 03-05), which is the right to stop producing the support that could have informed the work, is how the third authority is represented. That is, he had the right to stop producing the software or other means of communication for the work whenever he felt that "this intellectual achievement no longer matches his convictions. " (Saleh, 2006)

On the other hand, Article 4 of the European Directive recognizes the right of the owner of the computer program to reproduce it and all that it entails in terms of storage, preservation, and transmission.

According to Article 80 of Ordinance No. 10-10 related to copyright and related rights, which states that "the author has the right to exploit his work in any form of exploitation and to obtain a financial return from it," the author also has a financial right in addition to these moral rights. The rights to transmit the work, to present it to the public, and to take further action make up the bulk of this right.

2.2. The Search for a Solution to the Crisis of Software Protection Through International Experiences: American Legislation as a Model

Beginning with how the US federal judiciary has sought to distinguish between the program, which is restricted to mathematical algorithms that are not in and of themselves subject to protection because they are merely mental operation and the program as a new utilitarian patentable innovation This, because it satisfies all the objective conditions of the protected invention, will be the basis for determining whether the program is patentable. Unless the computer program is brand-new, beneficial, and innovative (35 U.S.C sect.101). the creator is not

entitled to legal protection. As a result, computer programs aren't eligible for patent protection under US law unless they qualify as an innovation-containing invention, which they do when they have a demonstrable technical impact.

Even though it is challenging to restrict the state of technology to the field of computerized information given the unique nature of this technological field, this program must also be new (35 U.S.C. sect.101.) meaning it should not be included in the previous industrial art. According to the general guidelines of the novelty clause in US patent law, the novelty of an invention is determined by taking into account the man of the art in the software industry. And if some Arab jurisprudence believes that the condition of novelty in a computer program can only be applied in the case of the program in its initial capacity when analyzing American legislation in its aspect related to the computer program, as a basic idea for the creation of the program, which can approach a kind of What is the concept of invention.

The rules of patents are “difficult to reconcile with the nature and content of computer programs.” (Wasel, 2011) In addition, the program must be counter-intuitive and unclear to the craftsman in the field of invention Inventive activity is estimated, like the condition of novelty, with regard to prior art.

The program's usefulness, or the fact that it is industrially applicable and does not violate public morals or order, as was previously stated, is the most crucial requirement that must be met. With regard to the attitudes that oppose granting the patent for this innovation, the significance of this condition lies in the fact that it was the primary justification for excluding computer programs from the patent's purview. In the past, the American legislator's position had changed from one that required the invention to have a material dimension to one that required utilitarianism. In accordance with the terms of the Paris Agreement, which did not restrict industry in the strictest sense, it is also explained from a different perspective, but rather extends to all areas of human intervention, including the newly developed technological fields.

By meeting these requirements, the applicant for protection of the computer program is entitled to the 20-year monopoly right granted to every inventor, regardless of the type of invention (35 U.S.C. sect. 271), starting on the date the application was filed. The inventor will be shielded from any kind of attack on the computer program during this time. In the event that the program is granted a

patent and the requirements for patentability are also satisfied, the program's patent holder has the right to sell the program as well as the platform on which it is installed.

Taking into account the uniqueness of computer programs in terms of assessing novelty, inventive activity, and portability, it is possible to implement the possibility of protecting computer programs under a patent in the Algerian legislation after removing the conditions for patentability specified under article 0 of Ordinance No. 10-10 related to patents for industrial use, in addition to the legal requirement that the program does not violate public morals, public order, or public health and habitat. It should be noted that the legality clause and the industrial applicability clause included in the national legislation are both incorporated into the expediency clause established by American law. If there is no technical contribution in the field of human activity, there is not the same possibility of copyright protection for the program.

Conclusion:

In this research paper's conclusion, we have come to present two aspects of the crisis that intellectual property systems are currently facing in light of remarkable technological advancement. Regarding the protection of digital works, it is illogical and out of step with the effort to achieve the public interest represented in empowering the public with technology and technical information, especially in terms of the duration of protection established throughout the author's life and the first year after his death. Additionally, despite the critical importance of this type of protection—which may even be more important than judicial protection—the legislator did not adopt a system of technical measures.

We also came to the conclusion that, given the significance of these innovations in the development of new inventions, we should not be content with the copyright system for protecting computer programs. Instead, we should approve protection for these programs under the patent system, when the conditions for patentability are met, and we should acknowledge the technical contribution requirement as an additional requirement for the possibility of the software being protected by a patent.

At the conclusion of this study, the following recommendations can be proposed:

-The Algerian legislator should intervene for individuals with digital works with a legal system independent of the copyright and related rights law, given the different legal nature of digital works from traditional physical works. Given that:

-Establishing criteria for identifying protected digital works

-Determining a legal period of protection that is compatible with the rapid change and modification of these works

-Adopting technical protection measures and activating legal systems to prevent fraud.

-Establishing an independent body whose mission is to ensure the respect and protection of intellectual property rights over digital works, combining technical and legal competencies specialized in the field.

-Opening the door for granting a patent for software, when the technical contribution requirement is met, given the important economic effects of investing in this field.

References

- Abu Al-Ayal, A. T. (2014). Civil Responsibility for Media Websites. *Damascus University Journal of Economic and Legal Sciences*, 443.
- Ali, M. H. (2011). Protection of Computer Programs by Patent Law in the United States of America. , *Sharia and Law Journal*, 119.
- Djilali, A. (2012). *The Crisis of Intellectual Property Rights*, . Algeria: Dar al-Khaldūniya for Publishing and Distribution.
- Douhaji, H. (2021). Definition of the Digital Worker in the Legislation of Algeria and Morocco: An Analytical Study of the Laws of the Two Countries. *Journal of Judicial Jurisprudence*, 959-974.
- Fatima, B. (2014). The Legal Framework for Fighting Intellectual Piracy. *Journal of Enterprise and Trade*.

- Kheira, M. (2016). The duality of protecting computer programs with the copyright and patent system, and the position of the Algerian legislator on it. *Journal of Economic Law*.
- Mazouni, K. (2008). *The Digital Network and Its Relationship to Intellectual Property*. Al-Azaritta: Dar al-Jami'a al-Jadida.
- Muhammad, H. A. (2018). Legal Protection Problems for Databases - A Comparative Study - . *Journal of the Kuwait International Law College*.
- Rami, I. H.-Z. (2013). *Digital Publishing of Works and Its Impact on the Literary and Financial Rights of the Author*. Jordan: Wael Publishing House.
- Saleh, F. Z. (2006). *ELkamel in algeria commercial law: Intellectual Property rights: Industrial and Commercial Property Rights- Literary and Artistic Proprty Rights*. Oran: Ibn Khaldoun.
- Taiseer Kilani, M. K. (2001). *Al-Kilani Dictionary of Computer Terms*. Lebanon: LEbanon Library.
- Wasel, M. (2011). Legal Protection of Computer Programs "Electronic Works". *Damascus University Journal of Economic and Legal Sciences*.