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WHO INVENTS? ARTIFICIAL INTELLIGENCE, PATENT LAW AND THE LIMITS OF LEGAL PERSONHOOD

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QUEM INVENTA? INTELIGÊNCIA ARTIFICIAL, PATENTES E OS LIMITES DA PERSONALIDADE JURÍDICA

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(Quaisquer questões relacionadas com o conteúdo do presente artigo deverão ser dirigidas ao autor, através do seguinte endereço de email: psaeza@ceu.es)

Resumo

Este artigo analisa as implicações jurídicas da atribuição de autoria de invenções a sistemas de inteligência artificial no âmbito do direito das patentes. Com foco no caso DABUS e nas suas repercussões internacionais, examina como diferentes jurisdições abordaram a questão de se um sistema de IA pode ser reconhecido como inventor. Conclui-se que os quadros jurídicos actuais continuam a exigir personalidade humana ou jurídica para a titularidade da invenção.

WHO INVENTS? ARTICICIAL INTELLIGENCE, PATENT LAW AND THE LIMITS OF LEGAL PERSONHOOD

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Abstract

This article explores the legal implications of attributing inventorship in patent law to artificial intelligence systems. Focusing on the DABUS case and its international ramifications, it analyses how different jurisdictions have addressed the question of whether an AI system can be recognized as the inventor of a patentable invention. The study concludes that current legal frameworks still require human or legal personhood for inventorship.

ÍNDICE

1. INTRODUCTION[1]

We are currently immersed in the so-called "Fourth Industrial Revolution" or "Industry 4.0", in which the growth and development of technology are exponential. This context, though not entirely new, is becoming increasingly complicated to follow, and raises legal questions that should be analysed. This research deals with the inventorship of patents on inventions "developed" by artificial intelligence systems.

To that end, this paper draws on key international judicial and administrative decisions concerning patents and artificial intelligence systems, focusing specifically on the inventions attributed to the Device for the Autonomous Bootstrapping of Unified Sentience (DABUS). This AI system, devised by the Artificial Inventor Project and, specifically, by the engineer Stephen Thaler, is credited with having created two inventions: a food container and a device for alerting in case of hazardous situations.
The central question addressed in this paper is whether artificial intelligence systems such as DABUS can be considered as "inventors" of patentable inventions or, if not, who would (or could) be the rightful owner of the resultant patent and rights. To answer this, the analysis is structured in three parts. First, it reviews the basics of artificial intelligence, including its classifications ("narrow", "general" or "superintelligence" AI) and the main "branches" through which it may manifest itself or develop (such as machine learning or deep learning). Second, it examines the cases that have ruled on DABUS-related patent applications, focusing on the legal reasoning behind each. There are up to three court proceedings with final judgments in the world that have been pronounced in this regard, and it is relevant to study the legal grounds for each of them. Third, it analyses the core arguments advanced by the Artificial Inventor Project in support of recognising DABUS as the inventor.

The motivation for this research lies in the growing relevance of this topic not only in the present, but near future. Currently, AI systems are not fully "autonomous" (although this paper will present arguments to the contrary) as they still depend on prior human input and continuous supervision. Nonetheless, since it is impossible to predict how AI systems will evolve in the coming years, it is worth questioning whether these systems could eventually get or, more plausibly, share some of the rights derived from the invention in which they are involved.

Much of the existing literature on intellectual property and artificial intelligence focuses on copyright, where originality and the "soul" of the artist plays a decisive role in the works they create. Nevertheless, in the realm of industrial property and patent law, the focus shifts to the invention itself, particularly to the criterion of novelty. Thus, it raises a central question: is novelty sufficient (among other objective criteria) to justify granting a patent to an AI-generated invention or do subjective factors such as inventorship continue to carry equal (or greater) weight?

Before turning to the legal analysis, it is essential to understand how artificial intelligence systems function and how they are currently categorised in the technological landscape. To show the legal framework for this debate, the following section will provide a brief overview of artificial intelligence systems and their classifications.

[1] This paper is part of the "Eficiencia tecnológica, dignidad y derechos humanos. ¿Quo vadis, humanidad, en la era de la IA?" research project, funded by Convocatoria de Ayudas a Proyectos de Investigación en Líneas Estratégicas CEU 2024-2025, coordinated by Universidades CEU (Fundación Universitaria San Pablo CEU).

2. UNDERSTANDING ARTIFICIAL INTELLIGENCE: FOUNDATIONS AND CLASSIFICATIONS

In 1955, John McCarthy coined the term "artificial intelligence" to describe the hypothesis that all learning (or any other aspect of intelligence) could be formulated in such a way that allowed it to be simulated by a machine. According to this view, such machines or systems would be capable of solving problems, improving, and learning by themselves.[2]

More than half a century later, the term "artificial intelligence" is still in use, although, from our point of view, it may be argued that the concept of "intelligence" is misapplied in this context. On the one hand, intelligence entails understanding and comprehension, capacities whose actual presence in AI systems remains highly debatable, given that these systems process information without necessarily apprehending its meaning[3]. On the other hand, these systems are not so much "artificial", as real and tangible, implemented through code and computational processes. Leaving this nuance aside, the term continues to be widely accepted to refer to the processes executed by computer programmes, that "execute operations comparable to those carried out by the human mind, such as learning or logical reasoning"[4]. Moreover, artificial intelligence means that "machines can be improved to assume some capabilities normally thought to be like human intelligence";[5] or the machine is "capable of performing tasks that, if performed by a human, would be said to require intelligence".[6]

Without giving an exhaustive typology of AI, we must stop briefly to provide some key features to better understand the core of this paper, namely the Device for the Autonomous Bootstrapping of Unified Sentience, or DABUS.

First, AI is commonly classified into three types: "narrow", "strong" and "superintelligence", which we will not examine here because of its inapplicability in current practice.[7] Narrow AI would be an AI system which is "focused on a limited task [or], a specific application".[8] In contrast, "general" artificial intelligence would be capable of "reasoning, representing knowledge, planning, learning, communicating in natural language and integrating all these skills towards a common goal".[9] Until recently, artificial intelligence systems were designed to perform narrowly defined tasks and lacked the

[2] John McCarthy, Marvin Minsky, Nathaniel Rochester, Claude Shannon, A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, 1955.
[3] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59, states that "From a scientific point of view, intelligent systems cannot be creative, they lack intention and consciousness". On the other hand, José Luis González San Juan, "Inteligencia artificial y derechos de autor", in *FODERTICS 9.0: estudios sobre tecnologías disruptivas y justicia* (Comares 2021), p. 258, "AI attempts to reproduce human cognitive functions through programming".
[4] Definition from the *Diccionario de la lengua española* of the Real Academia Española (RAE), assumed in language, not only doctrinal, but also social. For example, see the definition of Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 56: "[artificial intelligence is] a software tool (...) which is, to some extent, intelligent", and p. 59: "[Artificial intelligence] Provides systems with the ability to automatically learn and improve from experience and accumulation of larger volumes of data".
[5] Joost N. Kok, Egbert J. W. Boers, Walter A. Kosters, Peter van der Putten and Mannes Poel, "Artificial Intelligence: Definition, Trends, Techniques and Cases" [2009] 1 *Artificial intelligence* 270.
[6] Matthew Scherer, "Regulating Artificial Intelligent Systems: Risks, Challenges, Competencies, and Strategies" [2016] 29 Harv. J.L. & TECH. 353, p. 362.
[7] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59.
[8] Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 57.
[9] *Ibid.*

flexibility to address objectives beyond those explicitly foreseen in their programming.[10] However, the emergence of generative AI based on foundation models —such as GPT-4 or DALL·E— has challenged this paradigm. These systems can perform broad and unforeseen tasks, including the generation of legal texts, the drafting of contractual clauses, or the creation of visual content in response to novel prompts, without having been explicitly programmed for any of these specific outputs. Nevertheless, despite their versatility, such systems remain within the realm of narrow AI, as they lack genuine understanding, self-awareness, or general reasoning capabilities.

Artificial intelligence can also be analyzed in terms of the "branches" through which it develops. In this regard, DABUS AI system may be situated within the field of deep learning, which is considered an advanced subset of the machine learning or autonomous learning[11]. Thus, we will start by analysing the latter and then focus on deep learning to understand how the DABUS system works.

Machine learning is usually divided into several categories based on the algorithms employed.[12] In the first group we find "supervised machine learning", in which the system uses labelled data, in such a way that the data is labelled with "input" variables (i.e., when it is introduced into the system). The AI system's task is to learn the function that maps inputs to outputs so it can generalize this mapping to new, unseen data.

In the second group, we find "unsupervised automatic learning", where only the input data is labelled. In this way, the algorithm must "explore" to find patterns in the data provided without predefined outputs. This system organises this data or gives it a certain structure to provide more simplified information; for example, classifying a group of images according to any characteristic it finds in common among the data.

A third and final category is often referred to as "machine learning tasks", which combines supervised and unsupervised learning with a feedback factor. The system receives "rewards" or "penalties" based on how effectively it processes the data, gradually improving its performance through this iterative process. In this sense, the machine is said to engage in "self-learning", though always within the constraints of a predefined goal (narrow artificial intelligence).

The general process of machine learning unfolds in two main stages. First, the system is trained using a set of "solved" cases or assumptions, where both input and expected output data are known. Second, once trained, the system applies those patters to new cases working "autonomously", since it takes the previous data as a reference and applies "the same pattern" to the new cases that are incorporated into it without a solution.[13] This process, though *automated* "is based on probability and statistics".[14]

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[10] José Luis González San Juan, "Inteligencia artificial y derechos de autor", in *FODERTICS 9.0: estudios sobre tecnologías disruptivas y justicia* (Comares 2021), p. 259; Esperanza Gallego Sánchez, "La patentabilidad de la inteligencia artificial. Otros sistemas de protección", in *Revolución digital, derecho mercantil y Token economía* (Tecnos 2019), p. 244; Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 152.

[11] Michael Mills, "Artificial intelligence in law: the state of play 2016" [2016] *Thomson Reuters Legal Executive Institute* 1, p. 3; Esperanza Gallego Sánchez, "La patentabilidad de la inteligencia artificial. Otros sistemas de protección", in *Revolución digital, derecho mercantil y Token economía* (Tecnos 2019), p. 242.

[12] Jacob Biamonte, Peter Wittek, Nicola Pancotti, Patrick Rebentrost, Nathan Wiebe, Seth Lloyd, "Quantum machine learning" [2017] 549 *Nature* 195, p. 196; Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), pp. 60-61.

[13] Jaime Carbonell, Ryszard Michalski, Tom Mitchell, "An overview of machine learning", *Machine learning: an Artificial Intelligence Approach* (Morgan Kaufmann Publishers, 2014), p. 4; Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 59.

[14] Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 60.

Deep learning is a more specialised subfield of machine learning whereby the system extracts high-level features from input data to solve problems through multiple layers of processing. It is often considered an evolution of machine learning[15] and is based on how the human brain works, using artificial neural networks.[16]

The difference between machine learning and deep learning is that in machine learning the system has several layers of data processing (currently there are approximately 150 layers of information that are interconnected) with two deeper "neural" networks than in machine learning and is based on learning many levels of features through examples.[17] The first of these two neural networks provides a network made up of general knowledge data from various disciplines and "on that basis, generates new content". The second network "controls" the first to detect novel data based on pre-existing content.[18]

Similarly, in some of the deep learning architectures, two main neural networks can be found. The first one draws on a broad knowledge base from various disciplines and generates added content based on that information. The second network functions as a control mechanism, evaluating the output of the first and detecting novel elements by comparing them to pre-existing content. This layered structure contributes to the system's ability to generate increasingly complex and refined outputs—an approach relevant to understanding how the DABUS system operates.[19]

The advantage of deep learning over machine learning is that the work involved in extracting features in machine learning can now be done directly by the system, instead of by designated experts. In addition, systems using deep learning can oversee much larger amounts of data than those using machine learning and, of course, more than a person. Furthermore, the system learns as it is provided with more data and examples, based on "analogy".[20] As a result, their analyses will be much more complex, in-depth, and comprehensive.

Having outlined the technical characteristics of AI systems, we now turn to the central legal controversy: whether such systems can be named as inventors under existing patent law. This section focuses on the DABUS case, the most prominent real-world example.

3. THE DABUS CASE: PATENT APPLICATIONS AND LEGAL PROCEEDINGS

DABUS (Device for the Autonomous Bootstrapping of Unified Sentience) is an artificial intelligence system developed in 2018 by scientist Stephen Thaler. Its intended function

[15] Isaac Pérez Borrero, Manuel Emilio Gegúndez Arias, *Deep Learning* (Servicio de Publicaciones de la Universidad de Huelva 2021), p. 191; Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 61.
[16] Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 150.
[17] Isaac Pérez Borrero, Manuel Emilio Gegúndez Arias, *Deep Learning* (Servicio de Publicaciones de la Universidad de Huelva 2021), pp. 191-194; Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 62.
[18] Montiano Monteagudo Monedero, Francisco Javier García Pérez, "¿Puede la inteligencia artificial desarrollar una invención patentable?", [2020] *Actualidad jurídica Aranzadi* 959.
[19] Isaac Pérez Borrero, Manuel Emilio Gegúndez Arias, *Deep Learning* (Servicio de Publicaciones de la Universidad de Huelva 2021), pp. 194-196.
[20] Moisés Barrio Andrés, *Manual de Derecho digital* (Tirant lo Blanch, 2022), p. 63.

is to "create" inventions. As such, its developers—under the name Artificial Inventor Project—have sought legal recognition of DABUS as the inventor in several patent applications.[21] So far, only one application has been successful, which will be discussed below, granted by the South African Patent Registry. The rest of the patent applications they have filed are under appeal[22] or have been refused.[23]

The applications given by the Artificial Inventor Project concern two inventions, namely a food container and an attention-getting device. The Project claims that these two inventions were "autonomously" generated by AI system DABUS, which the project says are "inventions in circumstances where we believe that no natural person, as traditionally defined, qualifies as an inventor".[24] Accordingly, the "inventor" named in these applications is the AI system itself, with the claim that DABUS should be designated as such, while the applicant, Stephen Thaler—the creator of this artificial intelligence system—would hold the rights derived from the invention. In this section, we will study some of the decisions on these applications, which we will analyse jointly as they appear in the World Intellectual Property Organization (WIPO).[25]

3.1. ARGUMENTS IN FAVOUR OF RECOGNISING DABUS AS INVENTOR

On 24 June 2021, the patent application filed at the South African Patent Registry concerning the food container and attention-getting device generated by DABUS was allowed (2021/03242).[26] In the acceptance of this application, the following appears in the field to be filled in with the inventor's information: "DABUS, The invention was autonomously generated by an artificial intelligence"; it is, therefore, the first patent in the world granted to this "inventor".[27]

Nevertheless, it should be noted that South Africa does not examine filed patent applications to check whether patentability requirements are met, as might be the case in other countries.[28] This has led some to argue that any application meeting formal requirements is likely to be granted, regardless of substantive examination.[29]

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[21] The Project aims to encourage dialogue on the social, economic and legal impact of cutting-edge technologies and to seek the possibility of protecting the results generated by artificial intelligence; its website is available at https://artificialinventor.com/.

[22] Those filed in the UK, at the European Patent Office, Germany, Israel, South Korea, Japan, and New Zealand.

[23] Specifically, patent applications filed in the United States, Australia, and Taiwan.

[24] Ryan Abbott, "The Artificial Inventor Project", *WIPO Magazine* [2019] 6.

[25] The application code of this patent application is WO/2020/079499, the information on which is available at https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2020079499&_cid=P12-KCS16F-43450-1.

[26] The descriptions of the two inventions are given below. On one hand, for the food container, it is stated that "A container (10) for use, for example, for beverages, has a wall (12) with and external surface (14) and an internal wall (16) of substantially uniform thickness. The wall (12) has a fractal profile which provides a series of fractal elements (18-28) on the interior and exterior surfaces (14-16), forming pits (40) and bulges (42) in the profile of the wall and in which a pit (40) as seen from one of the exterior or interior surfaces (12, 14) forms a bulge (42) on the other of the exterior or interior surfaces (12, 14). The profile enables multiple containers to be coupled together by inter-engagement of pits and bulges on corresponding ones of the containers. The profile also improves grip, as well as heat transfer into and out of the container." On the other hand, the description of the device for attracting enhanced attention refers to "an input signal of a lacunar pulse train having characteristics of a pulse frequency of approximately four Hertz and a pulse-train fractal dimension of approximately one- half; and at least one controllable light source configured to be pulsatingly operated by the input signal; wherein a neural flame emitted from at least one controllable light source as a result of the lacunar pulse train is adapted to serve as a uniquely-identifiable signal beacon over potentially-competing attention sources by selectively triggering human or artificial anomaly-detection filters, thereby attracting enhanced attention."

[27] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59.

[28] For example, Spanish Ley 24/2015, de 24 de julio, de Patentes, s 35.

[29] Patil Utkarsh, "India: South Africa Grants a Patent with An Artificial Intelligence (AI) System As The Inventor – World's First!!" [2021] *Mondaq*; David Kaplan, "Intellectual property rights and innovation in South Africa: A framework", in *The*

Consequently, the South African decision should not be understood as a substantive legal endorsement of AI inventorship, but rather as a procedural outcome based on compliance with filing requirements. Similarly, rejections in other jurisdictions, such as the United Kingdom, Australia and the United States, were primarily based on formal grounds—namely, the failure to name a natural person as inventor—rather than on an in-depth evaluation of the merits of AI-generated inventions.

On this patent, we would also like to point out that the South African Patent Office considers that DABUS generated this invention autonomously, although this conclusion may be subject to debate, given the current state of narrow artificial intelligence. We understand that it could be qualified as an 'autonomous' invention, in the sense that this machine learning technology is capable of self-learning—an attribute often associated with deep learning systems, although DABUS itself does not fall within this category. However, this leads us to qualify another interpretation of the term "autonomous", which we discard, as we could not accept that this artificial intelligence system would generate the invention *motu proprio* without any kind of intervention or "help".

Several authors consider that there are works produced autonomously,[30] but the technology does not currently exist to make this claim; artificial intelligence systems are "basically tools".[31]

In earlier versions of this research (2023)[32], it was suggested that the DABUS system could be classified within the field of deep learning, as far as it relies on a neural network-based architecture and exhibits autonomous behaviour in the generation of ideas. However, a more precise technical review allows for a necessary clarification. DABUS does not operate based on typical deep learning mechanisms—such as large-scale supervised training or backpropagation—but rather on a distinct connectionist model developed by Stephen Thaler, structured around idea-generating and idea-evaluating networks. Accordingly, while it shares certain features with other neural approaches, DABUS cannot be regarded as a deep learning system in the strict sense.

In any case, DABUS falls within the category of narrow or weak artificial intelligence. It does not reach the level of autonomy or generalisation associated with artificial general intelligence (AGI), nor does it exhibit the cross-domain capabilities of foundation models. At present, we cannot consider that general artificial intelligence exists, at least for the time being, so we are still in the realm of narrow artificial intelligence. Consequently,

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economics of intellectual property in South Africa (World Intellectual Property Organization 2009), p. 3; Samantha Gregory, *Intellectual Property Rights and South Africa's Innovation Future* (South African Institute of International Affairs 2008), p. 12.

[30] Among others, Felipe Osorio Umaña, "Inteligencia artificial y derecho de autor: un estudio sobre la regulación británica", [2022] 5(1) *Revista Justicia & Derecho* 1, p. 6; Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 154, who quotes Ryan Abbott, "Artificial Intelligence, Big Data and Intellectual Property: Protecting Computer-Generated Works in the United Kingdom", in *Research Handbook on Intellectual Property and Digital Technologies* (2017), pp. 1-2; Ryan Abbott, "I Think Therefore I Invent: Creative Computers and the Future of Patent Law" [2016] 54 *B.C. L. Rev* 1079, pp. 1079-1126, who is part of the Artificial Inventor Project. Nevertheless, if we take a closer look at this author, Ryan Abbott, it is possible to see that, in order to affirm what he says, he bases his assertion on John Koza, "Human-competitive results produced by genetic programming" [2010] 11 *Genet Program Evolvable Mach* 251, p. 251, who states that "the increased availability of computing power (through both parallel computing and Moore's law) should result in the production, in the future, of an increasing flow of human-competitive results, as well as more intricate and impressive results", underlining added to emphasise that this author is talking about a future that is at least hypothetical. More than two decades ago, everything could point to the existence of strong artificial intelligence or even super intelligence. However, from our point of view, this does not serve to affirm that, in the present, these inventions created autonomously by machines already exist.

[31] José Luis González San Juan, "Inteligencia artificial y derechos de autor", in *FODERTICS 9.0: estudios sobre tecnologías disruptivas y justicia* (Comares 2021), p. 267.

[32] Paula Sáez Álvarez, "Autoría de patentes e inteligencia artificial", in *El derecho y la justicia ante la inteligencia artificial y otras tecnologías disruptivas* (Aranzadi, 2023), pp. 245-275.

and after analysing how DABUS works, we cannot affirm that the invention is conducted autonomously, as it depends on the data and processes that have been previously programmed by a human being.[33]

Nonetheless, while the DABUS system remains fully dependent on pre-programmed data and parameters and cannot be deemed autonomous in the keen sense, the outputs it generates may not be entirely foreseeable or predetermined by its creator. This element of unpredictability, albeit within the framework of narrow AI, raises relevant legal questions as to authorship, originality, and the threshold of human control.

In the same year that the patent application designating the DABUS artificial intelligence system as an inventor was accepted (2021), the Federal Court of Australia (single judge) ruled in favour of the Artificial Inventor Project, allowing DABUS to be listed as an inventor.[34] This decision was the first in the world to consider the inventor of an invention to be a machine and not a human being. As noted above, the Artificial Inventor Project created the DABUS system and has gone to various authorities to obtain a patent admitting the DABUS system as an inventor. Except for the South African Patent Registry, all other patent offices where patent applications for these inventions have been filed have refused to allow this possibility, which we will examine in the next section. However, regardless, this is the first court decision to rule positively on the matter, so it is worth considering it and the reasons given by the judge for his decision.

As a precedent for this ruling, Stephen Thaler filed a patent application with the Australian Patent Office (APO) for the food container mentioned above, appointing DABUS artificial intelligence system as the inventor. The APO refused this application to patent the inventions created by the DABUS artificial intelligence on the basis that a human inventor was not contemplated within the meaning of Section 15 of the Australian Patents Act 1990.[35] Stephen Thaler appealed against the APO's decision and, as a result, the legal proceedings were instituted, which led to the judgement that will be examined below.

The Federal Court of Australia (we insist that the judgment of this body that we are studying is that of a single judge, as opposed to the full house that resolves appeals, which we will examine later) structures its decision on two arguments: that artificial intelligence software can be an inventor and that there is confusion over the question of ownership and control of a patentable invention.

As to the first argument, the judge said that an artificial intelligence system could be considered an inventor for the Patents Act for three reasons. The court argued that "inventor" is an agent noun, which can refer to both persons and things—a grammatical

[33] This is also expressed in Concepción Sáiz García, "Inteligencia artificial y derecho de autor", in *Propiedad intelectual 2021* (Tirant lo Blanch 2021), p. 586: "The operation of AI technologies always depends on the training of one or more algorithms from the consumption of a huge amount of data (...) [which] are pre-existing works or other content. In many cases, the person responsible for the selection of this data is the human being himself. In the same terms, *vid*. José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59, who highlights the relevance of data by stating that "Data is the essential input for the operation of AI systems and, in particular, for machine and deep learning".

[34] *Stephen L. Thaler* [2021] APO 5; 162 IPR 381.

[35] Australian Patents Act 1990, s 15 "Who may be granted a patent? (1) Subject to this Act, a patent for an invention may only be granted to a person who: (a) is the inventor; or (b) would, on the grant of a patent for the invention, be entitled to have the patent assigned to the person; or (c) derives title to the invention from the inventor or a person mentioned in paragraph (b); or (d) is the legal representative of a deceased person mentioned in paragraph (a), (b) or (c). (2) A patent may be granted to a person whether or not he or she is an Australian citizen".

rather than a legal justification.[36] Regarding this first argument, we find it remarkable, to say the least, since we are dealing with a grammatical and not a legal reason for affirming that an artificial intelligence system can be an inventor. It does not seem reasonable to us that this is, moreover, the first argument on which the judge bases his decision since it does not seem to have sufficient "substance", at least from a legal point of view, to support a judicial decision.

Secondly, the judgment states that this assumption "reflects the reality in terms of many patentable inventions in which a human being cannot be said to be the inventor". About this second argument, it does not seem to us to be a reasonable argument to consider either, as far as we contend that such a "reality" does not reflect the current technological state. Certainly, artificial intelligence is getting better and will be able to develop more advanced technology. But neither does this demonstrate the fact that we are currently facing a reality in which artificial intelligence systems are constantly "creating" or "inventing" their initiative; rather, it is something residual and, to say the least, objectionable.

While it is true that the Artificial Inventor Project is convinced that its DABUS software creates, this claim is refutable. We cannot help but keep in mind that we are still in the presence of a "narrow" artificial intelligence, designed to perform a specific task. And, although we are dealing with an advanced connectionist system that shares certain features with neural models but does not operate based on deep learning techniques, we must not ignore the fact that it exists because of and from human creation. Its results, in the end, come from the data that humans include and are processed in a limited way based on what the human has programmed in his or her software.

Nevertheless, the Federal Court in this instance believed DABUS could be considered a semi-autonomous system, if not autonomous in the sense that the (human) programmer while setting the objective to be pursued by the artificial intelligence (in this case it would be to invent), was not involved in the choice of options to achieve that objective. Thus, the court understood that the software has the apparent autonomy in selecting data, within predefined parameters, as the system must search for and select the data to process. Based on this idea, the judge argued that we were not dealing with a simple "tool", but that the artificial intelligence functioned "more or less independently". However, we consider that at no point has it been proven that DABUS had such freedom, nor that it was the one that fed itself with the data it chose. Furthermore, it has previously been shown that being a deep learning system, it works with data that have been introduced (input) by human beings and whose choices are based, fundamentally, on given rules of probability and statistics, without this meaning that it has "freedom" to make decisions.

It is important to clarify that the Artificial Inventor Project does not claim that DABUS operates in complete independence from human input. Rather, the argument is that the system automates the core functions traditionally associated with inventorship—such as problem identification and solution generation—without direct human intervention during the inventive process itself. This position does not imply that DABUS is autonomous in a legal or cognitive sense, but rather that its role is functionally equivalent to that of a human inventor operating within a defined objective. However, we contend that at no

[36] In the resolution, "In this respect then, the word "inventor" is an agent noun. "Computer", "controller", "regulator", "distributor", "collector", "lawnmower" and "dishwasher" are all agent nouns. As each example demonstrates, the agent can be a person or a thing. Accordingly, if an artificial intelligence system is the agent which invents, it can be described as an 'inventor'".

point has it been demonstrated that the DABUS system possessed such freedom, nor that it autonomously acquired the data it processed. As previously clarified, although it is an advanced connectionist system, it does not operate as a deep learning model; it functions based on input provided by human agents, and its choices are essentially grounded in pre-established statistical rules—none of which can be equated with genuine decision-making freedom. While the comparison with corporate inventorship is suggestive—since employees also operate within objectives defined by others—it overlooks a decisive distinction. Human inventors, even under hierarchical or contractual constraints, retain cognitive autonomy, legal personality, and moral agency. In contrast, DABUS is a machine: it lacks the capacity for intentional decision-making, legal standing, and self-determination. This ontological and legal gap is essential and cannot be bridged by mere functional analogy.[37]

Third, the court argues that nothing in the Australian Patents Act 1990 compels the opposite conclusion, i.e., that artificial intelligence cannot be considered as an inventor. In this argument, we will offer two observations. The first is that this should have been the reason that could have justified the court's position in the first place since it is a legal argument. The second is to point out that the Australian Patents Act dates to 1990 and that, at that time, there was no reason to foresee how artificial intelligence would evolve and whether it would be conceived as it is today, more than 30 years later. Thus, it was clear that the act could not foresee the opposite of artificial intelligence being considered an inventor either. In this respect, the judge considers that unless the mentioned act requires it, outdated notions of the subject matter of a patentable invention are not determinative: "I do this to demonstrate that unless the Act demands it, outmoded notions of the agent that may invent and the subject matter of a patentable invention are not controlling". This is noteworthy, to say the least, as it relativises the relevance of the Australian law itself.

While it is true that the Federal Court notes that section 15 of the Patents Act refers to "person", it also recalls the Acts Interpretation Act 1901, section 2C (1), which states that "In any Act, expressions used to designate persons generally (such as "person", "party", "somebody", "anyone", "nobody", "one", "other" and "whoever"), include a body politic or company as well as an individual";[38] on which the court relied to consider that the law did not exclude the possibility of an artificial intelligence system being considered an inventor, on which we reiterate the ideas expressed above. In broad terms, the argument on which the court relies seems to us to be a poor one, insofar as section 15 of the Patents Act still refers to a "person" and, in any case, bearing in mind that section 2C (1) of the Acts Interpretation Act referred to by the court still has in mind, in our opinion, the concept of legal personality. It should also be noted that the act cited by the court is from 1901 and that the concept of "person" at that time did not contemplate non-human entities such as AI systems. Therefore, it does not seem to us that this argument can be applied in this case, given the context (early twentieth century) in which the law was adopted, to a case of topicality.

As analyzed, current legal frameworks do not allow an artificial intelligence system to be

[37] For example, under Spanish law, when an invention is created within the scope of an employment relationship, the rights to the patent may be attributed to the employer. However, the legal status of "inventor" is still reserved to the natural person who conceived the invention. This distinction is evident in Articles 15 and 17 of Law 24/2015, of 24 July, on Patents, which regulate ownership and use rights in favor of the employer, without ever attributing inventorship to the company. Articles 12 and 19 further confirm that the inventor must be identified as a natural person in the patent application.

[38] Acts Interpretation Act 1901, s 2C (1) "In any Act, expressions used to denote persons generally (such as "person", "party", "someone", "anyone", "no-one", "one", "another" and "whoever"), include a body politic or corporate as well as an individual".

recognized as an inventor.[39] However, this does not preclude the legal protection of AI-generated inventions. A legally consistent alternative—one that will be further explored below—would be to attribute inventorship to a legal person, such as a corporate entity created specifically for this purpose. This solution aligns with the requirement that the inventor be a person, either natural or legal, and reflects the current reality of narrow AI, where human oversight remains essential. Although the debate on granting legal personhood to artificial intelligence agents is ongoing, particularly in certain theoretical and policy-making contexts, it remains highly contested and has not been adopted by any binding legal framework. Accordingly, our analysis remains grounded in the current understanding of legal personality, which presupposes human or institutional agency.[40]

The second idea on which the judge bases his ruling is the question of ownership, in which the court distinguishes between who can have ownership of the patent and who is the inventor. In the first case, ownership corresponds to whoever has control over the patentable invention and over its rights. The court recognises that, on this point, only "a human or other legal person can be an owner, controller or patentee". In contrast, the court argues that "it is a fallacy to argue from this that an inventor can only be a human. An inventor may be an artificial intelligence system, but in such a circumstance could not be the owner, controller or patentee of the patentable invention".

The court considered that the DABUS system may be an "inventor" under section 15 of the Patents Act, for subsections (b) and (c) of that section. It is recalled that under subsection (b) of the section, a patent of the invention may be granted to who "would, on the grant of a patent for the invention, be entitled to have the patent assigned to the person (…); and, in the case of subsection (c), to who "derives title to the invention from the inventor or a person mentioned in paragraph (b)". So, as Stephen Thaler is the owner, programmer, and operator of DABUS, he is the owner of the invention; in this sense, ownership of the work of the artificial intelligence system is analogous "to the treatment of the fruits or crops produced by labour". While it is true that, following this argument, we recognise that the ownership of what is "produced" by the artificial intelligence system would belong to Thaler, we cannot claim that DABUS is the inventor. Clearly, who can be considered the inventor is one question, which cannot be the machine because it has no legal personality (not even because it is not a person), and who is entitled to own the patent is another, which, under this section 15 of the Patents Act, either letter (b) or (c), could be recognised to Mr Thaler.

In short, the court ruled that an artificial intelligence device could be recognised as an inventor, even though he may be neither the applicant nor the patentee, which is "consistent with the reality of the current technology. It is consistent with the Act. And it is consistent with promoting innovation" the court ruled.

Nevertheless, the Australian proceedings did not end there, as the Commissioner of Patents of the APO appealed the earlier judgment to the Federal Court of Australia (Full

[39] The analogy with corporate personhood, while frequently invoked, fails to recognize a fundamental distinction: corporations are recognized as legal persons through a structured legal framework that provides them with agency, representation and accountability mechanisms. By contrast, artificial intelligence systems lack not only legal standing, but also the normative infrastructure necessary to sustain personhood. Any recognition of AI as a legal person would require an explicit and unprecedented legislative act, which goes far beyond the interpretive flexibility afforded to legal fictions such as corporations.

[40] It is true that in some legal systems, certain entities without legal personality—such as an inheritance in Portugal or a "herencia yacente" in Spain—may temporarily hold rights or obligations. However, these are exceptional and transitional constructs that are tightly regulated and ultimately tied to natural or legal persons. They do not constitute a general model for recognizing the ownership of rights by non-personal entities such as AI systems. Extending such exceptional treatment to artificial intelligence would require a radical conceptual and legislative shift.

House), which ruled in favour of the decision taken by the APO and overturned the earlier judgment.[41] Consequently, DABUS would not be considered the inventor of the inventions for which a patent was sought. The arguments on which the Federal Court of Australia (Full House) based its decision are two, which are analysed below.

First, in Australia, when applying for a patent, it is necessary to prove the name of the inventor of the work referred to in the application. The APO did not accept the application filed by Thaler because the inventor's field was blank, and the applicant was given time to fill in the missing information. If the applicant does not follow the APO's order to complete the application with the required data within two months from the date of the order, the application lapses;[42] which is what happened in this case. According to the court, this is justified by the explanatory memorandum of the Patents Act 1990, which tells that the name of the inventor "is required to ensure that the entitlement of the applicant to be granted a patent is clear". In this sense, the court ruled that the details of the alleged invention for which a patent was sought should be stated in the application filed, including, among them, the name of the inventor: "The material particulars respecting an alleged invention for which a party seeks to obtain a patent, must, as has already been observed, be stated in the petition for the patent. The petition must therefore state that the petitioner is the inventor or importer of the invention, and that the invention possesses the qualities of novelty, utility, andc., so as to be the proper subject of a grant by patent".[43]

Secondly, on the question of whether artificial intelligence can be considered a "person" to qualify as an inventor, the court ruled that patent law provides that an invention arises "from the mind of a natural person or persons" so that the patent "rewards their ingenuity". As for section 15(b) and (c) of the Patents Act on which the previous judgment relied to grant the patent to the artificial intelligence system, the Federal Court of Australia (Full House) specified that "only a person with a legal personality could be the 'actual inventor' under this legislative scheme" (Patents Act and the Patents Regulations). On the other hand, the court acknowledges that until now it had not been possible to consider whether artificial intelligence could be an inventor, since the technology had not allowed this debate to arise, but that, even so, "the law to which we have referred has proceeded on the assumption that only a natural person could be an inventor". In support of this, the court brings up another earlier patent judgment whose arguments we consider key to understanding the difference between artificial intelligence and a human one: "The information is not "made" by *human action*. It is discerned". An artificial intelligence system can manufacture something, but that something is, in the end, caused by human action.

Before moving on to the next section of this paper, we will comment on the legal arguments of Lord Justice Birss, which appear to differ from those of his two colleagues in the Court Of Appeal (Civil Division): Lord Justice Arnold and Lady Justice Elisabeth Laing.[44] As in other procedures that we have seen and that we will study in this paper, the appeal arises from a decision made in the UK Intellectual Property Office (UKIPO hereafter) which denied the two patent applications designating DABUS as the inventor. The cause of rejection was Patents Act 1977, section 13(2) which states that "Unless he

[41] Commissioner of Patents v Thaler [2022] FCAFC 62.
[42] Patents Regulations 1991, reg 3.2C, s 5 (b): "The PCT application lapses if: (…) the applicant has not complied with the direction within 2 months of the date of the direction".
[43] Indeed, the novelty of the inventions is not at issue in the proceedings considered in this paper, as both inventions are "potentially patentable" in this respect, as stated in the judgment of the Court of Appeal (Civil Division) [2021] EWCA Civ 1374.
[44] Court of Appeal (Civil Division) [2021] EWCA Civ 1374.

has already given the Patent Office the information hereinafter mentioned, an applicant for a patent shall within the prescribed period file with the Patent Office a statement (a)identifying the person or persons whom he believes to be the inventor or inventors; and (b)where the applicant is not the sole inventor or the applicants are not the joint inventors, indicating the derivation of his or their right to be granted the patent; and, if he fails to do so, the application shall be taken to be withdrawn". The UKIPO considered that this requirement was not successfully completed, therefore, both applications were withdrawn.

Although some authors have pointed out that the decision taken by the Court of Appeal on 21 September 2021 was not unanimous,[45] since Lord Justice Birss, seemed to support recognizing DABUS as the inventor, this interpretation does not clearly appear from the judgment itself. It is true, however, that "there [was] no suggestion that Dr Thaler [had] done anything other than complete it fully and honestly". This divergence of judicial opinion illustrates the uncertainty and fragmentation that still characterize international responses to AI-generated inventions.

In any case, the above rejection of DABUS was finally confirmed by the UK Supreme Court in its judgment of 20 December 2023[46], in which it held that only natural persons can be appointed as inventors under the Patents Act 1977. The decision upheld in full the Court of Appeal's judgment and rejected the argument that the owner of an artificial intelligence system can be considered an inventor in a legal sense, even if the artificial intelligence system has generated the invention autonomously.

3.2. ARGUMENTS AGAINST RECOGNISING DABUS AS INVENTOR

As we have already mentioned, Stephen Thaler had filed patent applications in different countries for the "inventor" DABUS. To this day, there are three final judgments that have denied the possibility of recognising an artificial intelligence system as an inventor: one in Australia, discussed in the earlier section; another in the United States, and a third in Taiwan, both of which will be analysed below. In addition to these rulings, relevant positions have also emerged in other jurisdictions—such as New Zealand and Canada—which will be briefly addressed.

First, when Stephen Thaler applied for the patent for the food container and for the attention-getting device in which DABUS was listed as the inventor, the United States Patent and Trademark Office's (USPTO hereafter) rejected these applications because the machine (artificial intelligence system) could not be considered an inventor. Thaler appealed the decision, but the United States Court of Appeals for the Federal Circuit upheld the USPTO's decision on the grounds on which we will comment briefly.[47]

Once again, the ruling raised the question of whether an artificial intelligence system can qualify as an inventor under U.S. patent law. Specifically, whether an artificial intelligence software system could be an inventor. In this regard, in his appeal before the United States Court of Appeals for the Federal Circuit, Thaler challenged the USPTO's decision by arguing that the term "inventor" under the Patent Act should be interpreted broadly—

[45] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59.
[46] Thaler v Comptroller General of Patents, Designs and Trade Marks, [2023] UKSC 49.
[47] *Thaler v Vidal*, [2022] Appeal No. 2021-2347 (Fed. Cir.).

specifically, that the use of the word "whoever" in the statute could encompass artificial intelligence systems.[48] Nonetheless, the Court of Appeals was enlightening in this regard, ruling that the Patent Act requires inventors to be natural persons, i.e., human beings: "there is no ambiguity: the Patent Act requires that inventors must be natural persons; that is, human beings". "The term "inventor" means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention", as in Section 35 U.S.C. 100 Definitions, (f).

On the term "individual", the court also pronounced that, although the Patent Act does not define this term (which is also not its scope), the U.S. Supreme Court has interpreted the term "individual" to mean a natural person: the Court reaffirmed the ordinary legal interpretation of "individual" as a human being, citing previous Supreme Court rulings, meaning in this respect "as we use the word in everyday language".[49]

The second argument on which Thaler based his appeal was that artificial intelligence software programs should be considered inventors because otherwise, patentability would depend on "the manner in which the invention was made", which would contravene 35 U.S.C. Section 103.[50] In addition, the court considered that section 103 does not deal with inventorship and that the part of the provision referring to "Patentability shall not be denied on the basis of the manner in which the invention was made" refers to the fact that the "flash of creative genius" was unnecessary for patentability. Furthermore, the court states that section 103 refers to how an invention is made and does not override a provision specifically regulating who can be an inventor.

The third argument relied upon by the appellant was that the term "inventor" should be interpreted considering the "context in which that language is used". On this, the court simply confirmed that inventors must be human beings.[51]

In addition to the above, the US Court of Appeals for the Federal Circuit rejected the arguments of the appeal presented by Thales on an administrative ground; since, in the US, to file a patent application, the inventor must file an oath or a declaration certifying that he or she believes that he or she is the original inventor of the claimed invention. The court states: "Although we do not decide whether an artificial intelligence system can formulate or hold beliefs, nothing in our record shows that it can, as reflected by the fact that Thaler himself submitted the required declarations, purportedly on behalf of DABUS". This position was reiterated in similar terms elsewhere in the ruling: "While we do not decide whether an AI system can form beliefs, nothing in our record shows that one can, as reflected in the fact that Thaler submitted the requisite statements himself, purportedly on DABUS" behalf".

The same idea was expressed in New Zealand, where the DABUS case was initially

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[48] The Patent Act of the United States defines an inventor in section 100(f) as "the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention." The term "whoever" appears in 35 U.S. Code, section 101: "[*w*]*hoever invents or discovers* (…)"; and s, 207 constantly repeats the use of the term "whoever" to refer to companies and other "legal persons". Thaler's argument rests on interpreting "whoever" as broad enough to include non-human agents such as AI systems.

[49] *Mohamad v Palestinian Auth.* [2012] 566 U.S. 449, 454.

[50] 35 U.S.C., s 103: "A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 , if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made".

[51] In doing so, they relied on the following precedents: *Univ. of Utah v Max-Planck-Gesellschaft zur Forderung der Wissenschaften E.V.*, [2013] 734 F.3d 1315, 1323 (Fed. Cir.) and *Beech Aircraft Corp. v EDO Corp.*, [1993] 990 F.2d 1237, 1248 (Fed. Cir.) in which it was ruled that only natural persons could be inventors.

examined by the Intellectual Property Office (IPONZ), which issued a refusal decision on 31 January 2022, finding the patent application invalid for failure to write down a human inventor, as required by national law.

Thaler's project appealed this decision in court, resulting in a High Court decision in 2023, which upheld the administrative rejection in full. The court held that New Zealand law, like that of many other authorities, does not provide for an artificial intelligence system to be considered an inventor, either directly or by representation. This decision reinforces the uniform interpretation among common law systems, where inventive authorship is still necessarily associated with the human condition.

Finally, within the Common law block of legal systems, the case of Canada also stands out, whose federal legislation on industrial property is based on the common law model, despite the influence of Civil law in some provinces such as Quebec. In this context, the application filed by the Artificial Inventor Project was rejected by the Canadian Intellectual Property Office (CIPO) through a Notice of Non-Compliance issued on 8 November 2021.

In that ruling, CIPO noted that the Patent Act require that every patent application include the designation of a human inventor. In that decision, CIPO pointed out that the Patent Act requires that every patent application be filed by the inventor or his legal representative[52] and that the Patent Rules require that the inventor be identified by name and address and expressly state his entitlement to apply for the patent[53].

Thaler responded by invoking the principle of accession, arguing that, as the owner of the DABUS system, he should be considered the rightful owner of the inventions generated by it, in the same way that a farmer owns the fruit produced by his tree. However, this interpretation was rejected by the Canadian office, which considered that the current rules do not allow the concept of inventor to be extended beyond natural persons. Thus, the Canadian case is in line with the majority doctrine and underlines the impossibility of replacing the requirement of human authorship by an ownership relationship with the generating system.

As for Taiwan, the Supreme Administrative Court, we find two judgments concerning the two patent application proceedings that were filed by Thaler for the food container and the attention-getting device. In the first of these judgments,[54] concerning the latter invention, the Taiwanese Supreme Administrative Court considered as valid the arguments expressed in the first instance, which set up that creation is defined as the result of human intellectual activity. In this sense, the Supreme Administrative Court insists that the inventor can only be a person who "has substantially contributed to the spiritual creation (...) [of] the subject matter of the patent application" and stresses that DABUS is not a natural person, nor does it have legal personality. The court relies on the Manual of Patent Examining Procedure of the United States Patent and Trademark Office, whose section 2138.04 defines invention as "the complete performance of the mental part of the inventive act" and as "the complete performance of the mental part of the inventive act" and it is "the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied

[52] *Patent Act* (R.S.C., 1985, c. P-4), sec. 27(2): "The prescribed application fee must be paid and the application must be filed in accordance with the regulations by the inventor or the inventor's legal representative and the application must contain a petition and a specification of the invention."
[53] *Patent Rules* (SOR/2019-251), sec. 54: "The application must indicate the name and postal address of each inventor […] and contain a statement to the effect that the applicant is entitled to apply for a patent."
[54] Supreme Administrative Court Judgment, [2022] Court case No. 111 appeal No. 55.

in practice….";[55] by referring with the concepts "mental" and "mind" to aspects solely related to the human mind. In addition, the application had to hold the name and nationality of the inventor, which is an expression of the right of personality, and the court therefore concluded that the inventor must be a natural person. As a result, the appellant, Stephen Thaler, was adjudicated against, so his application listing DABUS as the inventor was not accepted.

On the judgment which ruled on the food container proceedings,[56] the scheme is remarkably like the earlier one, so we will only focus on what complements the earlier one so that the arguments used by the Taiwanese court are not reiterative. This ruling highlights Article 16.2 of the Enforcement Rules of the Patent Act, which states that "When filing an application for a patent for invention, the application form shall specify the following elements: (...) name and nationality of the inventor."[57] While the court acknowledges that this provision does not refer to a natural person, it does argue that the inventor can be the patent applicant or apply for the patent through a representative; and that this right of representation is a personality right, which means that the inventor can only be a natural person, which DABUS is not.

Outside the European and Common law spheres, the Brazilian legal system has also expressed its opposition to the possibility of recognising an artificial intelligence as an inventor, even from a purely formal perspective. Brazil's Instituto Nacional da Propriedade Industrial (INPI) issued a technical opinion in August 2022 in which it concluded that it is not possible to accept patent applications in which an artificial intelligence system is listed as an inventor. The agency based its position on the Brazilian legal requirement that the inventor must be a natural person, according to article 6 of the Industrial Property Law[58]. Although the pronouncement did not derive from a court decision or a contentious procedure, it forms an official administrative statement that anticipates the position of the Brazilian legal system in the face of possible similar applications. This opinion places Brazil in line with those countries that, from a formal perspective, reject the possibility of recognising an artificial intelligence as a subject with inventive ability for the purposes of patent registration.

The legal arguments against DABUS's inventorship raise deeper conceptual questions. One of them is the very purpose of recognising an artificial intelligence system as an inventor—and whether such recognition implies legal consequences.

4. INVENTORSHIP AND LEGAL PERSONALITY IN PATENT LAW: THE CASE FOR AND AGAINST AI

One of the central questions arising from the preceding analysis is the purpose of recognising an AI system as an inventor and, by extension, as the holder of rights derived from such inventions.

[55] *Townsend v Smith*, [1929] 36 F.2d 292, 295 (4 USPQ 269, 271 CCPA).
[56] Supreme Administrative Court Judgment, [2022] Court case No. 110 appeal No. 813.
[57] Enforcement Rules of the Patent Act, s 16.2: "When filing a patent application for invention, the application form shall specify the following items: 2. name and nationality of the inventor".
[58] *Lei da Propriedade Industrial* (Lei n.º 9.279/1996), art. 6.º: "Ao autor de invenção ou modelo de utilidade será assegurado o direito de obter a patente que lhe garanta a propriedade, nas condições estabelecidas nesta Lei."

Although the Artificial Inventor Project explicitly maintains that it does not seek legal personhood for AI systems, the act of designating DABUS as the inventor necessarily prompts a deeper reflection. This article argues that such designation—if accepted—would constitute a first step toward granting artificial intelligence systems a form of functional legal recognition, at least in the limited context of inventorship. While this does not imply ownership or full legal ability, it would stand for a symbolic and conceptual shift in the definition of legal subjectivity under patent law.

Even though legal frameworks already allow for the attribution of ownership to legal people, the Artificial Inventor Project opted to name DABUS as the inventor to reflect the system's actual role in the inventive process—without asserting legal personality or ownership rights for the AI itself.

In addition to the natural person inventor, we must not forget the legal person inventor.[59] Many patented inventions today are the result of collaborative research conducted within organizations, where inventorship is attributed to individual employees while ownership is often vested in the employing company, as, unfortunately, the investment, and sometimes even the cost involved in research is extremely high.[60] Thus, protection through patents does not necessarily require the inventor to be a natural person acting independently.

From a different point of view, some scholars have expressed concern whether companies using AI systems might be discouraged from investing in new inventions because of such court rulings that do not provide the desired "protection" through patents. However, these companies can avail themselves of the legal protection afforded by a patent, albeit in a separate way to that sought, for example, through a legal entity.[61]

As discussed in this paper, the Artificial Inventor Project's stated goal was to secure patents for inventions generated by AI systems, while ensuring full transparency about how those inventions were developed. To achieve this, it designated DABUS as the inventor in the application forms—not to establish legal personhood or rights for the AI system, but to accurately reflect the inventive process. This shift in focus—away from protecting the outcome and toward redefining the concept of inventorship—poses profound challenges to existing legal definitions and doctrinal assumptions. The DABUS case has fuelled the debate on whether (and how) intellectual property law should adapt to the growing influence of artificial intelligence; indeed, this is one of the aims of the Artificial Inventor Project.[62]

Some scholars advocate for a regulatory overhaul that would explicitly include AI-

[59] Although ownership of the patent may be vested in a legal person, most jurisdictions require that inventorship be attributed to a natural person. Legal persons (such as corporations or institutions) may hold rights derived from the invention but are not considered inventors in a legal sense.

[60] Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 157, nota al pie número 54, states that "*el mayor porcentaje de inventos son realizadas [sic] en el marco de una relación de empleo o de servicios, y siendo esto así tales inventos pertenecen o son asumibles por el empleador*"; "the largest percentage of inventions are made within the framework of an employment or service relationship, and being so, such inventions belong to or can be borne by the employer". For more information on this issue, *vid*. Rosalía Estupiñán Cáceres, "Luces y sombras en la reciente regulación española de las 'invenciones realizadas en el marco de una relación de empleo o de servicios'" [2015] 18 *La Ley mercantil*.

[61] Trevor Ward, "DABUS, and Artificial Intelligence Machine, Invented Something New and Useful, but the USPTO Is Not Buying It" [2023] 75(1) *Me. L. Rev*. 72, p. 74; VENÂNCIO, P. D., «Questões em torno da relação entre Patentes & Sistemas de Inteligência Artificial», [2023] 17(2) *UL-P Law Review* 49, p. 56.

[62] Its website states that the mission of the Artificial Inventor project "is intended to promote dialogue about the social, economic, and legal impact of frontier technologies such as AI and to generate stakeholder guidance on the protectability of AI-generated output".

generated inventions within the scope of patent law.[63] Nevertheless, this article takes the view that legislative reform is not currently warranted, given the technical limitations of present-day AI systems, which still function as human-dependent tools, which does not rule out the possibility of changes in the future.[64]

We share the opinion expressed in the judgment of the Federal Court of Australia (Full House),[65] that the debate on the inventorship of artificial intelligence is already present in our society. We believe that technological advances are improving day by day and could eventually lead to a "general" artificial intelligence, capable of developing processes like those of humans. The question then is to consider the ownership of the rights of these possible artificial intelligence systems.

Under the above, it is worth considering the arguments used by the Artificial Inventor Project itself to defend that inventions created by an artificial intelligence system belong to the artificial intelligence system alone. The notion of "autonomy" in this context refers not to full independence or legal agency, but to the system's ability to execute the inventive process without human guidance at the operational stage. The design, training and input data remain the result of human activity, and any form of autonomy must be understood within these technical and legal constraints.

The first reason reflects the idea that while it is true that current patent laws only consider people as inventors, this makes sense only as far as patent laws generally date back decades before the invention or development of artificial intelligence as we think of it today (or will be in the future). Thus, many patent laws were drafted long before the emergence of advanced AI and therefore make no explicit provision for or against non-human inventorship. They add that the law does not expressly exclude the possibility to accept patents for an artificial intelligence system. It should be noted, however, that the Artificial Inventor Project's position focuses on accurate disclosure of the AI's contribution to the inventive process—not on granting legal standing to the system.

From our point of view, we have discussed in this paper that, while it is true that the laws do not expressly deny software as an inventor, the judgments that have interpreted them currently do so. Moreover, the fact that something is not expressly provided for or excluded in a legal rule does not mean that it is implicitly included. It is also recalled, and in another order of similar legal rules, that the European Patent Convention (EPC

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[63] Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 146. On the other hand, Montiano Monteagudo Monedero, Francisco Javier García Pérez, "¿Puede la inteligencia artificial desarrollar una invención patentable?", [2020] *Actualidad jurídica Aranzadi* 959, state that "*es necesario un debate profundo y una homogenización de criterios a nivel internacional que permitan definir con mayor claridad el concepto de inventor en los supuestos de intervención autónoma de una inteligencia artificial. En efecto, el avance de la tecnología, sumado a los diferentes (y menguantes) niveles de intervención humana en el proceso de innovación desarrollado mediante sistemas de inteligencia artificial (propietario, desarrollador, programador, controlador, etc.), hace que se torne imprescindible sentar las bases de un nuevo marco regulatorio uniforme que resuelva todas las incógnitas legales que presenta este particular tipo de invenciones*"; "There is a need for an in-depth debate and a homogenisation of criteria, at international level, to define more clearly the concept of inventor in cases of autonomous intervention by an artificial intelligence. Indeed, the advance of technology, added to the different (and decreasing) levels of human intervention in the innovation process developed through artificial intelligence systems (owner, developer, programmer, controller, etc.), makes it essential to lay the foundations of a new uniform regulatory framework that resolves all the legal unknowns presented by this particular type of inventions".

[64] We therefore share the opinion of José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59, by stating: "*La atribución de la condición de inventor a un ente sin personalidad jurídica, esto es, un sistema de IA, supuestamente "autónomo" o con cierta "autonomía" e independiente, y sin posibilidad de ser titular de derechos y obligaciones, requeriría una profunda reformulación de los marcos vigentes*"; "The attribution of inventor status to an entity without legal personality, i.e. an AI system, supposedly "autonomous" or with a certain "autonomy" and independence, and without the possibility of being a holder of rights and obligations, would require a profound reformulation of the existing frameworks".

[65] Commissioner of Patents v Thaler [2022] (FCAFC 62).

hereafter) explicitly regulates in Articles 58 to 62 the issues relating to the persons entitled to apply for and obtain European patents, as well as the regulation relating to the designation of the inventor, which only contemplates a natural person. Similarly, Rule 17.1 of the EPC states that "The designation of the inventor shall be made in the application for the grant of the European patent. However, if the applicant is not the inventor or the sole inventor, this designation shall be made in a separately filed document, which shall contain the full name and address of the inventor, the declaration referred to in Article 81 and the signature of the applicant or his representative". Thus, it is still the prevailing interpretation that the notion of inventor, under current European patent law, is inherently tied to the concept of a natural or legal person.

The position of the European system has recently been reinforced by a key decision at national level: the decision of the German Federal Court of Justice (Bundesgerichtshof) of 11 June 2024[66], which confirms that only a natural person can be listed as an inventor under German patent law. The case also concerned the DABUS system and its designation as inventor. While the judgment admits that the intervention of an artificial intelligence in the inventive process can be mentioned, it tells that the legally recognised inventor must be a natural person whose contribution has been decisive in the configuration of the system[67]. Thus, the Court considers that it is not sufficient to declare that the system has generated an invention autonomously, but that a human subject must be identified who has exerted a significant technical influence on that result. This decision reinforces the line of interpretation followed by the European Patent Office and limits the possibility of opening exceptions to the requirement of human authorship in the European framework.

A distinct concern raised in academic debates —though not articulated by the Artificial Inventor Project itself— is the potential long-term opacity surrounding AI-generated inventions. Unlike human inventors, AI systems do not have a natural lifespan, which raises hypothetical questions about the administration of disclosure, expiry, and access to inventions. If no clear rules are established regarding the attribution of inventorship, some argue, AI-generated inventions might escape the safeguards of the patent system. However, such concerns remain speculative, and the time-limited nature of patent protection continues to apply regardless of the inventor's identity.

We would like to make two reflections on this argument. Firstly, an invention created by a person, once that person dies, is not lost but enters the public domain. It is not necessary to "wait" for the person to die, as patents have limited duration. Secondly, the usefulness of an "infinite patent" is highly debatable from a legal and practical standpoint. A patent, *per se*, grants a time-limited right of exploitation. If the Artificial Inventor Project intends to obtain a patent that is not limited in time, we would not be dealing with a patent. Furthermore, we question the usefulness of the above. While it is understandable that a company would like to have an exclusive right to exploit a product unlimited in time for its benefit, this does not fit in with the *philosophy* of this Artificial Inventor Project which, precisely, presumes that the inventions obtained by artificial intelligence "benefit society as a whole", since more inventions are obtained for the same society.[68]

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[66] German BGH, 11.06.2024, X ZB 5/22 – DABUS.

[67] In the same way, *vid*. VENÂNCIO, P. D., «Questões em torno da relação entre Patentes & Sistemas de Inteligência Artificial», [2023] 17(2) *UL-P Law Review*, p. 49; PEIXOTO, S., «O requisito da atividade inventiva da invenção patenteável e as invenções geradas por inteligência artificial», Mestrado, Universidade do Minho, Braga, 2022, p. 86.

[68] "An underlying principle of patent law is that is seeks to entice inventors and owners of inventions to disclose their inventions, which ultimately benefits society as a whole", vid. Ryan Abbott, "Should an AI system be listed as an inventor?" [2019] The Artificial Inventor Project.

In this connection, we would like to mention again the judgment of the United States Court of Appeals for the Federal Circuit,[69] in which Thaler argued that inventions created by an artificial intelligence system should be patentable to encourage "innovation and public disclosure". However, the court found these arguments to be "political" and "speculative" in nature, a position we agree with, as they were not based on legal grounds, but on a promotional and eye-catching message aimed at drawing attention to their product.

In a similar vein, one of the arguments on which the decision of the Federal Court of Australia was based was precisely that it was "In my view it is consistent with the object of the Act to construe the term 'inventor' in a manner that promotes technological innovation and the publication and dissemination of such innovation by rewarding it, irrespective of whether the innovation is made by a human or not". Furthermore, the court considered that the improvement in computing would encourage the development of better systems and greater creativity, which would lead to new scientific advantages. However, we contrast this idea—which we consider positive and aligned with the progress of the ongoing Technological Revolution 4.0—with the stance taken by the Artificial Inventor Project, which, as discussed above, seeks to retain patent rights in perpetuity through the attribution of inventorship to an AI system.

The second reason used by the Artificial Inventor Project can be seen in the appeal lodged by Thaler against the decision of the Australian Patents Office, explaining that the owner of a patent can also be "whoever derives ownership of the invention from the inventor (...)".[70] It is recalled that, in response to this argument, the Australian Federal Court (Full House) held that this provision only referred to natural or legal persons. In addition, the Federal Court's judgment said the following: "Dr Thaler is the copyright owner of the DABUS source code. He is also the owner of and responsible for the computer on which DABUS runs. But Dr Thaler is not the inventor of the alleged invention that is the subject of the application. The inventor is named in the application as "DABUS, the invention was autonomously generated by an artificial intelligence". Thus, DABUS is not a natural or legal person. DABUS is an artificial intelligence system incorporating artificial neural networks. Therefore, it cannot be considered as an inventor.

Nevertheless, this argument has also been used by Stephen Thaler concerning article 60.1 of the EPC, which states that "The right to a European patent belongs to the inventor or his successors in title (...)"; arguing that some legislations leave the "door open" as to who should be the owner of the rights. Therefore, they argue that "Thus, patent laws already provide for the rights in an invention to vest with someone else in place of the inventor (…)There is, therefore, in our view no prohibition to the naming of an AI system as an inventor or to the patenting of an invention made by an AI system that could be based on the provisions of ownership of that invention".[71] However, we do not share this opinion, since the provision refers to the inventor (who, as has already been argued, must be a natural or legal person) or to his successors in title, i.e., his heirs, who must also be natural or legal persons. Furthermore, Stephen Thaler, although an applicant for the patent, cannot be considered a successor in title to DABUS because DABUS is an artificial intelligence system, without legal personality, which means that they are not holders of rights which, therefore, cannot be transferred. The doctrine pronounces this article on the understanding that it creates "legal fictions" intending to

[69] *Thaler v Vidal*, [2022] Appeal No. 2021-2347 (Fed. Cir.).
[70] Australian Patents Act 1990, s 15 (b).
[71] Ryan Abbott, "Should an AI system be listed as an inventor?" [2019] *The Artificial Inventor Project*.

attribute the benefits of the legal protection of the patent to a third party, other than its author, but always assuming that there is a human being behind it.[72]

Patents applied for by Thaler appointing DABUS as inventor were also filed with the European Patent Office (EPO). However, as in the earlier cases (except for South Africa), they were rejected. The Artificial Inventor Project appealed the decision of the European Patent Office, and a procedure was conducted which went on appeal to the Legal Board of Appeal of the EPO (Legal Board of Appeal). This body, again, ruled on whether an inventor could be an entity other than a natural or legal person.[73] According to article 81 EPC, "The European patent application shall designate the inventor. If the applicant is not the inventor or is not the sole inventor, the designation shall contain a statement indicating the origin of the right to the European patent". The above provision relates to Rules 20 and 21 of the EPC on the registration of patent rights, from which it follows that the designation of the inventor is a "mandatory requirement" and that the inventor is to be understood in its ordinary terms, i.e., as a person.

We find it particularly relevant in this resolution that a more flexible approach or an "evolutive reading" of the concept of "inventor" is envisaged, taking the Vienna Convention on the Law of Treaties 1969 as a basis. Thus, practices or agreements after those in the context in which the 1969 Convention was adopted could be considered within this term. The purpose of the regulations on the inventor is to protect his rights, ease the enforcement of claims for compensation and show a legal basis for entitlement to a patent application. However, this body concludes that appointing the machine without legal ability (personality) does not serve any of these purposes so that no other interpretation of the concept of "inventor" could be given.

At present, as we have analysed, there is no place for an artificial intelligence system to be considered an inventor. However, the value of an invention should not be discredited either and it should be recognised as legally protected. Therefore, the most proper possibility is to name the inventor as a legal person; in this specific case, the Artificial Inventor Project.[74]
Concerning the above, we would like to highlight a judgment of the Shenzhen District

[72] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59.
[73] J 0008/20 (Designation of inventor/DABUS) of 21.12.2021.
[74] While it might be interesting to have inventions in the public domain, this would not, in our opinion, fit in with the very purpose of patents, which grants an exclusive right to an invention. Patents offer temporary protection, seeking to reward the investment in such an invention. In the same opinion, *vid*. Esperanza Gallego Sánchez, "La patentabilidad de la inteligencia artificial. Otros sistemas de protección", in *Revolución digital, derecho mercantil y Token economía* (Tecnos 2019), p. 264; Rosalía Estupiñán Cáceres, "El futuro del derecho de patentes ante el imparable avance en inteligencia artificial" [2022] 78 *Cuadernos de derecho y comercio* 143, p. 157.
See in this regard, Alberto Bercovitz Rodríguez Cano, Apuntes de Derecho Mercantil. Derecho Mercantil, Derecho de la Competencia y Propiedad Industrial (Thomson Reuters Aranzadi, 2019), p. 474: "Si la patente no existiera, sería difícil que ningún empresario invirtiera en investigación. La razón es evidente. Si después de hacer gastos cuantiosos en investigación se obtiene un invento, y cualquier competidor puede copiarlo y explotarlo en el mercado, entonces no habría empresario que estuviera interesado en hacer esa inversión en investigación, porque al final su posición en el mercado sería peor que la del competidor que le copia. (…) [Éste] no tiene que amortizar gastos de investigación, por lo cual puede ofrecer su producto más barato. Por el contrario, quien ha tenido que financiar la investigación tiene que amortizar esos gastos, y si no tiene el derecho exclusivo de explotación, tendría que vender el producto más caro que su competidor"; "If the patent did not exist, it would be difficult for any entrepreneur to invest in research. The reason is obvious. If, after spending a lot of money on research, an invention is obtained, and any competitor can copy it and exploit it in the market, then there would be no entrepreneur who would be interested in making that investment in research, because, in the end, his position in the market would be worse than that of the competitor who copies him. (...) [The latter] does not have to amortise research costs, so he can offer his product more cheaply. On the contrary, the one who has had to finance the research has to amortise those expenses, and if he does not have the exclusive right of exploitation, he would have to sell the product more expensively than his competitor"; which would have no future in the market.

People's Court (Guangdong, China). For some authors,[75] this ruling has led them to claim that "there are already some isolated rulings at the international level that recognise the protection of intellectual creations conducted by intelligent systems". Nevertheless, looking at this judgement, we can appreciate that it is about granting a patent to a company which, effectively, uses an artificial intelligence system as a tool. As context, we will simply say that the company Tencent, a multinational company resolute among other activities (technology development, artificial intelligence) to advertising in China, uses an artificial intelligence system to develop its activity. In this advertising business, the company has created an artificial intelligence system, a software called Dreamwriter, which "writes" articles. The controversy was that information from a report published on Tencent's website "signed" by Dreamwriter was copied by the company Shanghai Yingxun. The Guangdong Shenzhen Nanshan District People's Court settled this dispute[76] which, while recognising that there was plagiarism, acknowledged that a copyright holder is a legal person; that is, the work team "including the editorial team, the product team and the software technology development team".[77] The procedure explained how this software worked: first, it created a database that collects information, analyses, and combines it; second, it checks the databases and proceeds to draft the text; third, it reviews and corrects the text; and fourth and finally, it publishes it. In the steps described above, Tencent explained that members of the creative team collaborated at all stages of this procedure.[78] Therefore, we should not merely understand that rights were granted to the artificial intelligence system, but to the legal person that was the whole team, since the Dreamwriter software did not have (and does not have) legal personality.

This could be the most realistic solution to what the Artificial Inventor Project is pursuing. Current legislation continues to advocate a conception of the inventor as a person, whether natural or legal. This solution may not satisfy this Project, but, to date, we are still operating within the framework of narrow artificial intelligence, where human input remains indispensable, where human (or, generally, a group of them) continues to have (or share) the leading role in the invention.[79]

Other authors consider, however, that at some point in time, patent ownership and rights should be granted to artificial intelligence systems. However, from our point of view, we question whether it is proper to grant these rights and thus these powers to systems that do not have legal personality. [80]

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[75] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59.

[76] Guangdong Shenzhen Nanshan District People's Court Civil Judgment [2019] Yue 0305 MinChu No. 14010 [广东省深圳市南山区人民法院 民事判决书 (2019) 粤0305民初14010号] (first instance).

[77] In the end, Shanghai Yingxun was fined 1,500 yuan (less than 200 euros, approximately).

[78] Ju Yoen Lee, "Artificial Intelligence Cases in China: Feilin v. Baidu and Tencent Shenzhen v. Shanghai Yingxin" [2021] 1 *China & WTO Review* 211, p. 215.

[79] José Manuel Muñoz Vela, "Inteligencia artificial y Cuestiones de propiedad intelectual e industrial" [2022] *Revista Aranzadi de derecho y nuevas tecnologías* 59, states that "a mi juicio, la solución más adecuada, cuando resulte aplicable, será la asociación a la persona física o jurídica detrás del proceso inventivo, considerando al sistema el medio o instrumento creativo utilizado para generar la invención, lo que seguirá sin dar una solución adecuada a las supuestas invenciones por parte de sistemas inteligentes sin intervención humana"; "in my view, the most appropriate solution, where applicable, will be the association with the natural or legal person behind the inventive process, considering the system as the creative means or instrument used to generate the invention, which will still not provide an adequate solution to alleged inventions by intelligent systems without human intervention".

[80] José Luis González San Juan, "Inteligencia artificial y derechos de autor", in *FODERTICS 9.0: estudios sobre tecnologías disruptivas y justicia* (Comares 2021), p. 263.

CONCLUSIONS

The legal analysis of the DABUS case across multiple authorities reveals a fundamental tension in current patent law: while AI systems increasingly contribute to inventive activity, they are still excluded from legal recognition as inventors.

The AI system Device for the Autonomous Bootstrapping of Unified Sentience or DABUS falls into the group of "narrow" artificial intelligence, although advanced concerning the machine learning branch; so, we are dealing with a connectionist system that shares certain features with deep learning, but does not follow its typical mechanisms, such as large-scale supervised training or backpropagation. However, despite being an advance over other machine learning or autonomous learning systems, we must not forget that we are still dealing with "weak" artificial intelligence software, dependent on human beings for its operation.

The Artificial Inventor Project, which developed DABUS, argues that the system should be recognised as the inventor of the inventions it has generated. To that end, the Project has filed patent applications in various jurisdictions naming DABUS as inventor. The only patent granted so far has been in South Africa, a jurisdiction where patent applications are subject only to formal, not substantive, examination. Other patent offices—including those of Australia, the United Kingdom, the United States, Taiwan, the European Patent Office, as well as New Zealand and Canada—have rejected the applications on the grounds that the inventor must be a natural person.

At present, AI systems are not recognised as legal persons and therefore lack the ability to hold or transfer rights. This raises the broader legal question of whether, and under what conditions, such systems could be granted formal recognition as contributors to inventive activity. Given the current technological state of AI, which is still non-autonomous and tool-like, this article takes the view that legal inventorship should not yet be extended to artificial intelligence systems.

A pragmatic interim solution is to attribute the rights derived from AI-generated inventions to a legal person—such as the human operator, developer, or an institutional entity like the Artificial Inventor Project. While this resolves the issue of ownership and legal protection, it does not fully address the conceptual debate about attribution and the recognition of non-human inventive agency.

While this paper advances an interpretative thesis on the legal implications of recognizing AI systems as inventors, it does not claim that current case law endorses such recognition. Rather, it argues that the procedural challenges and judicial reasoning in recent cases reveal the need for a conceptual reassessment of inventorship in the age of machine-generated innovation.

The comparative analysis of court rulings in South Africa, Australia, the UK, the US, and Taiwan confirms that existing patent systems uniformly require inventors to be natural persons. Yet these rulings also expose growing tensions in the traditional legal framework when confronted with AI-generated inventions. While this paper does not advocate immediate reform, it calls for a broader, interdisciplinary discussion on whether and how patent law should adapt to the emergence of increasingly autonomous technologies, without compromising the conceptual foundations of inventorship.

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