

NUEVAS TENDENCIAS EN EL DERECHO DE LA COMPETENCIA Y DE LA PROPIEDAD INDUSTRIAL III

Anxo Tato Plaza
Julio Costas Comesaña
Pablo I. Fernández Carballo-Calero
Francisco J. Torres Pérez
Sara Louredo Casado
(directores)

Autores

Belén García Álvarez
María Gómez Santos
Francisco Marcos
Vanessa Martí Moya
Eugenio Olmedo Peralta
Juliana Rodríguez Rodrigo
Alicia Armengot Vilaplana
Elisabet González Pons
María Flora Martín Moral
Ana Miranda Anguita

Marta Cernadas Lázare
Marcos Cruz González
David Fuentes Lahoz
Rafael García Pérez
Mónica Lastiri Santiago
Eduardo Miranda Ribera
Jorge Luis Ordellín Font
María Victória Rocha
Benjamín Saldaña Villoldo
Luz Sánchez García



COMARES

NUEVAS TENDENCIAS
EN EL DERECHO DE LA COMPETENCIA
Y DE LA PROPIEDAD INDUSTRIAL
III

ANXO TATO PLAZA
JULIO COSTAS COMESAÑA
PABLO I. FERNÁNDEZ CARBALLO-CALERO
FRANCISCO J. TORRES PÉREZ
SARA LOUREDO CASADO
(directores)

NUEVAS TENDENCIAS EN EL DERECHO DE LA COMPETENCIA Y DE LA PROPIEDAD INDUSTRIAL III

Autores

BELÉN GARCÍA ÁLVAREZ	MARTA CERNADAS LÁZARE
MARÍA GÓMEZ SANTOS	MARCOS CRUZ GONZÁLEZ
FRANCISCO MARCOS	DAVID FUENTES LAHOZ
VANESSA MARTÍ MOYA	RAFAEL GARCÍA PÉREZ
EUGENIO OLMEDO PERALTA	MÓNICA LASTIRI SANTIAGO
JULIANA RODRÍGUEZ RODRIGO	EDUARDO MIRANDA RIBERA
ALICIA ARMENGOT VILAPLANA	JORGE LUIS ORDELÍN FONT
ELISABET GONZÁLEZ PONS	MARÍA VICTÓRIA ROCHA
MARÍA FLORA MARTÍN MORAL	BENJAMÍN SALDAÑA VILLOLDO
ANA MIRANDA ANGUITA	LUZ SÁNCHEZ GARCÍA

GRANADA, 2022



El presente libro ha sido realizado en el marco del Proyecto de Investigación del Programa estatal de fomento de la investigación científica y técnica de excelencia «La reforma del Derecho de la competencia y de la propiedad industrial: armonización europea y codificación mercantil» (Referencia: DER2014-53956-P)

Maquetación:
Virginia Vélchez Lomas

© Los autores

© Editorial Comares, 2022
Polígono Juncaril
C/ Baza, parcela 208
18220 • Albolote (Granada)
Tlf.: 958 465 382

www.comares.com • E-mail: libreriacomares@comares.com
facebook.com/Comares • twitter.com/comareseditor • instagram.com/editorialcomares

ISBN: 978-84-1369-361-3 • Depósito Legal: Gr. Gr. 554/2022

Impresión y encuadernación: COMARES

SUMARIO

PRÓLOGO	IX
---------------	----

PRIMERA PARTE DERECHO ANTITRUST

1. LAS PLATAFORMAS AUDIOVISUALES DE <i>STREAMING</i> Y EL <i>BIG DATA</i> , <i>Belén García Álvarez</i>	3
2. LA CARA OCULTA DEL <i>REGULATORY SANDBOX</i> : EFECTOS ANTICOMPETITIVOS, <i>María Gómez Santos</i> ..	25
3. IDENTIFICACIÓN DEL PERJUICIO INDEMNIZABLE EN ACCIONES CONSECUTIVAS (FOLLOW-ON) EN CASO DE CÁRTELES: DE LA INFRACCIÓN (Y SANCIÓN) A LA COMPENSACIÓN DEL DAÑO, <i>Francisco Marcos</i> . . .	39
4. LA CIRCULACIÓN TRANSFRONTERIZA DE CONTENIDOS DIGITALES PROTEGIDOS POR DERECHOS DE AUTOR EN UN MERCADO ÚNICO DIGITAL INCOMPLETO, <i>Vanessa Martí Moya</i>	67
5. REDEFINIENDO EL ÁMBITO DE APLICACIÓN DE LA LEY DE MERCADOS DIGITALES: ¿A QUIÉN? ¿CÓMO? Y ¿PARA QUÉ?, <i>Eugenio Olmedo Peralta</i>	87
6. PODER DE MERCADO Y MERCADO DE REFERENCIA EN LA ECONOMÍA DIGITAL, <i>Juliana Rodríguez Rodrigo</i>	117

SEGUNDA PARTE DERECHO DE LA PUBLICIDAD Y COMPETENCIA DESLEAL

7. LA PREPARACIÓN DEL PROCESO CIVIL EN MATERIA DE COMPETENCIA DESLEAL. LA NECESIDAD DE UNA REGULACIÓN GENERAL SOBRE EL ACCESO A LAS FUENTES DE PRUEBA, <i>Alicia Armengot Vilaplana</i> ..	149
8. REFLEXIONES SOBRE LA PLANIFICACIÓN DE LA VIDA ÚTIL DE UN PRODUCTO COMO UN SUPUESTO DE PRÁCTICA COMERCIAL DESLEAL, <i>Elisabet González Pons</i>	169
9. LA ACTIVIDAD DE LOS INFLUENCERS Y SU ENCAJE EN EL ANTEPROYECTO DE LEY GENERAL DE COMUNICACIÓN AUDIOVISUAL, <i>María Flora Martín Moral</i>	185
10. HACIA UNA REGULACIÓN GENERAL DEL USO LÍCITO DE LA LETRA PEQUEÑA EN LA PUBLICIDAD, <i>Ana Miranda Anguita</i>	201

TERCERA PARTE DERECHO DE LA PROPIEDAD INDUSTRIAL E INTELECTUAL

11. EL ALCANCE DE LA EXCEPCIÓN POR FUNCIONALIDAD TÉCNICA Y LA ACUMULACIÓN DE DERECHOS AL HILO DEL CASO <i>BROMPTON</i> , <i>Marta Cernadas Lázare</i>	231
12. PROPIEDAD INTELECTUAL Y SECRETO DE LOS ALGORITMOS: ESTABLECIENDO LOS INCENTIVOS ADECUADOS, <i>Marcos Cruz González</i>	249

13. APROXIMACIÓN A LOS <i>TOKENS</i> NO FUNGIBLES Y SU PROBLEMÁTICA. ESPECIAL REFERENCIA A SU RELACIÓN CON LA PROPIEDAD INTELECTUAL, <i>David Fuentes Lahoz</i>	273
14. DERECHO DE MARCAS E INTELIGENCIA ARTIFICIAL: ¿HACIA UNA APRECIACIÓN AUTOMATIZADA DEL RIESGO DE CONFUSIÓN?, <i>Rafael García Pérez</i>	287
15. LA EVOLUCIÓN DE LA PROTECCIÓN DE LA MARCA EN EL ESPACIO DE NOMBRES Y SUS NUEVOS DESAFÍOS: LA NUEVA CLASE DE CYBERSQUATTING Y LA PROTECCIÓN DE DATOS PERSONALES, <i>Monica Lastiri Santiago</i>	301
16. LA UTILIZACIÓN DE LAS NUEVAS TECNOLOGÍAS EN DEFENSA DEL DERECHO DE OBTENCIÓN VEGETAL, <i>Eduardo Miranda Ribera</i>	329
17. DATOS UTILIZADOS PARA ENTRENAR SISTEMAS DE INTELIGENCIA ARTIFICIAL Y DERECHOS EXCLUSIVOS. ASPECTOS POLÉMICOS, <i>Dr. Jorge Luis Ordellín Font</i>	349
18. DECISÃO TOM KABINET: UM FORTE RETROCESSO DO ESGOTAMENTO DIGITAL NA UNIÃO EUROPEIA?, <i>Maria Victória Rocha</i>	359
19. EL DERECHO DE OBTENTOR DESDE EL NUEVO PARADIGMA DE LA PROTECCIÓN PROVISIONAL FIJADO POR EL TJUE. REFERENCIA A LOS PRODUCTORES SIN LICENCIA EX ARTÍCULO 95 DEL REGLAMENTO (CE) 2100/94, <i>Benjamín Saldaña Villoldo</i>	383
20. NEW CONCEPTS FOR A PATENT SYSTEM 4.0. THE ARTIFICIAL INVENTOR AND THE INVENTION CONCEPTION CONTRIBUTION TEST (ICC TEST), <i>Luz Sánchez García</i>	407

PRÓLOGO

La presente obra colectiva recoge la práctica totalidad de las comunicaciones admitidas y presentadas en el *III Congreso Internacional Carlos Fernández-Nóvoa: Nuevas tendencias en el Derecho de la competencia y de la propiedad industrial*, celebrado en la Facultad de Ciencias Jurídicas e do Trabalho de la Universidad de Vigo, los días 27 y 28 de septiembre de 2021.

Con la publicación de este tercer volumen, que se enmarca en las actividades desarrolladas dentro de los Proyectos de Investigación «*El Derecho de la Competencia y de la Propiedad Industrial: actualización, europeización y adaptación a la nueva economía*», financiado por el Ministerio de Ciencia, Innovación y Universidades y «*Retos para un mercado de trabajo equitativo y abierto a la competencia en el contexto de la nueva economía*», financiado por la Xunta de Galicia, se consolida una iniciativa que constituye un punto de encuentro, debate y reflexión para los investigadores españoles y extranjeros en el ámbito del Derecho de la Competencia y la Propiedad Industrial e Intelectual.

En el 2016, el Área de Derecho Mercantil de la Universidad de Vigo organizó el *I Congreso Internacional Carlos Fernández-Nóvoa*, con el objeto de realizar un homenaje póstumo y puntual al Profesor Carlos Fernández-Nóvoa por su inmenso magisterio, que sirviese como marco para la presentación del, por aquel entonces, número 36 de la revista *Actas de Derecho Industrial y Derecho de Autor (ADI)* editado en su memoria y, al tiempo, de foro para que sus discípulos directos, académicos y profesionales pudiesen disertar y exponer sus avances en un sector del ordenamiento jurídico en el que Don Carlos fue pionero en España y referente en numerosos países. La más que favorable acogida que tuvo entre los profesores e investigadores de las distintas universidades españolas y extranjeras, algunos habituales colaboradores de ADI, nos invitó a considerar la idea de darle continuidad a esta actividad científica, organizando con carácter bianual un Congreso Internacional bajo la «marca renombrada» Carlos Fernández-Nóvoa, e iniciar una serie o colección de publicaciones que a modo de Actas

del Congreso recogiese las ponencias y comunicaciones defendidas en el mismo por los participantes. Ambos eventos constituyen una excelente forma de transferencia del conocimiento desarrollado en la Academia, complementa la laborar que desarrollamos como actuales editores de ADI y contribuyen a consolidar el Área de Derecho Mercantil de la Universidad de Vigo como un referente y punto de encuentro para quienes desde las instituciones académicas y la abogacía investigan y trabajan en este campo.

Al igual que el Volumen I publicado en 2017 y el Volumen II publicado en 2019, esta obra *Nuevas tendencias en el Derecho de la Competencia y de la Propiedad Industrial III* es editada por Comares. Lleva el mismo título y presenta el mismo diseño que los dos primeros volúmenes con la pretensión de que muestre al público esa idea de ser una obra colectiva que forma parte de una colección, que acoge la investigación universitaria que se está realizando en las universidades principalmente españolas pero también foráneas en los ámbitos del Derecho de la competencia y de la propiedad industrial e intelectual.

Es por ello que este volumen III agrupa 20 trabajos doctrinales divididos en tres bloques temáticos. La primera parte reúne 6 estudios relacionados con el Derecho de defensa de la competencia o antitrust, la segunda agrupa 4 trabajos relacionados con el Derecho de la competencia desleal y la publicidad y, finalmente, la tercera 10 textos en los que se estudian cuestiones que se están planteando actualmente en el ámbito del Derecho de la propiedad industrial e intelectual.

El prestigio y la especialización de los autores, la actualidad de los temas que se abordan y el renombre de la editorial son indicios del alto valor académico y científico que presenta esta obra colectiva para profesionales, estudiosos e investigadores. Pero más allá de esta indudable utilidad, que el lector podrá comprobar y en su caso confirmar, este libro y la colección en la que se enmarca pretende ser un tributo permanente de los miembros del Área de Derecho Mercantil de la Universidad de Vigo a la memoria del maestro Carlos Fernández-Novoa, así como a las enseñanzas y magisterio de su primer discípulo, el Profesor José Antonio Gómez Segade, que continuó y engrandeció la Escuela gallega de Derecho Industrial.

La pandemia de COVID-19 impidió que el *III Congreso Internacional Carlos Fernández-Novoa: Nuevas tendencias en el Derecho de la competencia y de la propiedad industrial* pudiese celebrarse en 2020, tal y como estaba previsto inicialmente. No obstante, la citada pandemia no pudo evitar que el Congreso volviese, con más fuerza si cabe, en el 2021. La obra que el lector tiene entre sus manos constituye una excelente muestra de que, pese a que la pandemia nos ha golpeado —y sigue haciéndolo— con inusitada violencia, el esfuerzo y el talento de aquellos que firman sus páginas permanecen intactos.

LOS DIRECTORES DE LA OBRA
Vigo, diciembre de 2021

PRIMERA PARTE
DERECHO ANTITRUST

NEW CONCEPTS FOR A PATENT SYSTEM 4.0. THE ARTIFICIAL INVENTOR AND THE INVENTION CONCEPTION CONTRIBUTION TEST (ICC TEST)

PROPUESTAS PARA UN RENOVADO SISTEMA DE PATENTES 4.0. LA LLEGADA DEL «INVENTOR ARTIFICIAL» Y LA ADOPCIÓN DEL «INVENTION'S CONCEPTION CONTRIBUTION TEST» (ICC TEST)

LUZ SÁNCHEZ GARCÍA*

ABSTRACT: Advanced artificial intelligent systems are already capable of independently creating innovative and unpredictable outcomes, without any instructions. We have inventions that are fundamentally the work of artificial intelligent agents or, at least, they have participated significantly in them. This means that the existing Patent system will need to be completely overhauled. New tools will become necessary as existing ones cease to be suitable. The very term 'inventor' will have to be reinterpreted since its subjective scope is highly restricted and does not fit in with the emerging technologies. Hence, we propose the creation of a new category —Artificial Inventor— that should ensure innovation whilst fully respecting the new sources of inventions that are appearing. Different legal measures will be implemented to accurately cover the category of inventorship. We propose the adoption of what we call the Inventions' Conception Contribution Test» which will identify the degree of participation of every potential actor —human and artificial— engaged in the inventive process. We also suggest setting up a Register for artificial intelligent agents and at the same time a fund to manage their inventions appropriately.

KEYWORDS: Artificial Intelligence, Artificial Intelligent Agent, Invention, *Artificial Inventor*, *Invention Conception Contribution Test*, Patent Law

RESUMEN: Los sistemas avanzados de inteligencia artificial ya son capaces de alcanzar resultados innovadores e impredecibles, de forma independiente y sin instrucciones. En este sentido, existen invenciones que son fundamentalmente obra de agentes inteligentes o, en las que al menos, han participado de forma significativa. Esta circunstancia conduce a una necesaria revisión del actual sistema de patentes, debiendo acudir a nuevas herramientas en la medida en que las existentes dejan de ser adecuadas. El propio término «inventor» debe ser reinterpretado ya que su alcance subjetivo es muy restringido y no se adecúa a las tecnologías emergentes. Por ello, proponemos la creación de una nueva categoría —Inventor artificial— que garantice la innovación respetando estas nuevas fuentes creativas. Asimismo, proponemos la adopción de lo que hemos denominado Invention Conception Contribution Test, que permitirá identificar el grado de participación de cada

* Prof. Contratada Doctor (Int) Universidad de Murcia. Dirección de correo electrónico: luz.sanchez@um.es.

actor potencial —humano y artificial— que participe activamente en el proceso inventivo. También sugerimos la creación de un Registro de agentes inteligentes y al mismo tiempo un fondo para gestionar adecuadamente sus invenciones.

Palabras clave: Inteligencia Artificial, Agente Inteligente Artificial, Invención, *Inventor Artificial*, *Invention Conception Contribution Test*, Derecho de Patentes

CONTENTS: I. INTRODUCTION. II. CAN AN AIA BE CONSIDERED AN INVENTOR UNDER THE CURRENT PATENT SYSTEM? III. PROPOSALS FOR A NEW PATENT SYSTEM 4.0. 1. A new category of inventor: the Artificial Inventor. 2. The ownership of inventions produced —entirely or in part— by an AIA. The introduction of the Invention Conception Contribution Test (ICC Test). 2.1. *Inventions belonging to the creator of the AIA*. 2.2. *Inventions belonging to the AIA user*. 2.3. *Inventions belonging to the AIA*. 3. Creation of an AIA Register. 4. Creation of a fund to manage inventions generated —entirely or partially— by an AIA. IV. CONCLUSIONS. BIBLIOGRAPHY.

SUMARIO: I. INTRODUCCIÓN. II. ¿PUEDE UN AIA SER CONSIDERADO INVENTOR EN EL SISTEMA DE PATENTES ACTUAL? III. PROPUESTAS PARA UN NUEVO SISTEMA DE PATENTES 4.0. 1. Una nueva categoría de inventor: el «Inventor Artificial». 2. La titularidad de las invenciones generadas —total o parcialmente— por un AIA. La introducción del Invention's Conception Contribution Test (ICC Test). 2.1. *Invenciones pertenecientes al creador del AIA*. 2.2. *Invenciones pertenecientes al usuario del AIA*. 2.3. *Invenciones pertenecientes al AIA*. 3. Creación de un Registro de AIAs. 4. Creación de un fondo para la gestión de invenciones generadas —total o parcialmente— por un AIA. IV. CONCLUSIONES. BIBLIOGRAFÍA.

I. INTRODUCTION

Since time immemorial, machines have been built to carry out tasks, from the most basic —the use of natural energy— to the most complex —management of data and personal information—. Machines increase human capacities by adding speed or accuracy to the results, and they generally require energy consumption¹.

With the incorporation of techniques based on evolutionary genetics, molecular biology, neurology and human cognitive processes, we have reached the stage where we can talk about 'thinking machines'², which, on occasions, are even able to perform creative and innovative tasks³. The results they achieve are competitive with those of humans and can often be classified as patentable inventions⁴.

It should be noted that there are various levels in the development of these intelligent machines. There are agents who merely follow the primary algorithms installed by the programmer or user —who have previously described the task— and are not

¹ LATORRE (2019), pp. 27 onwards.

² See SEARLE (1980), *passim*; NEWELL and SIMON (1976), *passim*.

³ ROGEL VIDE (2018), pp. 12-14.

⁴ VERTINSKY and RICE (2002), p. 577.

able to act outside the scope of these algorithms [Weak Artificial Intelligence (AI)]⁵. Elsewhere, the aim is to go beyond agents that reproduce an intelligent action to those that actually think intelligently (Strong AI). Hence, some authors believe that some level of consciousness will come into play⁶. This would allow the creation of entities able to solve problems autonomously⁷, although today it can be stated that no intelligent agent is bestowed with consciousness, despite numerous attempts to create machine consciousness⁸. So, we can say that an intelligent agent, considered in isolation, lacks intentionality, i.e., its own will, which remains the quality of the person who creates the agent or of its user⁹. Finally, there is a third possibility to consider, that of a future AI, or 'Superintelligence' that surpasses human capabilities in all spheres, including scientific and artistic creation¹⁰.

Notwithstanding this categorization, what interests us here is the phenomenon of the '*Artificial Invention Age*'¹¹, in which human-machine collaboration is a key issue. Humans will detect and specify problems and the machines will simulate and evaluate possible solutions¹². Indeed, advanced AI systems are already able to produce innovative and unpredictable results independently and with no instructions¹³, and today we have inventions that are to all effects the creations of intelligent agents¹⁴.

In this sense, a part of the doctrine holds that '*machines have been autonomously generating patentable results for at least twenty years and that the pace of such invention is likely increasing*'¹⁵. In these scenarios, artificial intelligent agents (AIAs) cease to be mere tools at the service of humans and become the leading players in the inventing.

Even if AIAs are able to take autonomous decisions¹⁶, they are not moved by any intrinsic purpose, rather the decision to adopt a certain behavior will be guided by a creature endowed with a will; in this case a human.

⁵ BISHOP (2006), p. 138.

⁶ BRINGSJORD and SCHIMANSKI (2003), p. 892.

⁷ SOLUM (1992), p. 1264.

⁸ This possibility cannot be justified if there is no clarity about consciousness with regard to the human being. PUTNAM (1964), p. 669.

⁹ SEARLE (1980), p. 439. The author talks specifically about computer programs. In this concern, the will would reside in the programmer or the user of the program, be it the one who enters the information or the one who interprets the results obtained.

¹⁰ PEARLMAN (2018), p. 10.

¹¹ This term is used in MCLAUGHLIN (2018), p.8.

¹² PLOTKIN (2009), pp. 1 onwards.

¹³ YANISKY RAVID and LIU (2018), p. 2220.

¹⁴ ABBOTT (2016), p. 1080. The author calls them «*computational inventions*».

¹⁵ ABBOTT (2016), p. 1081; see also KOZA (2010), p. 251.

¹⁶ On the suitability of using the term «Artificial Intelligent Agent» instead of robot, see SÁNCHEZ GARCÍA (2018), pp. 58 onwards.

Thus, while technical decisions may be taken exclusively by an artificial entity —e.g., the choice of the most efficient solution to a technical problem in an inventive process— the initiative to solve a particular problem and the decision about its final execution must always be assisted or at least overseen by the person in charge of the AIA —the creator or the user, depending on the scenario— since this person can take into account the real impact of the solution proposed.

Thus, in order to protect a creation in which and AIA has intervened, it is necessary to ascertain its degree of involvement and that of the human on which it depends. Once this factual information is known, it is then necessary to discern whether legally these inventions can be subsumed under existing Patent Laws, which implies reviewing current categories, such as the condition of the inventor. This is the aim of this paper, in which we propose a multi-aspect reform. On the one hand, conceptually we propose the incorporation of a new category of inventor —the *Artificial Inventor*—¹⁷ and, on the other, procedurally, we suggest the creation of an AIAs Register, and what we have called the *Invention Conception Contribution Test (ICC Test)*¹⁸, as a means of suitably expressing the legal protection of this new reality under the new Industry 4.0¹⁹, in which machines are not only present in the production process but are also active parties in the invention process.

II. CAN AN AIA BE CONSIDERED AN INVENTOR UNDER THE CURRENT PATENT SYSTEM?

Some authors hold that robots —in our case, AIAs— will become more and more intelligent and autonomous until they reach the point where, in a few decades (2040-2050), there will be a '4th generation robots' that will surpass human capacities in all aspects²⁰. This phenomenon is known as 'technological singularity' and will enable machines to reach a level of intelligence where they will be able to reproduce or even improve themselves²¹. This hypothesis leads to the issue of the capacity of these agents to offer solutions to technical problems, either autonomously or in collaboration.

If this is the case, it is paramount to determine which subject can be considered the inventor. Art. 81 of the Convention on the Grant of European Patents of 5 October

¹⁷ This proposal is developed in section III.1.

¹⁸ Both proposals are developed in section III.2.

¹⁹ This term is closely linked to the so-called 4th Industrial Revolution, in which there is a clear leadership of machines based on their capacity to act in an autonomous way. In this regard, one of the main goals of this new Industry 4.0 is the establishment of a safe legal framework capable of solving the problems associated to these new technologies. On the concept of Industry 4.0, see among others, ZHOU, Liu, and ZHOU (2015), p. 2148

²⁰ MORAVEC (2000), *passim*.

²¹ KAPLAN (2016), pp. 148 onwards. This feature may bring negative consequences. Therefore, we must be careful with regard to the treatment granted to them since, otherwise, these machines could take control of everything that surrounds them. In this respect, see BOSTROM (2014), *passim*.

1973 (EPC) requires that the inventor be identified in patent applications. It is therefore necessary to check whether current, traditional patent regulations are sufficiently flexible to admit possible inventions by AIAs.

The EPC does not specify the concept of inventor, but merely determines who is legally allowed to apply for a European patent. EPC art. 58 states that *'a European patent application may be filed by any natural or legal person, or anybody equivalent to a legal person by virtue of the law governing it'*.

Despite there being no express legal reference to what may be understood by inventor, subsuming an AIA into this category is an arduous affair since the human factor seems to be present in the whole invention process as currently envisaged²². Thus, when EPC art. 60 attributes the right to a European patent to the inventor or to his or her successors in title, it does not specify who can enjoy that condition. However, it subsequently, hints at this when it speaks of inventions obtained at the same time and independently *'by two or more persons'* (EPC art. 60.2). A reading of this section points to the traditional conception of the legislator of the invention process, given the use of the term 'person' to refer to the main and sole actor in obtaining the invention. The following precept continues in this line of thinking when it envisages the possibility that a final judgment may recognize the right to a European patent to *'a person other than the applicant'*—European patent applications filed by non-entitled 'persons'— (EPC art. 61.1). Likewise, all precepts regulating application procedures and exploitation of the patent have been incorporated in accordance with the same logic, as they refer to both the applicant and the owner—when different—in their condition as 'persons'²³.

This is the approach that has been adopted by most European national legal regimes. As an example, the Spanish legal system reproduces almost verbatim under Patent Law 24/2015 of July 24 (SPL) (art. 10 and thereafter) the precepts envisaged in the EPC. Even more explicit is the Spanish Royal Decree 316/2017, of March 31st, which passes the Regulation for the Implementation of Law 24/2015, of July 24, of Patents (RELP) in terms of its orientation towards a substantially 'human' inventor. An example of this is art. 2.1 e) RELP when it establishes that the application for patent should contain, among other information, *'the designation of the inventor or inventors, including given name and family name or names'*. The human factor is also present in the regulatory requirement on the part of the inventor to renounce in writing a duly signed his or her right to be mentioned in the invention (art. 2.2 d) RELP). It is clear that this essentially human behavior, in terms of both will—the intention to renounce one's right—and execution—the act of signing a document—.

²² A similar analysis, but referring to the US legal system, is observed in VERTINSKY and RICE (2002), p. 586.

²³ An example of this is Art. 63.2 SPL when it says: *'the rights conferred by the patent do not extend to the acts relating to a product after it has been put into commerce by the person who enjoys the exploitation right established in the previous section'*.

In the light of the current regime and given the traditional concepts in our Patent system, there would seem to be no place for a non-human, artificial inventor. A broad interpretation of certain precepts would only consider AIAs as a mere party to the application. Thus, as mentioned earlier, EPC art. 58 allows any natural or legal person to apply for a European patent. Therefore, given that any entity with its own legal personality can be the holder of an exclusive right, an AIA, could only have access to this right if at some point it were to be granted the status of a legal person.

In this respect, the European Parliament (EP) intends to create, in the long term, a sort of specific 'electronic personality'²⁴ for more complex autonomous machines, but this is still at the proposal stage²⁵. For some authors, this proposed electronic personality would be interpreted as a digital legal personality, similar to the corporate legal personality recognized in Commercial Law²⁶.

There are two reasons, of a mainly historical nature, that lead to granting legal personality to certain entities. One is the need for their perpetuity, as was the case with certain religious orders or certain governmental entities. The other is the need for such entities to enjoy property rights and to be able to face possible losses that might occur during throughout their existence²⁷.

However, while the proposal may be successful, there are many arguments against it. The Open Letter to the President of the European Commission, Jean-Claude Juncker, on Artificial Intelligence and Robotics²⁸, signed by over 200 specialists in AI and robotics, leaders of industry and experts in Law, Medicine and Ethics from 14 different countries, highlights some unfavorable aspects. On the one hand, the Letter sets out that: *'A legal status for a robot can't derive from the Natural Person model, since the robot would then hold human rights, such as the right to dignity, the right to its integrity, the right to remuneration or the right to citizenship, thus directly confronting the Human rights. This would be in contradiction with the Charter of Fundamental Rights of the European Union and the Convention for the Protection of Human Rights and Fundamental Freedoms. It also states that: 'The legal status for a robot can't derive from the Legal Entity model, since it implies the existence of human persons behind the legal person to represent and direct it. And this is not the case for a robot'. It finally states that: 'The legal status for a robot can't derive from the Anglo-saxon Trust model also called Fiducie or Treuhand in Germany' because, apart from not solving the issue of liability,*

²⁴ See para. 59 of the European Parliament Resolution P8_TA(2017)0051 of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics [2017] OJ C252/25. <http://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html#title1> accessed 16 July 2019.

²⁵ Some authors describe this proposal as a historical milestone. In this regard, see DI VIGGIANO (2018), p. 93.

²⁶ ARANSAY ALEJANDRE (2018), p. 101.

²⁷ DAVIES (2011), p. 617.

²⁸ This letter is available in <<http://www.robotics-openletter.eu/>> accessed 27 March 2019.

it would still imply the existence of a human being as a last resort —the trustee or the fiduciary— responsible for managing the robot.

In any case, given that this EP proposal has not reached legal maturity and there is still uncertainty about its possible assumption by the European legislator (and, consequently, by national laws), and given that the recognition of such an electronic personality would allow the AIA only to access the rank of patent applicant, it makes sense to look for another way to resolve the possible qualification of the AIA as an inventor.

III. PROPOSALS FOR A NEW PATENT SYSTEM 4.0

1. A new category of inventor: the Artificial Inventor

As noted above, the current Patent system is designed primarily for human actors (natural persons) although the legislator may, on certain occasions, grant some rights to legal persons —e.g. the right to apply for the patent—. Since there is no consensus on the recognition of a specific personality for AIAs, *a priori*, these agents would be outside the legal framework envisaged for the protection of inventions by means of patent and, hence, so would all their results

However, this legal reality is not a reflection of what is actually happening. Thus, it is considered demonstrable that these entities are able to produce effects in society and, specifically, in the case in question, to participate actively in the invention process²⁹. For this reason, it is necessary to grant them an adequate legal treatment that allows them to be considered true participants in the obtention of inventions so that the outcomes have access to appropriate legal protection in tune with the advance of technological progress.

Thus, we start from the fact that the AIA is not currently considered to be a subject of Law; so, what condition do they deserve? There are those who assert that machines are things and as such, they cannot be considered persons or, therefore, subjects of rights, but rather objects of those rights³⁰. Starting then from this consideration as a ‘thing’, it remains to be determined how the legal regime articulates regarding the effects that the AIAs, as things, produce.

An illustrative example is the legal treatment given to animals, insofar as both categories —animals and AIAs— exhibit certain autonomy when they react to stimuli from the environment independently of any human control³¹. Indeed, nature has served as inspiration on countless occasions for human creations and, in the case of AIAs, the

²⁹ ABBOTT (2016), p. 1080.

³⁰ ROGEL (2018), p.17.

³¹ LEHMAN-WILZIG (1981), p. 448; SCHAEERER, KELLEY, and NICOLESCU, (2009), pp. 73 onwards. This argument has been discussed by other authors considering it insufficient to equate two entities of such a different nature, being one of «natural» origin and the other, as a human creation, «artificial». BERTOLINI (2013), pp. 227 and thereafter.

basis of their design often lies precisely in biological components, and not only in terms of their morphology, but also in terms of the design of the behaviors to be adopted in relation to the environment³². In addition, we cannot overlook the fact that, in both cases, both the animal and the AIA are capable of carrying out actions that have (positive or negative) *ad extra* repercussions. Therefore, although they —AIAs— are not expressly considered subjects of Law, their participation, in our case in the invention process, must, at least, be recognized by considering them 'Performance Imputation Centers' (PICs).

Continuing with this comparison, a concrete example that helps us to understand the AIA as a PIC would be, *mutatis mutandis*, the liability derived from the actions of pets when these cause damage to a third party. Under Spanish Law, art. 1905 of the Civil Code (CC) determines that '*the owner of an animal, or the one who makes use of it, is responsible for the damages caused, even if the animal escapes or is mislaid. This liability shall only cease in the event that the damage was caused by force majeure or by the fault of the person affected*'. Indeed, for this provision to be applicable, the animal must have acted independently (it is the autonomous and unconscious behavior of the animal that allows the liability to be imputed to its owner) and not stimulated by the owner to cause the damage³³. Hence, it would be necessary for the animal to have acted actively and independently.

With this in mind, and returning now to the case of AIA, we know that, within its margin of autonomy, it is capable of participating in the generation of new inventions. *A priori*, these inventions will have a positive impact on technological progress and, therefore, on society. Therefore, it will be necessary to take into account this positive action of the AIA in order to be able, later, to attribute the rights and duties deriving from the action. Thus, just as the legislator has determined that the owner of the animal is responsible for the acts independently committed by the animal, so in our case, it has to be established who, in the final instance, is the holder of the rights and obligations deriving from an invention in which the agent has participated.

This consideration of the AIA as a PIC could be reflected in the Patent system through the inclusion of a category different from the current condition of 'inventor', whose nature is radically opposed to that of the human being, but not for that reason negligible, which we could call '*Artificial Inventor*'. This condition would fall directly on the AIA —as something that produces effects— but not as a moral right of the machine, but rather as a formal requirement for the identification of the true center of imputation of the inventive activity deployed. This would enable the location of the actions —behaviors— that gave rise to the production of the invention and, ultimately, specify the human subject who supervised it.

³² ANDERSON and DONATH (1990), p. 146.

³³ BERGEL SAINZ DE BARANDA (2014), p. 379.

It is obvious that this proposal does not require the prior recognition of the legal personality of the AIA and yet, operationally, it would allow us to establish a firm criterion for the attribution of the rights and obligations related to the invention in which an AIA participates, and to the subjects that are associated with it. Likewise, the introduction of this new category of inventor would contribute to distinguish those natural or legal persons who are true inventors and who have actively participated in the success of the invention from those who only apply for the patent of the invention developed by the AIA. Therefore, and contrary to what might be thought *a priori*, this mechanism would reinforce the moral aspect of the condition of inventor, and would be reserved for those cases in which the subject in question really does participate in the outcome.

To this end, we intend to give a broad interpretation of the concept of inventor; that is, the possibility of understanding the condition of inventor in such a way as to accommodate those agents that are not natural. For this, it is necessary to redefine, or perhaps define for the first time, what is meant by inventor.

A first step is to go to Comparative Law. In the USA, under U.S.C. 35 Sec.100 (f) '*the term 'inventor' means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention*'. Beyond paying attention to the literality of the precept that focuses its attention on the 'individual'³⁴, understood as the natural person individually considered, our interest lies in the fact that to be granted such a condition there must have been participation in the '*conception of the invention*'³⁵, that is, adding some input in the definitive and lasting formation of the invention as a whole, and in the manner in which it is put in practice³⁶. Thus, an inventor will be considered as that person who contributes to the invention process³⁷. And, how does one do that?

In general, in order to obtain an invention, certain faculties are required, such as the performance of physical work, the ability to think or the competence to decide, to name but some. In this sense, a decision-making process is perfectly programmable, and today there are examples of this, such as autonomous cars, artificial doctors —diagnosis

³⁴ As reflected, when the US legal order uses the term «individual», it refers exclusively to the natural person in order to prevent corporations from being recognized as inventors. Although corporations cannot reach the status of inventor, they can be holders of the right to apply for the patent. ABRAMS, David S. and WAGNER (2013), p. 537.

³⁵ Manual of Patent Examining Procedure (MPEP), § 2137.

³⁶ See *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986) when it determines that the «*conception is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice*». See also, *Coleman v. Dines*, 754 F.2d 353, 359, 224 USPQ 857, 862 (Fed.Cir.1985).

³⁷ Art. 2164 U.S. Patent & Trademark Office, Manual of Patent Examining Procedure, 2014. <<https://www.uspto.gov/web/offices/pac/mpep/s2164.html>> accessed 20 March 2019.

of diseases—, etc.³⁸. So, the quid of the matter lies in answering the question: Who decides how to decide?

Today, AI is basically about optimized complex algorithms performing specific tasks; but it is humans who discuss in detail the casuistry of decision each subroutine³⁹. However, we also assume that an advanced AI could modify the algorithms inserted (e.g. an error function by the programmer)⁴⁰, in which case, the results of an AIA's action would become unpredictable. So, when the AIA is a key element in the development of the technical solution to a technical problem, it should be accepted as a possible real party in the inventive process, as long as the latter acts with some autonomy. This would imply that this agent not only understands the scope of the problem to be solved and the convenience of solving it, but also actively contributes to the formulation of the solution.

For all these reasons, we believe it is convenient and necessary to introduce a new category of inventor—the *Artificial Inventor*—that allows effective protection of the inventions in which an AIA has contributed in a real way. A further question will be the recognition of the rights and duties deriving from this protection, a task for which, in our opinion, it becomes essential to demonstrate the degree of participation, of both, the agent and of the other parties involved; a matter that will be addressed in the following section.

2. The ownership of inventions produced—entirely or in part—by an AIA. The introduction of the Invention Conception Contribution Test (ICC Test)

The incorporation of this new category of inventorship makes it possible to grant legal protection to inventions obtained by an AIA outside the public domain; otherwise, they would be deprived of the possibility of being patented⁴¹. Once the patentability of these inventions is permitted, it is necessary to determine who the owner of the invention is when an AIA has participated—be it collaboratively or autonomously—.

To solve this question some authors resort to techniques of economic analysis of the Law, specifically proposing the application of the 'Normative Coase Theorem' to distribute the patent rights efficiently⁴². This microeconomic proposition holds that aggregate wealth is maximized through transactions between companies where property rights are clearly allocated and transaction costs are zero⁴³. In this way, if, by means

³⁸ LATORRE (2019), p. 133.

³⁹ LATORRE (2019), p. 207.

⁴⁰ LATORRE (2019), p. 205.

⁴¹ A temporary monopoly (as a patent is) is the most beneficial way to establish property rights over an invention. See SÁIZ GONZÁLEZ (1995), p. 28.

⁴² SCHUSTERS (2018), «Artificial intelligence and patent ownership», p. 1949.

⁴³ SCHROEDER (1998), p. 527 citing CALABRESI (1968), p. 68 ('if one assumes rationality, no transaction costs, and no legal impediments to bargaining, all misallocations of resources would be fully cured in the market by bargains').

of a specific and precise legislative proposal, a clear definition of property rights were established—in our case, it would be a question of designating the potential holders of the right to patents—, negotiation between the interested parties would be facilitated, thereby eliminating—or at least minimizing— transaction costs⁴⁴. In this sense, an efficient proposal for the attribution of the right to the patent on an invention obtained by an AIA would consist of designating the user of the AIA as the holder of this right, since it is the subject that most values the invention because it is a subject that, generally speaking, actively participates in the market⁴⁵.

Although this generic approach may give clues to the subject who, at the end, is most related to the invention and who, therefore, is proven to be the most suitable for the exploitation of the patent, we propose a solution that we believe to be more accurate and adapted to the specific scenario of the AIAs, which would be based, as anticipated, on the degree of participation of the subjects involved in the invention.

To this end, we propose the introduction of what we have called the '*Invention Conception Contribution Test (ICC Test)*', according to which, once the 'human' actors of the inventive process and the 'artificial' actor have been identified, the ownership of the patent right must be proportional to their actual level of participation in the invention⁴⁶.

There is a whole range of subjects that interact with artificial intelligent agents—e.g. programmer, manufacturer, operator, buyer, owner, AIA user etc.—⁴⁷ but, in our opinion, there are three major blocks of actors who can participate in producing an invention. On the one hand, there is the programmer/designer of the AIA, that is, its creator; the one who conceives the agent and develops it in an original way so that it behaves in one way or another depending on the factors to which it is subjected. Then, there is the figure of the user. This would be a subject who has the right to use the technology mentioned within certain limits, since it is not his or her property⁴⁸. Finally, the AIA itself could also intervene in the elaboration of an invention, acting either as a mere instrument, or acting autonomously, that is, performing a task assigned independently and without human guidance⁴⁹.

The *ICC Test* would consist in observing, case by case, to what extent the participation of one actor or another is essential in conceiving the invention. In this sense, it is understood that who participates in the conception of the invention is the one that

⁴⁴ On this interpretation of Normative Coase Theorem, from a general perspective, see AGUILAR GONZÁLEZ (2009), p. 124.

⁴⁵ SCHUSTERS (2018), pp.1950 and 1990.

⁴⁶ A similar affirmation, but related to civil liability, can be found in DÍAZ ALABART (2018), p. 72.

⁴⁷ SANTOS GONZÁLEZ (2017), p. 38.

⁴⁸ See the second meaning of «usuario» (*user*) in Diccionario de la Lengua Española de la Real Academia Española, 2018.

⁴⁹ KHOURY (2016), p. 640.

outlines and fixes the object of at least one patent claim⁵⁰, as well as those who, in collaboration, obtain an invention as a result of their joint effort. In contrast, it would not be enough to merely put the invention into practice, nor mere supervision of the invention process, nor obtaining the final result without having had the initial idea of how to achieve it, nor the discovery of the problem without having contributed to its solution⁵¹. Therefore, such a task clearly requires a supervised authorship verification procedure specifying the duties of the parties involved —such as the Patent Office at the time of filing the application or the owner/user of the AIA—⁵².

After this analysis, the AIA could be considered as 1) a mere assistance tool for the real (human) inventor, in which case, the regime applicable to the ownership of the inventions would be that currently in force; or 2) an inventor, when the agent has acted independently⁵³. In the latter case, the invention will be ‘wholly made by the AIA’ when it is the result of individual action by the agent or will be ‘partially made by the AIA’ when it is the result of collective action by the AIA and other, human agents⁵⁴. Obviously, in all scenarios in which an AIA actively participates (either as exclusive inventor or as collaborator —coinventor—), it will be necessary to propose a new regime of ownership of the results they obtain, given the impossibility of granting the AIA —as a thing— the ownership of the rights deriving from the patent⁵⁵.

This possibility, moreover, is feasible, insofar as recognizing the AIA as an inventor for the purposes of EPC Art. 60 should not mean that the AIA is attributed ownership of the results it generates or in which it collaborates. Although, *a priori*, it may seem that the condition of inventor entails the *ipso iure* ownership of the right to the patent (right to apply for its protection by this means), when the legislator reserves this right to the inventor or his successors in title, this is not, however, an absolute certainty. This assertion is blurred when EPC art. 62 recognizes the inventor’s right to be mentioned in the patent when it has been applied for by another subject, a provision that warns of the possibility that there is a patent owner other than the inventor himself.

⁵⁰ As shown in Art. 69.1 EPC, the claims determine the scope of the patent.

⁵¹ GATTARI (2005), p. 16.

⁵² The ICC Test proposal is developed in SÁNCHEZ GARCÍA (2021), pp. 122 onwards.

⁵³ ABBOTT (2016), p. 1094. Likewise, there are authors who have already discriminated, in relation to their patentability, among those inventions that have been generated in their entirety by an artificial intelligent agent (computer-generated invention) and those obtained just with the assistance of said agent (computer-assisted invention). In this regard, McLAUGHLIN (2018), pp. 15 onwards.

⁵⁴ Nevertheless, intermediate scenarios could occur, depending on the role of each of the parties in the inventive process. See STANDING COMMITTEE ON THE LAW OF PATENTS OF WORLD INTELLECTUAL PROPERTY ORGANISATION (2019), *Background Document on Patents and Emerging Technologies*, Geneva, p. 20. <https://www.wipo.int/edocs/mdocs/scp/en/scp_30/scp_30_5.pdf> accessed 12 July 2019.

⁵⁵ Some authors consider that a work must always belong to a person and never to a machine. See ROGEL VIDE (1984), pp. 59 onwards.

As in terms of copyright, the possibility of attributing ownership of the exclusive right to a person other than the inventor depends on the position adopted by the national legislator; thus, for example, the German legal system fully respects the principle of authorship, while others, such as the Spanish one, admit certain exceptions in favor of legal persons who have invested in the creation of the work⁵⁶. The most obvious case would be inventions made in the context of an employment or service relationship.

Precisely, because AIAs are expected to be subordinate to predictable humans⁵⁷, a system of ownership of the inventions generated by these entities could be drawn up by drawing a parallel with those achieved in the framework of an employment or service relationship or, in other words, with labor inventions, taking into account the degree of participation of all agents —human and artificial—⁵⁸.

2.1. *Inventions belonging to the creator of the AIA*

This idea arises from the dependency relationship between the AIA and its creator (usually the software programmer), assuming that the AIA has obtained an invention in a specific area for which it has been conceived by its creator. Making a comparison with the labor sphere, the invention would be nothing more than the due realization of the consideration to the employee⁵⁹ —in our case the AIA—.

A similar, but not identical, proposal has been contemplated in the United Kingdom in the field of copyright, where the doctrine of ‘works made for hire’ is used to transfer ownership of such rights to a natural person⁶⁰. The same occurs in the United States⁶¹ where the ‘employer’, while not considered to be the owner *de facto* is considered to be so *de iure*⁶². This doctrine would contemplate two scenarios: one in which the work is carried out by the employee within the scope of his contract; and that in which the

⁵⁶ SAIZ CARCÍA (2019), p. 15.

⁵⁷ Some authors draw a parallelism between robots and slaves, as for their condition of «thing». In this respect, see ERCILLA GARCÍA (2018), para. IV.

⁵⁸ The legal regime we proposed here is focused on the inventions generated by the AIA in its entirety. When the AIA has just partially participated on the conception of the invention, then we will refer to the economic rights resulting from its contribution, preserving in all cases those corresponding to the rest of the agents (co-inventors).

⁵⁹ GRIDEL (1980), p. 48.

⁶⁰ BRIDY (2012), p. 26.

⁶¹ In the United States, this doctrine only covers the field of copyright. The closest provision that may be applied within the patent field is the so-called ‘shop right’ of the employer, which allow him to obtain a non-transferable and free license on the patented inventions produced by his employees. See CLIFFORD (1997), p. 1697.

⁶² 17 U.S.C. sec. 201 (b) ‘the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright’. Ibid 1683.

work is created as a consequence of a specific commission consisting of a document written as such⁶³.

In any case, this doctrine refers rather to a right that can be 'assumed' by the creator, since the right to the work would originally belong to the AIA. However, the object of our proposal is an ownership 'belonging' *ab origine* to the AIA's creator, who is entitled, from the moment the invention is conceived, to apply for its protection. The main difference between the two options is the possibility or not of exercising [in our case] the right to the patent if its creator renounces such right. In our case, if the creator of the AIA finally decides not to exercise his right to the patent, the result would become an industrial secret or would pass to the public domain, and the AIA could not be attributed any protection over it.

In the described scenario, the ownership of the invention does not seem to pose any problems since, by virtue of the principle of alienation of benefits, the legitimate owner should be the creator of the AIA —analogy with the figure of the employer—. However, it could be questioned whether, just as the employee is remunerated for his research activity, the AIA should be compensated in some way. To this end, it would be opportune to create a particular fund that would be assigned —as a reward— to each AIA or to each invention; a fund that could be reinvested in their future inventions. A separate issue would be the subject in charge of the administration and management of such a fund⁶⁴.

In any case, granting the creator of the AIA ownership status of the invention, and hence the right to the patent, could entail some inconveniences. On the one hand, it would mean granting potential ownership of all the results generated by the AIA, which is contrary to the Patent system itself⁶⁵. Besides, it can be argued that the creator of the AIA already gets a reward when it is sold or licensed⁶⁶. On the other hand, asserting this right is not easy since the specific functions that the AIA finally performs will depend on its user, so the results obtained would be beyond the programmer's control⁶⁷. This

⁶³ With regard to the US legal order, see 17 U.S.C. sec.101, 'a work made for hire is—(1) a work prepared by an employee within the scope of his or her employment; or (2) a work specially ordered or commissioned for use as a contribution to a collective work, as a part of a motion picture or other audiovisual work, as a translation, as a supplementary work, as a compilation, as an instructional text, as a test, as answer material for a test, or as an atlas, if the parties expressly agree in a written instrument signed by them that the work shall be considered a work made for hire'.

⁶⁴ This proposal is developed in section 3.4.

⁶⁵ See *O'Reilly v. Morse*, 56 U.S. 62, 1853 —'Telegraph Patent Case'—, para. 475 '(...) the patent embraces nothing more than the improvement described and claimed as new, and that anyone who afterwards discovered a method of accomplishing the same object, substantially and essentially differing from the one described, had a right to use it'.

⁶⁶ SAMUELSON (1986), p. 1225.

⁶⁷ SAMUELSON (1986), p. 1208.

makes this ownership option inoperative unless there is a certain incumbency on the user to notify the creator of the AIA of any invention obtained within a certain time period.

2.2. *Inventions belonging to the AIA user*

This scenario would encompass those inventions obtained by an AIA in a particular sphere of technique —without that being the sole sphere of action of the agent—, since the agent would have been guided in all its actions by a user.

As stated in the so-called Robotics Open Letter⁶⁸, users must be guaranteed that the robot —in this case the AIA— performs the tasks for which it was conceived. But, what happens if the user oversteps the boundaries and directs the AIA to act in another technical area? In this case, it would seem logical to attribute the ownership of the invention to the user, since this was the person who gave the AIA instructions in a specific field and for a specific purpose. Precisely because of the elaboration of the orders that the agent executes, as well as the collaboration and substantial and necessary accompaniment of the user in the process of elaboration of the invention, in our opinion, the user should be the one who benefits from the results obtained⁶⁹. In addition, it is understood that the user will have already satisfied the stipulated royalties due to the programmer —the creator of the AIA— and is thus able to make use of the AIA.

In our opinion, this option is the most appropriate, since the user is the subject best related to the technical area in which the invention has been made and, therefore, will be able to exploit outcomes more efficiently⁷⁰.

2.3. *Inventions belonging to the AIA*

In this scenario, the invention is produced by an AIA autonomously, outside the scope for which it was conceived and regardless of the instructions given by the user. In other words, these inventions result from the AIA's own initiative, in which case it could be considered whether they could be deemed 'free'.

Free inventions are those that arise spontaneously, as a consequence of the inspiration or expertise of the employee —in our case, the AIA— and are the fruit of their personality. This requirement is controversial in the case of the inventions of an AIA, since it is difficult for these agents to manifest any 'personality' in the results they obtain. In our opinion, what would be appropriate in this framework would be to speak

⁶⁸ See Annex of European Parliament Resolution P8_TA(2017)0051 of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics [2017] OJ C252/25. <http://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html#title1> accessed 16 July 2019.

⁶⁹ On the adequacy of considering the user as the fair and reasonable owner of the creations made by a computer, but related to the copyright field, see SAMUELSON (1986), p.1203.

⁷⁰ SAMUELSON (1986), p. 1227.

of inventions resulting from the autonomy of the AIA, a condition that should be proven both in relation to the decision-making process and in relation to the resources used by the agent to arrive at the inventive result.

If this were the case, it could be said that the ownership of the right to the patent would fall to the AIA, which would have consequences at both the procedural level (How would the AIA decide on the patentability of the invention? With what criteria? What would be the extent of its protection? And what would happen to the exploitation rights? How would they be managed?), and at the global level, since these inventions, once protected, would become part of the state of the art, which would prove a barrier to the rest of the inventions made by humans⁷¹. This last consequence could only be remedied by appropriately reorienting human technological objectives⁷².

As a preventive measure to minimize the negative impact of a total autonomy of intelligent agents, its creators could be obliged to specify their field of action, incorporating mechanisms that would be set off in the event of operating outside those parameters⁷³. Such control would undoubtedly make the last possibility suggested highly remote.

3. Creation of an AIA Register

Undoubtedly, this general proposal requires a revision of the precepts that regulate the invention process in order to adapt them to a double reality: 1) Inventions generated by humans and 2) Inventions generated —totally or partially— by an AIA. While the former, as indicated, would be subject to the regime traditionally envisaged under the current Patent system, the latter would have to be provided with a new flexible regulation regarding the invention process, in the sense of not limiting the capacities of artificial entities, while at the same time restrictive, as regards the granting of rights and duties to these entities as a consequence of their actions (*human-control approach*)⁷⁴.

One tool that, in our view, seems essential to implement this new regime would be the creation of an 'AIA Register'. The EP intends to promote the creation of a register of intelligent robots that would facilitate both their traceability and the birth of the legal status of robot and the possible imputation of liability arising from breaches by these entities⁷⁵.

As in the area of civil liability, the creation of an AIA Register that enables their individual identification would help to identify their manufacturer⁷⁶. In our sphere, the

⁷¹ Even if the inventions obtained by the AIA were not patented and entered the public domain, they would become part of the state of the art, causing the same pernicious consequences for humans. See HATTENBACH and GLUCOFF (2015), p. 36.

⁷² ABBOTT (2016). P.1119.

⁷³ KAPLAN (2016), p. 159.

⁷⁴ This proposal is the object of a future publication.

⁷⁵ SANTOS (2017), p. 46.

⁷⁶ DÍAZ ALABART (2018), p. 112.

creation of such a register could facilitate the identification of the person behind the invention when it is generated. Thus, in order to determine whether it is the creator or, on the contrary, the user who deserves the attribution of the right to the patent, this register could contain the specificities of the AIA from the moment of its inscription and, in the event that this change, radically or partially, the person with ownership of the AIA should inscribe that modification in the register. This would make it easier to demonstrate whether the action of the AIA that gave rise to the patentable invention was due either to the initial programming of its creator or more to the subsequent contributions introduced by the user of the agent.

The AIA register system proposed here should make a distinction between the possible types of agents that could be registrable. In the first group —*Basic AIAs*— it would be possible to ‘register’ those AIAs whose specificities are limited, that is, those agents that do not enjoy full autonomy and that, from their conception, can be assured to be mere instruments for the person in whose possession they are. A second group that could be created —*Advanced AIAs*— would include those agents endowed with superior intelligence and which have already developed, or are susceptible to developing, an autonomy and independence in their actions that could separate them from their creators/users⁷⁷.

In any case, we understand it is crucial to establish a *sine qua non condition* that inventions generated by an AIA will be protectable by patent if and only if a previous requirement has been fulfilled, which is none other than that the AIA is registered in the *ad hoc* Register. The registration should be obligatory as soon as the invention produced by this agent is objectively protectable. In principle, determining who owns this duty seems controversial.

On the one hand, it seems obvious that it is the creator who, from the moment he or she generates it, should register it. This option would allow an exhaustive control of its technical specifications and advances, thus allowing the identification of the person behind each result obtained by the agent. However, another option would come from the user. It might be that the creator of the agent had not registered it. In this case, the user could register it or request the registration of his or her application (on behalf of the creator) in order to patent an invention. There is no doubt that, for all intents and purposes, this late registration, and at the request of the user, could be understood as pre-constituted evidence in the claim of the ownership of the patent.

⁷⁷ Some authors suggest that the typology —of robots— should take into account their field of application or their main function. In this respect, we highlight the classification proposed in VERUGGIO (2006), pp. 612-617. See also SANTOS (2017), p. 47.

4. Creation of a fund to manage inventions generated —entirely or partially— by an AIA

We believe that it would be appropriate to create a fund for AIAs that generate patentable inventions. It would be interesting to assign a part of the profits obtained from the exploitation of inventions by AIAs to the creation of the fund with the idea of correcting or covering unforeseen events regarding the invention process.

As occurs with inventions proceeding from the labor environment, where, under most legal systems⁷⁸, the employee is entitled to some consideration for his or her contribution to the invention, we believe it opportune for an AIA to receive some 'reward' for an unexpected invention, once its real degree of participation has been established. While machines do not need incentives to produce results⁷⁹, our proposal to create the said fund serves a functional purpose, which is none other than to feedback the necessary resources for the machine to continue to be operative or even to surpass itself. Moreover, we believe that this proposal is not only appropriate but that it also drives scientific and technical innovation.

A fund could be created for each AIA or a separate fund for each invention the AIA comes up with. The latter would be recommendable insofar as the AIA evolves and its features may be modified from one moment to another. However, were this possibility to be adopted, it would be advisable to constitute a single equity on the basis of all inventions obtained by the same AIA. This fund would be used to attend to the needs of a non-discretionary nature that might arise during the application, concession and exploitation of its patented inventions.

As for the amount and the application conditions of each contribution to the fund, these should be stipulated in the deed of foundation of the fund from the outset, in such a manner that they were known by all possible holders of potential inventions by the AIA (creator or, where appropriate, the user) prior to obtaining the invention.

Finally, as could hardly be otherwise, the creation of the fund must be accompanied by a proper management and administration regime, and always from a *human-control approach*. Thus, depending on the scenario, the person in charge of guiding and direc-

⁷⁸ Art. 60 EPC states that '*if the inventor is an employee the right to the European patent shall be determined in accordance with the law of the State in which the employee is mainly employed*'. If we take as an example the Spanish legal system, it grants the employee who produces an invention the right to receive a supplementary remuneration or a fair economic compensation, as the case may be. While the first —supplementary remuneration— implies that the inventor has already been paid for the research activity, the second —fair economic compensation— will be granted depending on the industrial and commercial importance of the invention and taking into account the means or knowledge provided by the employer (articles 15-17 SPL)

⁷⁹ SÁNCHEZ DEL CAMPO REDONET (2016), p. 132.

ting the fund would be the creator or, where appropriate, the user of the AIA, and there should be no exceeding the area of involvement of the AIA⁸⁰.

IV. CONCLUSIONS

We live in an age in which collaboration between humans and machines is a relevant factor from the point of view of technological progress and inventions. As noted, advanced AI systems are already capable of creating innovative and unpredictable results independently and in cooperation with human agents.

For the purposes of their legal protection these results would, *a priori*, be excluded from the traditional Patent system since the AIA is not envisaged as a possible actor in the inventive process. However, our proposal for a new category of inventor — '*Artificial Inventor*' — would end this legal vacuum, while remaining conservative at all times and in line with the human approach. In this sense, we understand the AIA as an object of rights, and we propose to consider it as a '*Performance Imputation Center*', since its real participation in the inventive process with the obtention of results protectable by patent generates a positive impact in society.

From this perspective, we propose to check its degree of involvement in generating the invention along with that of the human on which it depends. We suggest the incorporation of the *ICC Test*, an analysis that determines, factually and legally, which agents have actually intervened in the conception of the invention. The results of this test will enable us to distinguish between human inventions and those made —entirely or partially— by AIAs. In the case of the latter, we propose three large scenarios according to the degree of participation of the creator and/or user of the AIA: 1) Inventions belonging to the AIA creator; 2) Inventions belonging to the AIA user; 3) Free inventions. This classification contributes to an adjudication of the ownership of property rights which is, in our opinion, fair and reasonable and in tune with the essence of the Patent system.

We also advise the need to create a register to facilitate AIA traceability and its results. This would also help us to identify the scenario in question. This should be accompanied by the establishment of a fund for each AIA or each invention by AIA in order to manage the results obtained by the agent, and so feedback the resources necessary to continue operative or even to improve.

In short, a conceptual and sometimes procedural reform of the current Patent system is necessary, and it is essential that this be adopted on a European or even international scale, since the lack of homogeneity in the treatment of the inventions generated by AIAs would, in the end, be a further cause of disparity in the geographical distribution of technological development in favor of territories that are more open and receptive to this new reality.

⁸⁰ In addition, it should be noted that the provision of a fund would also allow the creation of an insurance for damages directly or indirectly committed by the agent.

BIBLIOGRAPHY

- ABBOTT, Ryan (2016), «I think, therefore I invent: creative computers and the future of Patent Law», *Boston College Law Review* 57 (4), pp. 1079-1127.
- AGUILAR GONZÁLEZ, José María (2009), «El análisis económico del derecho de propiedad», *Anuario Jurídico y Económico Escurialense* XLII, pp. 117-128.
- ARANSAY ALEJANDRE, Ana María (2018), «Antecedentes y propuestas para la regulación jurídica de los robots», in AA.VV., *Derecho de los robots* (Dir. BARRIO ANDRÉS, Moisés), Wolters Kluwer, Madrid, pp. 87-106.
- ANDERSON, Tracy L. and DONATH, Max (1990), «Animal behavior as a paradigm for developing robot autonomy», in AA.VV., *Designing autonomous agents. Theory and practice from biology to engineering and back* (Ed. MAES, Pattie), MIT Press, Massachusetts, pp. 145-168.
- BERGEL SAINZ DE BARANDA, Yolanda (2014), «La responsabilidad del poseedor de animales y cosas», in AA.VV., *Practicum daños 2015* (Coord. SOLER PRESAS, Ana and DEL OLMO GARCÍA, Pedro), Aranzadi, pp. 377-391.
- BERTOLINI, Andrea (2013), «Robots as products: the case for a realistic analysis of robotic applications and liability rules», *Law, Innovation and Technology* 5 (2) pp. 214-247.
- BISHOP, Christopher M (2006), *Pattern Recognition and Machine Learning*, Springer.
- BOSTROM, Nick (2014), *Superintelligence: paths, dangers, strategies*, Oxford University Press, Oxford.
- BRIDY, Annemarie (2012), «Coding Creativity: Copyright and the Artificially Intelligent Author», *Stanford Technology Law Review* 5, pp. 1-28.
- BRINGSJORD, Selmer and SCHIMANSKI, Bettina (2003), «What is Artificial Intelligence? Psychometric AI as an answer», *Proceedings of the 18th International Joint Conference on Artificial intelligence*, pp. 887-893.
- CALABRESI, Guido (1968), «Transaction costs, resource allocation and liability rules: a comment», *The Journal of Law and Economics* 11, pp. 67-74.
- CLIFFORD, Ralph D (1997), «Intellectual Property in the Era of Creative Computer Program: Will the True Creator Please Stand Up?», *Tulane Law Review* 71, pp. 1675-1703.
- DAVIES, Colin R. (2011), «An evolutionary step in Intellectual Property Rights - Artificial intelligence and Intellectual Property», *Computer Law and Security Review* 27, pp. 601-619.
- DI VIGGIANO, Pasquale Luigi (2018), «Robotics, rights and liabilities juridical prospects of intelligent machines», *Curentul Juridic* 72 (1), pp. 88-103.
- DÍAZ ALABART, Silvia (2018), *Robots y responsabilidad civil*, Reus, Madrid.
- ERCILLA GARCÍA, Javier (2018), «Aproximación a una personalidad jurídica específica para los robots», *Revista Aranzadi de Derecho y Nuevas Tecnologías* 47.
- GATTARI, Patrick G. (2005), «Determining inventorship for US patent applications», *Intellectual Property & Technology Law Journal* 17 (5), pp. 16-19.
- GRIDEL, Jean-Pierre (1980), *Les inventions de salariés à l'épreuve de la loi du 13 juillet 1978 et du Décret du 4 septembre 1979*, Librairie Générale de Droit et de Jurisprudence (LGDJ), Paris.
- HATTENBACH, Ben and GLUCOFF, Joshua (2015), «Patents in an era of infinite monkeys and artificial intelligence», *Stanford Technology Law Review* 19 (32) pp. 32-51.
- KAPLAN, Jerry (2016), *Inteligencia Artificial. Lo que Todo el Mundo Debe Saber*, Oxford University Press.
- KHOURY, Amir H. (2016), «Intellectual property rights for 'hubots': on the legal implications of human-like robots as innovators and crea-

- tors», *Cardozo Arts & Entertainment* 35, pp. 635-668.
- KOZA, John R (2010), «Human-competitive results produced by genetic programming», *Genetic programing and evolvable machines* 11, pp. 251-284.
- LATORRE, José Ignacio (2019), *Ética para las máquinas*, Ariel, Madrid.
- LEHMAN-WILZIG, Sam N. (1981), «Frankenstein unbound. Towards a legal definition of Artificial Intelligence», *Futures* 13 (6), pp. 442-457.
- MCLAUGHLIN, Michael (2018), «Computer-Generated Inventions», *Social Science Research Network Electronic Journal* (January), pp. 1-23.
- MORAVEC, Hans P (2000), *Robot: mere Machine to Transcendent Mind*, Oxford University Press, United States.
- NEWELL, Allen and SIMON, Herbert (1976), «Computer science as empirical inquiry: symbols and search», *Communications of the Association for Computing Machinery* 19 (3), pp. 113-126.
- PEARLMAN, Russ (2018), «Recognizing Artificial Intelligence (AI) as authors and inventors under U.S. Intellectual Property Law», *Richmond Journal of Law & Technology* 24 (2), pp. 1-38.
- PLOTKIN, Robert (2009), *The genie in the machine: how computer-automated Inventing is revolutionizing law and business*, Standford University Press, California.
- PUTNAM, Hilary (1964), «Robots: machines or artificially created life?», *The Journal of Philosophy* 61 (21), pp. 668-691.
- ROGEL VIDE, Carlos (1984), *Autores, coautores y propiedad intelectual*, Tecnos, Madrid.
- SAIZ CARCÍA, Concepción (2019), «Las obras creadas por sistemas de inteligencia artificial y su protección por el derecho de autor», *Indret. Revista para el Análisis del Derecho* 1, pp. 1-45.
- ROGEL VIDE, Carlos (2018), «Robots y personas», in AA.VV., *Los robots y el Derecho* (Coord. ROGEL VIDE, Carlos), Reus, Madrid.
- SÁIZ GONZÁLEZ, J. Patricio (1995), *Propiedad Industrial y Revolución Liberal. Historia del sistema español de patentes (1759-1929)*, Oficina Española de Patentes y Marcas, Madrid.
- SAMUELSON, Pamela (1986), «Allocating Ownership Rights in Computer Generated Works», *University of Pittsburgh Law Review* 47, pp. 1185-1228.
- SÁNCHEZ DEL CAMPO REDONET, Alejandro (2016), *Reflexiones de un Replicante Legal. Los Retos Jurídicos de la Robótica y las Tecnologías Disruptivas*, Aranzadi.
- SÁNCHEZ GARCÍA, Luz (2021). *The artificial inventor. A challenge for the Patent System*, Thomson Reuters, Pamplona.
- (2018), «Las invenciones generadas por inteligencia artificial y sus implicaciones para el Derecho de Patentes», *Informática y Derecho*, 2.ª Época 5, pp. 49-84.
- SANTOS GONZÁLEZ, M.ª José (2017), «Regulación legal de la robótica y la inteligencia artificial: retos de futuro», *Revista Jurídica de la Universidad de León* 4, pp. 25-50.
- SCHAEERER, Enrique, KELLEY, Richard and NICOLESCU, Mónica (2009), «Robots as Animals: A Framework for Liability and Responsibility in Human-Robot Interactions», *18th IEE International Symposium on Robot and Human Interactive Communication*, Toyoma, September- October.
- SCHROEDER, Jeanne L. (1998), «The end of the market: a psychoanalysis of Law and Economics», *Harvard Law Review* 112 (2), 1998, pp. 483-558. SEARLE, John (1980), «Minds, brains, and programs», *Behavioral and Brain Sciences* 3 (3), pp. 417-457.
- SCHUSTERS, W. Michael (2018), «Artificial intelligence and patent ownership», *Washington & Lee Law Review* 75, pp. 1945-2004.

- SOLUM, Lawrence B (1992), «Legal personhood for artificial intelligences», *North Carolina Law Review* 70 (4), pp. 1231-1287.
- VERUGGIO, Gianmarco (2006), «EURON Roboethics Roadmap», *6th IEEE-RAS International Conference on Humanoids Robots*, pp. 612-617.
- VERTINSKY, Liza and RICE, Todd M (2002), «Thinking about thinking machines: implications of machine inventors for Patent Law», *Boston University Journal of Science & Technology Law* 8.
- WAGNER, R Polk (2013), «Poisoning the next Apple? How the American Invent Act harms inventors», *Stanford Law Review* 65, pp. 517-564.
- YANISKY RAVID, Shlomit and LIU, Xiaoqiong (2018), «When artificial intelligence systems produce inventions: an alternative model for Patent Law at the 3A Era», *Cardozo Law Review* 39, pp. 2215-2263
- ZHOU, Keliang, LIU, Taigang and ZHOU, Lifeng (2015), «Industry 4.0: Towards Future Industrial Opportunities and Challenges», in AA.VV., *12th International Conference on Fuzzy Systems and Knowledge Discovery (FSKD)*, IEEE, pp. 2147-2152.