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PATENTABILITY OF AI-GENERATED INVENTIONS: CAN AI BE RECOGNIZED AS AN INVENTOR?

Punya Rai

Advocate

Abstract

"Recent developments in generative AI have brought into question ideas in patent law thought to be settled. The principal question is whether an artificial intelligence system—acting alone or with a modicum of human involvement—can be treated as an "inventor" under national laws, and international treaties. This article explores the legal, textual, and policy implications of the "AI inventor" question through case law across jurisdictions, and considers how statutes might be construed or modified in response. It argues that while history has tied inventorship to natural persons, that associational approach has practical and moral implications, including disincentives or evidentiary challenges for inventors. The article outlines specific legislative and doctrinal reforms to clarify what role human involvement may be required, and to establish temporary measures to assign rights when AI complies without humans. The goal is to navigate longer-term legal stability while enabling patent law to be a responsive legal framework capable of adapting to changes in technology over time."

Keywords: artificial intelligence, inventorship, patent law, DABUS, intellectual property reform, innovation policy.

Introduction

In return for a limited time of exclusivity for the inventor who discloses the new and non-obvious useful advance in the technology, patent law operates on a widely accepted quid pro quo principle, i.e., society receives enabling disclosure so society can promote cumulative innovation. The notion of who the "inventor" is should not be taken lightly: inventorship determines the legal right to file a patent application, assign rights to others, sue for infringement, and receive statutory damages if the patent is infringed. The growingly sophisticated capacity of systems to develop technical solutions with few or no humans

involved leads to the significant question once a machine is the principal inventor: who , if anyone, is the patentee for purposes of patent law?

The recent patent cases involving the AI system "DABUS" has highlighted this issue on multiple levels. The judgments have been mixed in the pursuit of patenting DABUS as its own inventor, and in some instances, the cases are similar, and others are distinct in statutory construction and policy. While judges and patent offices largely agree with the principle that inventorship should not be granted to an AI system, some policies permit patentability of an invention with the aid of human invention while excluding and identifying non-human inventors. These outcomes result from textual readings of the statute, however they expose policy weaknesses that might require statutory change if patents laws are to continue their purpose of incentivizing and disclosing in an era of AI. The remainder of the article will traverse the legal landscape, set our doctrinal mechanics, analyze policy trade-offs and suggest reforms.

The legal and doctrinal baseline: what “inventor” means

Patent law is not simply a mechanical and technical exercise of putting documents to paper. Patent law is not isolated but exists within a much larger system of law or normative legitimacy, partly via relationships with national parliaments but also via various international treaties and conventions. Aside from the Paris Convention for the Protection of Industrial Property of 1883, and, the Agreement on Trade Related Aspects of Intellectual Property, there is again an implicit presumption that the objective of these treaties is to protect innovation (or at least facilitate idea-generation). Both the Paris Convention and TRIPS Agreement share a common backdrop that patents relate to predominantly protect an invention, and an associated common understanding of a 'what' will we accept as invention -that is the invention is a (normally) process of creating an idea, or of conceiving the idea, when it was generating (or conceived) by the creator or inventor of authors of natural persons.

This is not merely a convention of language. This is a concept that is as old as time, based on a traditional understanding of invention, wherein invention can be understood as including the utilitarian, imaginative, intellectual, and deliberative faculties of human beings. Therefore, when the law promises to the inventor an exclusive right to the idea for the patent, in exchange for public disclosure, both a technical and normative understanding are at play: the belief that society will reward the intellectual risks taken by humans to invent.[1]

Through the lens of doctrine, inventorship has historically equated with “conception,” which has been represented in the law as the mental crystallization of the operating principle of a contemplated invention. Conception delineates a line separating those who emanate the inventive jump and those who merely assist in executing the jump. A laboratory assistant who follows directions, regardless of skills employed, is not an inventor as is a technician who merely follows procedures or punches in pre-programmed variables into a computational process. Their contributions, while indispensable, are not inventive contributions.

[1] “Dreyfuss, R. C., & Frankel, S. (2019). From incentive to commodification: Reframing the patent bargain in an era of cumulative innovation. Vanderbilt Journal of Entertainment & Technology Law, 21(4), 629–672.”

When artificial intelligence systems autonomously generate viable solutions or outcomes through recognizing patterns or a generative process, for example, a patented chemical structure, a drug formulation, or an engineering outcome, where no human actor had specifically conceived the solution or outcome, the legal question becomes if no human mind was engaged in the act of creative conception, then where does inventorship emanate.

It is only made worse in contexts where human engagement is limited to only a pre-training or supervision role, such as feeding training data into a system, running algorithms, or selecting outputs of the system. If conception is a moment of identifiable intellectual creation, is it sufficient for individuals to only contribute indirectly and/or as objects of computer science, or does that thrust the law into an uncomfortable slippery slope toward authorless inventions that otherwise only existed in science fiction? The strain on this doctrine reflects a deeper underlying structural issue. The statutory schemes were written with the implicit assumption that only human beings in fact could create invention. The draftsmen were not thinking about a system that is autonomous or semi-autonomous and produces outcomes that may be (and sometimes are legally) novel and useful in and of themselves. Therefore, even if the concept of an invention has always existed in language renewed to a human-only concept, patent law strains at its origin with the introduction of machine-created invention.

The DABUS litigation and its doctrinal impact

The DABUS decision is a pivotal moment in patent law, not so much because it is unprecedented but as one where the courts and patent offices have been made to confront the inadequacies of statutory language in the face of transformative technological advances. The application was intentionally worded to provoke confusion, having listed as inventor the artificial intelligence of his own design: "Device for the Autonomous Bootstrapping of Unified Sentience" (DABUS)[2], invented by Dr. Stephen Thaler[3]. In filing multiple applications in many different countries at the same time, Thaler effectively created a test case internationally that exposed common and divergent assumptions about global patent systems when confronted with the possibility of invention by machines.

In some ways, the result was to be expected in the United States. The Federal Circuit held firm in that inventorship pursuant to the Patent Act is limited to natural persons, relying on old case law defining invention as a "mental conception," an act inherently dependent on being human. By tying the invention to the human mind, the court effectively closed the door to recognizing an AI as an inventor without Congressional action.[4] The USPTO attempted a pragmatic middle path: its guidance provides comfort to applicants that what it calls AI-assisted inventions can still receive patent protection if a human participates in the conception process, but it takes the position that a non-human entity can never be an inventor. This

[2] "U.S. Patent and Trademark Office. (2020). Decision on petition in re Application of Stephen Thaler (DABUS)."
[3] "Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022)."
[4] "Thaler v. Hirshfeld, 558 F. Supp. 3d 238 (E.D. Va. 2021)."

solution maintains doctrinal consistency, but avoids a more challenging philosophical discussion about whether the law should ever recognize machine autonomy.[5]

An analogous point of view has been adopted by the European Patent Office[6], albeit with a distinctly civil law tilt. Article 60(1) of the European Patent Convention[7] governs rights vested in the "inventor or his successor in title," language which was interpreted by the Board of Appeal of the EPO as having necessarily human beings as its subject. For the EPO, the concern was not one of semantics but rather of legal structure: inventorship is the keystone to a larger web of rights and responsibilities — assignment, entitlement disputes, and moral rights — which presuppose a legally-responsible entity.[8] Machines do not possess property, assign rights, or bear responsibilities. To allow an AI system to undertake this role, the Board reasoned, would create incoherence in the very structure of patent law.[9]

Similarly, the Supreme Court in the United Kingdom arrived at the same core conclusion but with a much more institutional emphasis. Interpreting the Patents Act[10] 1977[11], the Court explained that ordinary usage of "inventor" and "person" cannot be extended to machines without distorting the intended meaning of the statute. In doing so, the Justices cited constitutional modesty[12]: whether AI should be considered an inventor is a policy question for Parliament, not the courts. This judgement shows more than a narrow sensitivity to the separation of powers - it informs us that patent law reform in the age of AI will need to be debated democratically as a separate force, rather than judicially improvised.[13]

Australia is the most visible, though temporary, exception to this emerging consensus. Originally a mere dictum, Justice Beach[14] of the Federal Court suggested that the language of the Patents Act 1990[15] did not mandate a strictly human meaning of the word “inventor.” It is clear from his judgment that he was willing to allow patent law to respond to technological change and warned that an inflexible construction would hinder innovation. But on appeal, the Federal Court of Australia disagreed.[16] The appellate judges stated that inventorship was a matter concerning entitlement and ownership and that if a machine were allowed to stand in that position, then such relationships would be destroyed. The refusal of special leave to appeal by the High Court was perhaps a reaffirmation of Australia's adherence to the other major jurisdictions, although a faint inkling still remains that the debate is doctrinally open.

[5] “European Patent Office (EPO), J 8/20, Decision of the Legal Board of Appeal (Dec. 21, 2021).”
[6] “European Patent Office. (2020). J 8/20 – Designation of inventor/DABUS (Legal Board of Appeal).”
[7] “European Patent Convention, Oct. 5, 1973, 1065 U.N.T.S. 199.”
[8] “Thaler v. Commissioner of Patents [2021] FCA 879 (Austl.) (Beach J).”
[9] “Commissioner of Patents v. Thaler [2022] FCAFC 62 (Austl.).”
[10] “UK Patents Act 1977, c. 37 (UK).”
[11] “Thaler v. Comptroller General of Patents, Designs and Trade Marks [2023] UKSC 49.”
[12] “Comptroller-General of Patents v. Thaler [2021] EWCA Civ 1374 (UK).”
[13] “Hilty, R. M., & Richter, H. (Eds.). (2021). Artificial intelligence and intellectual property: New developments at the interface of law and technology. Springer.”
[14] “Thaler v. Commissioner of Patents [2021] FCA 879 (Beach J).”
[15] “Patents Act 1990 (Cth) (Austl.).”
[16] “Commissioner of Patents v. Thaler [2022] FCAFC 62 (Full Fed. Ct., Austl.).”

The South African position[17], thus, is perhaps best seen as an exception. Given that its patent office has no substantive examination process, an application accepting DABUS as inventor does little more than accept the application for registration-the patent office is really merely registering rubbish. The grant attained notoriety, among other reasons, due to the ghost looming about what if inventorship is treated as mere formality opposed to a substantive precondition to the grant of a patent; similarly, the result opened the pathway for the possibility of regulatory arbitrage by those applicants who filed for protection at jurisdictions where the threshold is low and thus created an uneven playing field internationally.[18]

Overall, the litigious saga of DABUS tells us about a judicial conservatism that holds in its practice a human person should remain the agent of human innovation and succeed all the constitutional vigor of the patent regime. The decisions really do converge alarmingly from the United States, to Europe, to the United Kingdom to Australia, and the conclusions underlying them are far from" just textual-fidelity". The Courts' rhetoric is somewhat more subtle: at least if a Court were to endorse AI as an inventor, it ought at least not be considered to be anything innovative, but be brought in via negative legislation. In other words, the judges seem to be coalescing toward an implicit constitutional consensus: judges do appreciate that any redefinition of inventorship would carry social and economic consequences of a far greater magnitude than the judgments that the legislature is good-to-go to make on a democratically assumed policy choice.

Textualism, purposivism and the limits of judicial law-making

The really exceptional uniformity of judging across the major common-law jurisdictions is no accident. It is rather the encapsulation of two interpretive instincts that have had a preceding existence and still continue to guide the adjudication of statutes.[19] One of these instincts is operative within the sphere of textualism-formalism. Courts have generally understood terms such as "inventor," "devisor," or "the person who made the invention" in terms of their ordinary natural linguistic meaning.[20] Unless expressly so limited by the statute, these words point to natural persons. This aspect of interpretation is grounded in a technical legal background, with a case law of hundreds of years directly relating inventorship to conception, which is an individual cognitive act, implying that it is impossible for anyone to even think about the concept of inventorship without immediately thinking about the mental agency of an individual.[21] Under this iteration of textualism-formalism, there would not merely be a slight extension in the statutory language to recognize an AI system as an inventor. Rather, a completely different claimant would be introduced by loosely claiming an AI system to be an inventor, especially when, historically, it

[17] "South African Companies and Intellectual Property Commission. (2021). Patent No. 2021/03242 (grant listing DABUS as inventor)."
[18] "Rimmer, M. (2022). The DABUS decisions and the question of artificial intelligence inventorship. Journal of Intellectual Property Law & Practice, 17(5), 374–384."
[19] "Scalia, A., & Garner, B. A. (2012). Reading law: The interpretation of legal texts. West Publishing."
[20] "Eskridge, W. N. (1988). Dynamic statutory interpretation. University of Pennsylvania Law Review, 135(6), 1479–1555."
[21] "Dworkin, R. (1986). Law's empire. Harvard University Press.

would be reasonable to conclude that the very conceptual basis of inventorship involves human inventors with historical antecedents in the individual or person's conception of the invention to even begin with.

The second instinct is constitutional, being founded on the theory of separation of powers. Courts have categorically maintained that the thought process of recognizing, or instilling, machine-inventorship would be of monumental shift in patent law and thus would concern major economic, social, and ethical implications. These are policy matters, and legislatures are uniquely positioned to decide on the social contract of innovation incentives, market structure, competition policy, and welfare, all from an institutional and democratic stand.[22] On those lines, the judicial restraint is not itself an abdication but merely acknowledging that patent law is a matter of policy, whereby even the slightest shift in the doctrine can cause major change over the whole spectrum of a sector. Accordingly, by declining to give the statutory words any interpretation different from their ordinary meaning, courts are thereby refraining from taking sides in what is recognized as the policy debate among human and machine agents with or without manufacture.[23] Rather, they have insinuated that this reform, if it is to be seen, is a matter for public policy decided by the elected representatives, not the judges.[24]

While these interpretive instincts can be justified, they are not immune from criticism. Although it professes to adhere to the statutory text, pure textualism can also lock patent law into a time period that predates modern technology. For the most part, patent statutes were enacted long before modern machine learning systems came into being, and their drafters could not have anticipated actual machine systems producing new and inventive results or outputs. Recognizing the statutory text as static creates a growing fissure between law and the technology it is designed to keep pace with and regulate. Proponents of purposivism argue that interpretation must think about the purpose animating the statute: the advancement of innovation through disclosure and reward. In this sense, whereas AI systems cannot be rights-holders, even if rights (or inventorship or entitlement) flow to the human actor (or actors) who actively designed, directed, or employed those systems to advance the patent bargain, it would be tangential to the intended purpose.[25]

However, purposivism also presents risks. Doctrinal categories can only be stretched so far before coherence begins to break down. To say that something was created by a “conception” by a human operator whose function was merely to initiate information retrieval from an algorithm would break the normative connection between inventive creativity and a grant of exclusivity, and reduce inventorship to just being close to technology, therefore rewarding ownership of the resource instead of an invention by acts of intellect. The distributive consequences are serious; it could lead to patent rights being assigned

[22] “Purdy, J. (2010). Neoliberal constitutionalism: The deep structure of American law and politics. Yale Law Journal, 77(2), 132–187.”
[23] “Burk, D. L. (2021). Patents and artificial intelligence: The role of interpretive traditions. Houston Law Review, 58(3), 563–598.”
[24] “Llewellyn, K. N. (1950). Remarks on the theory of appellate decision and the rules or canons about how statutes are to be construed. Vanderbilt Law Review, 3(3), 395–406.”
[25] “Ghosh, S. (2019). Interpreting patent law’s statutory text in the age of AI. Journal of the Patent and Trademark Office Society, 101(4), 845–872.”

unfairly to organizations that have access to sophisticated AI systems and not assign sufficient value to innovation acts of a genuine nature by people.[26]

Policy costs of strict human-only inventorship

Enforcing a strict human-only requirement for invention will certainly provide doctrinal stability. But that stability does come at a price. Most directly, it will leave truly original, independent outputs generated by AI unprotected. If there is no natural person who could reasonably be identified as the inventor of an inventive step, the outcome is a statutory orphan; the innovation immediately descends into the public domain. While that provides widespread access, it also eliminates the opportunity for exclusive rights and could stymie investment in capital-intensive industries, such as pharmaceuticals, materials science, and advanced electronics - the very areas where AI is likely to have the greatest impact in creating innovations.[27]

A further challenge exists in evidentiary practice. Modern machine learning models operate as non-linear processes that are opaque, operating on voluminous datasets and stochastic optimizing functions. [28] Unlike other modes of research, where the inventive step can be traced to identifiable cognitive persons, the outputs of AI tend to have no clear cognitive source. This creates additional difficulty in determining inventorship, increases uncertainty, and increases inconsistency of outcomes, which raises costs of enforcement and dilutes predictability.[29]

The restriction that only humans can be recognized as inventors also distorts the distribution of credit. It has the potential to encourage opportunistic behavior to the extent that it allows people who did little to nothing — for example, people who simply gathered the data or initiated the training run — to be recognized as inventors.[30] Moreover, where no human is identified as having invented the invention, no intellectual property protection attaches to the invention and competitors can freely copy it. Both situations disrupt the equilibrium between incentivizing innovation and fairly identifying rights.[31]

Ultimately, the reliance on the human invented will cause fragmentation in the patent world. The distinctions in the law and administration would result in a forum shopping scenario for applicants, to get protection in jurisdictions that are friendlier to claimed inventorship on account of using AI to assist their application.[32] There is a disgoal of the law in doing so, since differences in the law break down the

[26] "Heydon's Case (1584) 76 ER 637 (UK) (establishing the mischief rule)."
[27] "Llewellyn, K. N. (1950). Remarks on the theory of appellate decision and the rules or canons about how statutes are to be construed. Vanderbilt Law Review, 3(3), 395–406."
[28] "World Intellectual Property Organization. (2020). Revised issues paper on intellectual property policy and artificial intelligence. WIPO/IP/AI/2/GE/20/1."
[29] "Merges, R. P. (2011). Justifying intellectual property. Harvard University Press."
[30] "Pila, J., & Torremans, P. (2019). European intellectual property law (2nd ed.). Oxford University Press."
[31] "Sattler, S. (2021). Artificial intelligence and inventorship: Policy proposals for reform. European Intellectual Property Review, 43(5), 297–310."
[32] "Ginsburg, J. C., & Budiardjo, L. (2019). Authors and machines. Berkeley Technology Law Journal, 34(2), 343–388."

harmonizing advantages of TRIPS and the Paris Convention. Moreover, applicants trust in the international uniformity of intellectual property principles could be threatened.[33]

Paths forward: legislative and doctrinal reform

Instead of continuing to rely on courts to devise case-specific solutions, we should have a clear reform agenda to harmonize AI-driven invention with the structure of patent law. This reform might proceed along three interrelated paths: targeted law reform, clarification in existing doctrine and the creation of a special regime for true autonomous AI-generated inventions.[34]

The first possible course of action is legislation that must state the obvious; i.e., to specify that a non-human or artificial entity cannot be considered an inventor.[35] The uncertainty surrounding non-human or artificial entities has resulted in various judicial interpretations of them. Therefore, if changes took place in the law, it would be possible to clarify the rules as to who has the status of being an inventor.[36]

A new law could maintain that an inventor is a human being, while the law could specify that, if an A.I. system can generate a patentable invention without human input whatsoever, the "inventor" is instead the person who either (i) explained to the A.I. the invention it should produce, (ii) provided key data to the A.I., or (iii) otherwise influenced the operation of the A.I. system. This level of reform would stop short of stating that machines can achieve legal personhood, while also acknowledging that "the creation of today is the province of many minds." Perhaps ownership would vest in the companies or groups that pay for or otherwise utilized the A.I. or machine, which keeps ownership rights connected to financial expenditure and benefit.[37]

The second would necessitate a revision of the doctrine. Historically, in the courts, inventorship has been linked to conception, albeit AI presents an impediment to that standard. It is time to have a clear boundary that informs us where human involvement is, almost enough, and when it is not.[38] If anyone devises with the creative idea on the understanding and improvement of AI output, whether it be in form of prompts or modified context-expectancy, then they would be an inventor. People doing busy work, i.e. organizing data, modifying settings, or initiating computations, would not qualify. This would serve as both a threshold to lessen dubious claims as it would guide preverbal human interaction in AI-assisted inquiry.[39]

Finally, Third Way reduces global welfare (relative to the Second Way) with “orphan inventions,” those which no human has approximate access to even in principle to their conception. Here, the reduction of

[33] “Dinwoodie, G. B., & Dreyfuss, R. C. (2012). A neofederalist vision of TRIPS: The resilience of the international intellectual property regime. Oxford University Press.”
[34] “Dreyfuss, R. C. (2010). The levers of patent law. Columbia Law Review, 110(6), 1135–1181.”
[35] “Rimmer, M. (2023). The future of AI and intellectual property: Reform pathways for global harmonisation. Queen Mary Journal of Intellectual Property, 11(2), 145–172.”
[36] “European Commission. (2020). White Paper on Artificial Intelligence: A European approach to excellence and trust. COM(2020) 65 final.”
[37] “Hilty, R. M., & Liu, K.-C. (Eds.). (2021). Artificial intelligence and intellectual property: New developments at the interface of law and technology. Oxford University Press.”
[38] “Yu, P. K. (2021). The quest for AI inventorship in patent law. American University Law Review, 70(5), 1641–1702.”
[39] “Abbott, R. (2022). Intellectual property law and AI inventions: Time for legislative clarity. Cardozo Arts & Entertainment Law Journal, 40(4), 765–804.”

doctrine seems considerably less preferable (but still preferable) to moving towards a new protection scheme entirely. This new protection scheme could be something simpler such as a thin and temporal exclusivity with disclosure obligations by the AI creator or user. To put this into practice, those outcomes have lower barriers than existing intellectual property laws against things like data exclusivity in pharmaceutical regulation. Still, those would promote the incentive to invest, while maintaining not only the spirit of human creative activity but also the recognition of such activity in patent law.

Legislative reform, doctrinal clarification, and special protection seem balanced in these terms. They preserve a human-centered approach to inventorship, while lessening concerns on under-protection, lack of evidence and injustice in cases where AI has made an important input into an invention. When the law is both clear and flexible, creativity placed by machines can be adopted without detracting from its core coherence.

Institutional and procedural reforms

Although legislative reform is necessary, it must be supplemented by administrative and procedural change within patent offices. Patent administration represents the practical intersection between the language of statutes and the experience of innovation, and, regarding AI-generated inventions, it is in administration that many of the doctrinal and evidentiary issues arise most starkly. Therefore, patent offices should create disclosure obligations to expose the role of human agents in the inventive process. An obligation to disclose whether and to what extent training data was disclosed, to describe the architecture of the machine-learning-inventive system, to explain the degree of autonomy of algorithmic decision-making, and to characterize the role of the human contributor could all be required.[40] Although this line of thinking raises relevant concerns regarding trade secrets and proprietary technical information, these could be resolved with more appropriate procedural reforms, for example, sealed technical disclosures, restricted access to the examiner, and confidentiality of examination.[41] With some ability to relax the rules around disclosure, Patent Administration could concentrate on maintaining the examined patent without compromising reasonable commercial confidentiality.

The training and professional development of the examiners is also extremely important. Traditional patent examination accepts the concept of an inventiveness process associated with observable and identifiable acts of human conception and judgement, however the narrative becomes a bit more complicated for AI-generated inventions. Examiners will most often be asked to express opinion about novel contributions and machine-generated outputs requiring not only high level legal intelligence, but also technical literacies. As a result, in addition to annual trainings, Patents Offices may also want, or need, training modules at the very least, or some potential pool of specialized examiners or divisions of patent examination focused around AI inventions to help prepare patent offices for making decisions on innovative step beyond enablement and sufficiency of disclosure. Inventions that emerge from opaque or

[40] "Kur, A., & Levin, M. (Eds.). (2011). Intellectual property rights in a fair world trade system: Proposals for reform of TRIPS. Edward Elgar."
[41] "Calo, R. (2015). Robotics and the lessons of cyberlaw. California Law Review, 103(3), 513–563."

stochastic algorithmic processes, may present unique challenges in this regard, such as reproducibility, an important underpinning of the patent bargain. Without appropriate training, patent offices would risk inconsistent results and potentially weakening confidence in the patent process.

National reforms and international cooperation are equally important. In the absence of standardized procedures, creative actors may use forum shopping to take advantage of jurisdictional discrepancies and look for protections in the jurisdictions that are most forgiving of AI participation.[42] Such arbitrage weakens international coherence in the area of intellectual property and challenges efficient and just norms.[43] Establishing model provisions and best practices, such as harmonized thresholds for determining what level of human contribution is required, frameworks for disclosing the role of AI, and frameworks for allocating rights with regard to inventions generated by AI, may be a major responsibility of organizations like the World Intellectual Property Organization (WIPO) and regional patent offices like the European Patent Office or the African Regional Intellectual Property Organization. Partial administrative standard convergence will reduce arbitration's power and increase global trust that the patent system can adjust to evolving technological realities, even though full harmonization may prove to be a challenging political undertaking.[44]

In conjunction with modifying statutory and doctrinal change, administrative reform and international coordination are necessary complements. They help to secure reform at both the level of principle, and at the level of practice, whilst also maintaining the integrity of the patent system as it relates to its legitimacy, consistency with the common law tradition, and its responsiveness in the new innovation ecosystem, which is influenced heavily by AI.

Practical examples and doctrinal application

The tangible impact of these reforms is evident in the well-known DABUS applications. Under the present law, courts within the United States, Europe, the United Kingdom, and Australia steadily all rejected the idea of naming the AI itself as inventor, which meant that the inventions would be unprotected unless it could sustain a human inventive claim. In contrast, a tripartite reform response — statutory clarity, refined doctrinal thresholds, and sui generis-style regime — would be less arbitrary and more equitable.[45]

For example, in the instance where an AI system like DABUS autonomously produced a container design, or neural-flash beacon, with no identifiable human conception, the inventions would not become "orphaned". Entitlement could flow through a sui generis regime that provides a limited-time exclusivity of use, provided that one has disclosed the fact that a non-human AI played a role. This incentivizes

[42] "Stokes, S. (2022). Artificial intelligence and the law: Challenges and opportunities. Routledge."
[43] "Mazziotti, G. (2022). Regulating AI at the intersection of innovation and ethics: The EU approach. Common Market Law Review, 59(6), 1765–1792."
[44] "Zhang, S. (2021). Governing algorithmic inventors: Towards a global harmonization of AI patent law. Journal of World Intellectual Property, 24(5–6), 499–524."
[45] "Dreyfuss, R. C. (2010). The levers of patent law. *Columbia Law Review, 110*(6), 1135–1181."

continued investment in AI pipelines, while giving the public access to these inventions (once the limited rights have expired).

In cases where a human researcher has meaningfully reframed the problem, curated the data, or exercised creative judgment in adapting what has been output by the AI, the revised conception test would recognize that person as the inventor. This retains the doctrinal connection between inventive intellect, or conception, and entitlement, but reflects the importance of AI as a tool of discovery.

On the other hand, individuals who performed purely clerical activities - executing programs, adjusting normal parameters or merely watching the system run without concretely contributing to the inventive concept - would not qualify. This keeps inventorship tethered to substantial human contribution and keeps the opportunistic and false claims of non-substantive contributors in the peripheral realm.

This approach applied to the DABUS factual situation is viable and sensible. It avoids "legal fictions" and it doesn't allow valuable innovations to go public domain without protection; rather, it cuts through with more found understanding of the distinction between authentic human inventorship and fully autonomous AI-based creativity; and then provides the appropriate entitlement in either circumstance.

Normative considerations: incentives, justice and innovation policy

At the core of any alteration must lie the fundamental purposes of patent law: to incentivize useful innovation and to disseminate knowledge.[46] Where machine invention is a largely automated outcome of human agents providing the creativity, it serves to conserve the incentive structure designed for funding and organizing invention.[47] Narrow, specified, patentable protection for fully autonomous machine inventions not only dampens the risk of under-investment, but also limits the risk that socially beneficial inventions are released into the public domain - not just to the benefit of the collective, but without corresponding appropriation. The modes for both purposes should entail thorough passing-over of disclosure requirements, so that the public are able to access information which can serve further innovation.[48] Distributive/ethical considerations are also relevant. To the degree that a patent system concentrates rights among only a small number of large tech companies that have both the required data and the necessary computing capabilities to generate novel ideas, this could potentially produce market concentration.[49] Thus, in a policy-making context, they should also assess additional policies and procedure, including transparency mandates, the extent to which researchers can access data, and an

[46] "Ryan, M. P. (1998). *Knowledge diplomacy: Global competition and the politics of intellectual property*. Brookings Institution Press."
[47] "Stiglitz, J. E. (2008). Economic foundations of intellectual property rights. Duke Law Journal, 57(6), 1693–1724."
[48] "Pila, J., & Torremans, P. (2019). European intellectual property law (2nd ed.). Oxford University Press."
[49] "Reichman, J. H. (1994). Universal minimum standards of intellectual property protection under the TRIPS component of the WTO Agreement. International Lawyer, 29(2), 345–388."

aggressive antitrust response to prevent anti-competitive circumstances, but nonetheless acknowledging that invention did take place.[50]

BIBLIOGRAPHY

Primary Sources

Statutes and Treaties

- Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, 1869 U.N.T.S. 299.
- European Patent Convention, Oct. 5, 1973, 1065 U.N.T.S. 199.
- Indian Patents Act, No. 39 of 1970, Acts of Parliament, 1970 (India).
- Patents Act 1977, c. 37 (UK).
- Patents Act 1990 (Cth) (Austl.).
- Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, 21 U.S.T. 1583.
- U.S. Patent Act, 35 U.S.C. §§ 100–105 (2018).

Case Law

- Bd. of Educ. ex rel. Bd. of Trustees of Fla. State Univ. v. Am. Bioscience, Inc., 333 F.3d 1330 (Fed. Cir. 2003).
- Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984).
- Comptroller General of Patents, Designs and Trade Marks v. Thaler [2021] EWCA Civ 1374 (UK).
- Commissioner of Patents v. Thaler [2022] FCAFC 62 (Austl.).
- Diamond v. Chakrabarty, 447 U.S. 303 (1980).
- FTC v. Actavis, Inc., 570 U.S. 136 (2013).
- Heydon's Case (1584) 76 Eng. Rep. 637 (KB).
- Microsoft Corp. v. i4i Ltd. Partnership, 564 U.S. 91 (2011).
- Narendra Nath v. Union of India, (2004) 3 SCC 281 (India).
- Stanford Univ. v. Roche Molecular Sys., Inc., 563 U.S. 776 (2011).

[50] "Kapczynski, A. (2012). The cost of price: Why and how to get beyond intellectual property internalism. Yale Law Journal, 121(7), 2170–2210."

- Thaler v. Hirshfeld, 558 F. Supp. 3d 238 (E.D. Va. 2021).
- Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).
- Thaler v. Commissioner of Patents [2021] FCA 879 (Beach J).
- Thaler v. Comptroller General of Patents, Designs and Trade Marks [2023] UKSC 49.
- United States v. Microsoft Corp., 253 F.3d 34 (D.C. Cir. 2001).
- Whitney v. Stearns, 16 F. Cas. 269 (C.C.D. Mass. 1814).

Books

- Abbott, R. (2020). The reasonable robot: Artificial intelligence and the law. Cambridge University Press.
- Boldrin, M., & Levine, D. K. (2008). Against intellectual monopoly. Cambridge University Press.
- Bently, L., Sherman, B., Gangjee, D., & Johnson, P. (2018). Intellectual property law (5th ed.). Oxford University Press.
- Chesterman, S. (2021). We, the robots? Regulating artificial intelligence and the limits of the law. Cambridge University Press.
- Cornish, W. R., & Llewelyn, D. (2020). Intellectual property: Patents, copyright, trade marks and allied rights (9th ed.). Sweet & Maxwell.
- Dinwoodie, G. B., & Dreyfuss, R. C. (2012). A neofederalist vision of TRIPS: The resilience of the international intellectual property regime. Oxford University Press.
- Dworkin, R. (1986). Law's empire. Harvard University Press.
- Hilty, R. M., & Liu, K.-C. (Eds.). (2021). Artificial intelligence and intellectual property. Oxford University Press.
- Kur, A., & Levin, M. (Eds.). (2011). Intellectual property rights in a fair world trade system: Proposals for reform of TRIPS. Edward Elgar.
- Merges, R. P. (2011). Justifying intellectual property. Harvard University Press.
- Scalia, A., & Garner, B. A. (2012). Reading law: The interpretation of legal texts. West Publishing.
- Stokes, S. (2022). Artificial intelligence and the law: Challenges and opportunities. Routledge.

Journal Articles

- Abbott, R. (2022). Intellectual property law and AI inventions: Time for legislative clarity. Cardozo Arts & Entertainment Law Journal, 40(4), 765–804.
- Burk, D. L. (2020). AI and patent law's "nonobvious problem." Washington Law Review, 95(2), 325–370.
- Burk, D. L. (2021). Inventing equality: Artificial intelligence, patents, and distributive justice. Iowa Law Review, 106(5), 2103–2142.
- Burk, D. L., & Lemley, M. A. (2003). Policy levers in patent law. Virginia Law Review, 89(7), 1575–1696.
- Calo, R. (2015). Robotics and the lessons of cyberlaw. California Law Review, 103(3), 513–563.
- Chien, C. V. (2013). Reforming software patents. Houston Law Review, 50(2), 325–393.
- Contreras, J. L. (2019). Data exclusivity in pharmaceuticals and beyond. Journal of Law and the Biosciences, 6(1), 184–203.
- Drexl, J. (2021). Designing competitive markets for industrial data: Between propertisation and access. Journal of Intellectual Property, Information Technology and Electronic Commerce Law, 12(3), 221–240.
- Eskridge, W. N. (1988). Dynamic statutory interpretation. University of Pennsylvania Law Review, 135(6), 1479–1555.
- Gervais, D. J. (2020). The machine as author. Iowa Law Review, 105(5), 2053–2106.
- Ghosh, S. (2019). Interpreting patent law's statutory text in the age of AI. Journal of the Patent and Trademark Office Society, 101(4), 845–872.
- Hovenkamp, H. (2020). Antitrust and platform monopoly. Yale Law Journal, 130(8), 1952–2020.
- Kapczynski, A. (2012). The cost of price: Why and how to get beyond intellectual property internalism. Yale Law Journal, 121(7), 2170–2210.
- Lemley, M. A. (2020). Market power and intellectual property in the AI age. Stanford Technology Law Review, 23(2), 349–376.
- McDonagh, L. (2021). The DABUS decisions and the patentability of AI-generated inventions: A comparative analysis. International Review of Intellectual Property and Competition Law, 52(9), 1089–1108.
- Rai, A. K. (2021). Artificial intelligence inventions and patent disclosure. Harvard Journal of Law & Technology, 34(2), 389–416.

- Rimmer, M. (2022). The DABUS decisions and the question of artificial intelligence inventorship. Journal of Intellectual Property Law & Practice, 17(5), 374–384.
- Samuelson, P. (2020). Allocating ownership rights in computer-generated works. University of Michigan Journal of Law Reform, 54(1), 1–45.
- Senftleben, M. (2021). Data access, artificial intelligence and the role of competition law. Journal of European Competition Law & Practice, 12(7), 563–576.
- Titi, C. (2022). Artificial intelligence and inventorship before patent offices and courts: Global perspectives. Journal of World Intellectual Property, 25(3-4), 345–369.
- Yu, P. K. (2021). The quest for AI inventorship in patent law. American University Law Review, 70(5), 1641–1702.

Institutional and Policy Reports

- African Regional Intellectual Property Organization. (2021). Feasibility study on AI and IP in Africa. ARIPO.
- Australian Government, Advisory Council on Intellectual Property. (2015). Review of the innovation patent system. Canberra: ACIP.
- European Commission. (2020). White Paper on Artificial Intelligence: A European approach to excellence and trust. COM(2020) 65 final.
- European Commission. (2021). Intellectual Property Action Plan to support the EU's recovery and resilience. COM(2020) 760 final.
- European Parliament. (2020). Report on intellectual property rights for the development of artificial intelligence technologies (2019/2135(INI)).
- House of Lords Select Committee on Artificial Intelligence. (2018). AI in the UK: Ready, willing and able? HL Paper 100.
- United States Patent and Trademark Office. (2020). Decision on petition in re Application of Stephen Thaler (DABUS).
- United States Patent and Trademark Office. (2024). Inventorship guidance for AI-assisted inventions. 89 Fed. Reg. 9926.
- World Intellectual Property Organization. (2019). WIPO Technology Trends 2019: Artificial Intelligence. WIPO.
- World Intellectual Property Organization. (2022). Artificial Intelligence and Intellectual Property: A WIPO Conversation – Summary of the Fifth Session. Geneva: WIPO.