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**NEW FRONTIERS IN INTELLECTUAL PROPERTY
AND ARTIFICIAL INTELLIGENCE IN EUROPE**

Abstract. *This article highlights the most important innovations in the field of application of Artificial Intelligence to law, such as copyright, intellectual property and other sectors. In this context, particular attention is paid to the proposal for harmonized regulation within the European Union that proposes standard rules to be shared with the various private operators in the specific field. An in-depth analysis is made of the Dabus case that has raised the question of whether or not the creation of an artificial intelligence system can be patented. The question was decided negatively by the European patent authority and also in other legal systems such as America, England, China and others that followed the same approach unlike Australia and South Africa. Finally, the most important innovations in the sector are analyzed after the introduction of the European laws Digital Service Act (DSA) and Digital Market Act (DMA).*

Summary. 1. Artificial Intelligence and intellectual property: open questions; 2. Dabus case as a first example of a request for patentability of the creation of the artificial intellect; 3. Proposal for legislative harmonization on AI in the context of European Union; 4. Digital Service Act (DSA) and Digital Market Act (DMA): which innovations have European laws introduced; 5. Conclusions.

Keywords: *intellectual property, artificial intelligence, copyright, patents, EPO, UPC.*

1. Artificial Intelligence and intellectual property: open questions.

New technologies are increasingly present in various areas of human action, including the world of intellectual creations. The use of Artificial Intelligence (AI) technologies can generate data or entities that can be subject to autonomous protection of rights. From this evolution new questions have arisen that occupy the attention of the various scholars in Europe and beyond².

One of them is can AI be the holder of a patent or copyright or not. The answer is fundamental because on the basis of it you can recognize or not important rights in favor of artificial intelligence³. This question, in addition to the legal aspects, involves a series of assessments in the field of civil and criminal liability, as well as on the ethical front⁴. In this context, there was a Dabus legal case that raised these issues at the level of EU legislation and beyond.

² Anselmi N., Olivi G., on Italian Agenda Digitale, 2019-2021, available in: <https://www.agendadigitale.eu/mercati-digitali/intelligenza-artificiale-e-proprietà-intellettuale-le-questioni-aperte/>, last consultation 23.08.2022.

³ Caso R., The conflict between copyright and scientific research in the text and data mining discipline of the Digital Single Market Directive, Trento LawTech Research Papers, nr. 38, Trento, University of Trento, n. 2/2020, pp. 118-126.

⁴ Borghetti D., IntelligentIA, ed. Lektos, 2022, p. 5-225.

Other important aspect concerns, for example, copyright⁵. The AI technologies are mainly made up of software: it is no coincidence that for this reason AI systems are often referred to as "super software". The software as such is traditionally protected by copyright law. However, the protection offered by copyright with respect to software extends only to those elements that are the result and expression of the author's creativity⁶. In this sense, therefore, the protection offered by copyright extends only to the source code of the software, created by the author who in this case coincides with the programmer. Instead, the algorithms on which the predictive and computational capabilities of an AI technology are based would remain abstractly excluded from the copyright protection.

Another example to consider is patents protection. The Italian legislation on patents protection is represented by Legislative Decree no. 30/2005 which constitutes the "Industrial Property Code"⁷. The Article 45 of the Italian Industrial Property Code provides that software as such and mathematical methods cannot be considered as inventions and are therefore not patentable. Therefore, an algorithm as such, being abstractly mathematical in nature, is not patentable. However, a method involving the use of an algorithm may be patentable, as long as it is used to solve a technical problem. It should be considered that the Italian legislation must be integrated with the European one on patents protection law.

European Patent Office (EPO)⁸ which, at the outcome of the conference held on May 30, 2018 – emblematically entitled "Patenting Artificial Intelligence" – integrated the guidelines for the examination of patent applications with an appendix specifically dedicated to Artificial Intelligence. The EPO admits the patentability of inventions made with AI systems in the presence of some fundamental conditions. First of all, the invention must have a technical character, that is, it must have characteristics that contribute to the solution of a technical problem (the exclusion of patentability for inventions coming from AI technologies aimed at solving problems of a commercial nature remains); moreover, the technical characteristics of the inventions must involve an inventive activity, that is, they must provide a contribution with respect to the state of the art. In addition, the patent application concerning an invention developed by AI systems must respectively meet the requirements of clarity of sufficient disclosure, in the sense that any expert in the field, starting from the reading of the patent application, must be able to implement the invention.

From these brief considerations we can say that Artificial Intelligence (AI) is opening up completely new scenarios and posing questions in the world of intellectual property, not framed in the current regulatory framework, and with respect to which many jurists are questioning themselves with the aim of adapting existing law to these changes⁹. One of these questions is who is the author and the patent holder in the

⁵ See <https://www.ilprogettistaindustriale.it/la-proprietà-intellettuale-dell'intelligenza-artificiale/>, last consultation 23.08.2022.

⁶ Papa A., *Il diritto d'autore nell'era digitale*, ed Giappicchelli, 2019, pp. 3-185.

⁷ See on-line version in English language: <https://www.les-italy.org/cpi> or free version available on: <https://www.wipo.int/edocs/lexdocs/laws/en/it/it204en.pdf>.

⁸ See <https://www.epo.org/news-events/in-focus/ict/artificial-intelligence.html>, last consultation 23.08.2022.

⁹ Crawford K., *Neither intelligent nor artificial. The dark side of AI*, Bologna, ed Il Mulino, 2021.

case of inventions made by AI. Likewise, one might wonder who is entitled to the copyright for intellectual creations made by AI. I would like to give a concrete example to try to answer to some questions posed.

2. Dabus case as a first example of a request for patentability of the creation of the artificial intellect.

Stephen Thaler's "Dabus" case is the world's first attempt to gain recognition of the possibility that an intelligent artificial machine can gain the status of the inventor. After obtaining the registration of patents in Australia¹⁰ and South Africa, the case was submitted to the attention of the European Patent Office which denied registration as the formal requirements provided for by art. 81 of the European Patent Convention were not fulfilled. According to this reconstruction only a natural person can be an "inventor" and therefore the holder of the copyright and using of the creation. The decision was appealed and is awaiting review.

In November 2019, two patent applications were filed by Stephan Thaler – a computer engineer and general manager of the IT company Engines - at the European Patent Office. In the patent applications filed, "DABUS" was the first inventor. DABUS is an artificial intelligence system based on a mechanism of multiple neutral networks capable of generating ideas, modifying their interconnections. It was flanked by a second system of neutral networks that analyzed the consequences of these ideas and strengthened them with regard to forecasts.

The European Patent Office refused two patent applications on the grounds that in those applications an AI algorithm had been designated as the inventor. According to the European Patent Office, in particular according to the provisions of Art. 81 and Rule 19 of the European Patent Convention, the inventor must be a natural person and, consequently, the designation of inventor must contain a name, a surname and an address of the inventor¹¹.

An appeal was then lodged against the decision of the European Patent Office confirming the contested decision. On December 21, 2021, the Board of Appeal of the EPO rejected the appeal brought by Thaler, confirming the previous reasons and, in particular: that the invention must be a subject with legal capacity given that artificial intelligence lacks it; that the right cannot even be acquired by way of derivative since no right could be rooted in favor of it, nor could it be transmitted.

In the current legal system, a natural person naturally enjoys legal rights of "human being", and a legal entity enjoys rights on the basis of a legal "artifice" that allows him to have rights of a legal nature. However, an AI algorithm is neither a human being nor a legal entity and according to the current legal system can therefore enjoy

¹⁰ On July 30, 2021, the Federal Court of Australia issued the decision in which it recognized the patentability of the creations of the Dabus artificial intelligence system. The decision reads: *"In summary and for the following reasons, in my view an artificial intelligence system can be an inventor for the purposes of the act. First, an inventor is an agent noun; an agent can be a person or thing that invents. Second, so to hold reflects the reality in terms of many otherwise patentable inventions where it cannot sensibly be said that a human is the inventor. Third, nothing in the act dictates the contrary conclusions"*. Go on: *"first, that position confuses the question of ownership and control of a patentable invention including who can be a patentee, on the one hand, with the question of who can be an inventor, on the other hand. Only a human or other legal person can be an owner, controller or patentee. That of course includes an inventor who is a human. But it is a fallacy to argue from this that an inventor can only be a human. But it is a fallacy intelligence system, but in such a circumstance could not be theowner, controller or patentee of the patentable invention"*.

¹¹ Refusal decision taken on 27.01.2020 di EP18275163.

no rights. Identifying an ai system as an "inventor" would require, in essence, not only that we accept the fact that an AI system can be equated with natural persons, but the full recognition of legal rights to AI algorithms.

These issues require a broad and widespread debate regarding the moral, philosophical as well as legal aspects of the problem. The recognition of the legal personality of artificial intelligence would entail important consequences not only from a legal point of view, but also from a social and philosophical point of view. Not only our "anthropocentric" vision of law would therefore be changed, but also our relationship as human beings with the technology we create.

Also on the subject of the recognition of copyright for intellectual creations, the position of the various competent offices is therefore quite similar. To date, most countries share the position of the European Patent Office: USA, Japan, China, Korea, Germany, France, England have in fact expressed very similar positions regarding the rights of AI algorithms.

In fact, as has been mentioned, in addition to decisions within the EU, other states have had similar consequences. In America, the U.S. Intellectual Property Office, on the merits of copyright, said that *the Office will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author*¹². The High Court of Justice Business and Property Courts of England and Wales Patents Courts in 2020 in the Dabus case established that only one person can be an inventor at the patent office in accordance with the provisions of Sections 7 and 13 of the Patents Act.

These decisions are an important basis for assessing the evolution of new technologies applied to law. It seems that the time is not yet ripe in the states of the European Union, America and Asia to recognize the legal personality in favor of artificial intelligence systems with consequent application of the legal discipline of the sector. From an ethical point of view there is difficulty in conceptualizing that an artificial intelligence system can interact on an equal footing with the human being. This does not mean that we do not understand the importance of this evolution that will occupy the issues of the legal doctrine of the various legal systems in the near future.

3. Proposal for legislative harmonization on AI in the context of European Union.

Civil liability, ethics and protection of intellectual property rights in Artificial intelligence have been at the attention of the European institutions in recent years. It is important to mention the examples of the new frontier of the approach with respect to the problems described in the European context. Recently the EU Commission proposal for a Regulation¹³ laying down harmonized rules on artificial intelligence¹⁴ and amending certain Union legislative acts, COM (2021))¹⁵ seems to assign the utmost expectations to the standards as tools to ensure better governance and a balanced approach¹⁶.

¹² Compendium of U.S. Copyright Office Practices Chapter 300, S. 313.2.

¹³ Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union legislative acts, COM (2021) 206 def.

¹⁴ thereafter "AI Proposal"- Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence called Artificial Intelligence Act.

¹⁵ See <https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence>, last consultation 23.08.2022.

¹⁶ Coccia V., Civil liability, ethics and protection of intellectual property rights in artificial intelligence, in *Quotidiano Giuridico*, 2020, p. 66.

It's legal basis founded in Article 114 TFEU is thus likely to determine uniform and directly applicable constraints throughout the territory of the Union. Indeed, the Union interest is to preserve the EU's technological leadership and to ensure that citizens, firms, as well the whole society, can benefit from new technologies developed and functioning, according to the EU legal framework (above all fundamental rights and principles)¹⁷.

As in the other context of regulation on EU also in the proposal for an AI Regulation, the determination of standards with private actors is pivotal for more competition and freedom in the market¹⁸. Moreover, as far as ICT (Information and Communications Technology Industry) are involved and strictly connected with AI systems, reducing risk of lock-in on the demand side is essential. Due to the pervading feature of AI systems and tools, the EU legislator has proposed a legal framework inspired by risk analysis. It will be interesting to follow the evolution of the proposal to draw the first considerations and understand if the European proposal can become a model not only in the European context.

There have been several attempts at co-regulation in the EU area in the field of new technologies. For example, the AVMS Directive¹⁹, the Regulation P2B²⁰, the Digital Services Act²¹ and more generally in Data Strategy goals²². These initiatives follow the publication by the EU Commission on 19 February 2020 of the White Paper on Artificial Intelligence²³ and anticipate the legislative proposals that the Commission is expected to present in the first half of 2021. European regulatory interventions and proposals aim to promote innovation while preserving ethics and trust in new technologies, protecting the intellectual property rights of all stakeholders and defining a clear framework for the liability of the subjects involved.

The elements that guide the European legislator are those that can ensure the efficient exploitation of the benefits and prevention of possible misuse of AI systems²⁴. To avoid regulatory fragmentation in the European Union, it is essential to have uniform legislation, guided by ethical principles and adapted to future needs. At European level, the establishment of a horizontal and harmonized legal framework, based on common

¹⁷ Monica A., Regulating AI and the key-role of standard in the co-regulation of ICT: EU, Members States and private entities, in *Media Laws*, 3/2021, pp. 145.

¹⁸ A. Volpato, Controlling the Invisible: Accountability Issues in the Exercise of Implementing Powers By EU Agencies and in Harmonised Standardisation, in *Review of European Administrative Law*, 4, 2019, p. 82.

¹⁹ Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive), amended by Directive (EU) 2018/1808.

²⁰ Regulation 2019/1150/EU of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services.

²¹ Proposal for a Regulation of the European Parliament and of the Council on a Single Market for Digital Services (Digital Services Act) and amending Directive 2000/31/EC, COM (2020) 825 def. Actually, the proposal was adopted as a law.

²² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A European strategy for data, COM (2020) 66 def.

²³ See https://ec.europa.eu/info/publications/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en, last consultation 23.08.2022.

²⁴ Monica A., Regulating AI and the key-role of standard in the co-regulation of ICT: EU, Members States and private entities, in *Media Laws*, 3/2021, pp. 145.

principles, is essential in order to ensure legal certainty, establish uniform rules throughout the Union and effectively protect European values and citizens' rights.

The European approach²⁵ is such that the first basis will have to be represented by the common regulation, the second level will be formed by national legislation with a certain harmonization of the discipline. The third level, if the first two are not enough, will be represented by soft law. This way of proceeding recalls the idea of the "quality of regulation" rather than "quantity" and the most shared approach seems to be a winning way to proceed with the progressive regulation of new phenomena, linked to rapid technological evolution.

4. Digital Service Act (DSA) and Digital Market Act (DMA): which innovations have European laws introduced.

The European Parliament has recently²⁶ approved the Digital Services Act²⁷, a regulation that replaces and novates the previous liability regime for information society service providers, consisting of the E-commerce Directive²⁸. The stated purpose of that Regulation is to contribute to the proper functioning of the internal market for intermediary services by establishing harmonized rules for a safe, predictable and reliable online environment, facilitating innovation and in which the fundamental rights enshrined in the European Charter of Fundamental Rights, including the principle of consumer protection, are effectively protected.

The new regulatory framework applies to "information society services", these are entities that offer services at a distance, by electronic means, at the request of a recipient, "normally for remuneration". New rules on transparency, information requirements and accountability are introduced, largely transposing the jurisprudential guidelines that have already emerged over the years.

However, the exemption of liability for providers carrying out mere conduit, caching and hosting activities is maintained. However, the exemption of liability for providers carrying out mere conduit, caching and hosting activities is maintained. The provider of such an information society service is not responsible for the information stored at the request of a recipient of the service provided that the provider: (1) does not have actual knowledge of illegal activities or illegal content and, with regard to claims for damages, is not aware of facts or circumstances from which the illegal activity or illegal content is evident; (2) after obtaining such knowledge or awareness, act quickly to remove or disable access to illegal content.

The absence of a general obligation to monitor the platform for user activities is maintained, but some exceptions are introduced. The Digital Services Act requires: due diligence obligations for certain specific categories of brokerage service providers and new rules for implementation, enforcement, cooperation and coordination between Member States on digital services. Significant novelty is the introduction of a "scalar"

²⁵ Monica A., Regulating AI and the key-role of standard in the co-regulation of ICT: EU, Members States and private entities, in *Media Laws*, 3/2021, pp. 145.

²⁶ Following the adoption of the DSA at first reading by the European Parliament in July 2022, the text is to be adopted by the Council of the European Union. After adoption by the Council, the DSA will be signed by the Presidents of both institutions and published in the Official Journal. It will then enter into force 20 days after its publication in the Official Journal.

²⁷ See <https://www.consilium.europa.eu/en/press/press-releases/2022/04/23/digital-services-act-council-and-european-parliament-reach-deal-on-a-safer-online-space/>, last consultation 23.08.2022.

²⁸ EU Directive 31/2000, so-called "E-commerce Directive".

discipline with four categories of providers and a progressive increase in obligations, proportionate to the influence played, and the responsibilities placed on the platform due to belonging to one or the other of the specified categories.

Another novelty is the creation of new national bodies responsible for supervising the application of the DSA itself. The procedural framework underlying this body is defined in Chapter IV of the proposal. This figure is called the Coordinator of Digital Services, and will be responsible, in each Member State, to supervise the application of the DSA with respect to the platforms that have their main establishment in the respective Member State.

The Digital Market Act (DMA)²⁹, on the other hand, aims to ensure the absence of barriers to entry (contestability) of all online services. A general explanation of contestability and fairness has also been added. Contestability can also be damaged by an oligopoly of gatekeepers. In cases where cross-platform competition is not possible in the short term, competition within the dominant platform should be ensured.

Unfairness is defined as "an imbalance between the rights and obligations of business users where the gatekeeper gains a disproportionate advantage"³⁰. Importantly, this concept does not exclude free services, such as search results. In addition, gatekeepers cannot exclude or discriminate against businesses, an essential specification in light of the new default settings obligations, which allow users to choose their own search engines, virtual assistants and web browsers via a choice screen.

Similarly, gatekeepers will need to ensure that hardware and software are interoperable with third parties. However, it could take the strictly necessary measures to ensure that the provision of this interoperability does not harm the software and the device.

The text requires gatekeepers' app stores, search engines and social media to respect fair, reasonable and non-discriminatory access (FRAND) to their services for business users. A 'future-proof' clause has been added to address unfair practices that do not yet exist but could develop in the future. Gatekeepers should publish the general conditions of access to explain how the FRAND terms apply to their platforms, including an alternative dispute resolution mechanism. The EU executive will verify that the general conditions comply with the regulation.

A completely new requirement prevents gatekeepers from using the personal data of users using the service provided by a third party when that third-party service uses the gatekeeper's platform. The preamble to the rule clarifies the purpose: to prevent giants such as Google and Facebook from tracking users who have denied their consent when visiting websites that are part of their advertising networks. The regulation allows you to request consent to the processing of personal data only once a year. Advertisers will be able to access aggregated and non-aggregated data for the ads they serve. The data must be provided so that advertisers can analyze it with their tools.

At the time of designation, the gatekeeper will need to make sure that two people can exchange text messages, images, voice messages, videos, and encrypted files. Within two years, the same features will need to be interoperable for group chats. Interoperability will cover voice and video calls between individuals and groups by the

²⁹ See <https://www.euronews.com/next/2022/03/25/the-eu-s-digital-markets-act-what-is-it-and-what-will-the-new-law-mean-for-you-and-big-tec>, last consultation 23.08.2022.

³⁰See <https://www.jurist.org/features/2022/02/14/digital-markets-act-a-proposal-to-redefine-competition-laws-in-the-european-union/>, last consultation 23.08.2022.

fourth year. After receiving an interoperability request, the gatekeeper must provide interoperability within three months.

The approved text unlike the draft circulated to the public initially eliminated any reference to "ancillary" support services. Therefore, anti-bundling measures, to prevent gatekeepers from linking different services to each other, refer only to identification systems, payment systems and web browser engines. The text of the regulation provides that the European Commission facilitates the involvement of third parties and that it engages in regulatory dialogue and investigations into systemic non-compliance.

5. Conclusions.

The Dabus case has caused much discussion because it has brought a new issue to the attention of legislators and interpreters of the various legal systems: whether or not the artificial intellect can create and whether such creations are subject to copyright recognition. A particular and lively debate has been opened within the European Union which has taken an important position. This position has also been shared in other legal realities such as the USA, Japan, China, Korea, Germany, France, England ones.

The official position of the European authority on the patentability or not of creations by artificial intelligence systems is very clear. The EPO regarding the possibility that an AI system can be considered the inventor for the purposes of a patent application is that at present an AI system is not able to produce inventions without human intervention; the inventor is therefore a human being, and the European Patent Convention requires that the inventor designated in a European patent application be a human being.

From the practical cases analyzed we can draw the following conclusions: 1) rightsholders may only be persons because they have recognition of legal personality and legal capacity is granted only to natural and legal persons. Consequently, the inventor of a patent must be a natural person; 2) the principle that inventor is a natural person seems to be a standard applicable at the international level. The national courts of various countries of the world have issued decisions to this effect and also the national patent offices of the various countries have followed this approach; 3) the applicant for recognition of the patent right cannot circumvent the obstacle prohibiting the patentability of the creations of the AI system with the acquisition the rights of economic use from it. Consequently, artificial intelligence systems cannot appear as employees and much less use inventions or transfer the rights deriving from them. This means that one cannot replicate the general rule that in a corporate structure or research center the inventions discovered can be patented by the structure and not by the actual creator.

The role of harmonizing legislation in the field of intellectual property protection, especially in the field of new technologies such as AI, must be considered increasingly important. In fact, in this specific field, it would also be desirable to have more harmonized legislation both at European and international level. In this context, the process of introducing the new Unified Patent Court, which will be the competent forum for the resolution of patent disputes in the European context, seems more important than ever. The Unified Patent Court will have exclusive competence for the settlement of disputes in respect of both "classical" European patents and future Unitary Patents.

ABBREVIATIONS

AI – Artificial Intelligence;

EU – European Union;

EPC – European Patent Convention;
DSA – Digital Service Act;
DMA – Digital Market Act;
IPR – Intellectual Property Rights;
EUIPO – European Union Intellectual Property Office;
UPC – Unified Patent Court.

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