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Rethinking Patent Monopolies in the Age of Artificial Intelligence: Protection, Dysfunction, and the Case for Structural Reform

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Abstract: The global patent system operates under assumptions that have not been seriously revisited since the industrial age. Chief among them is the conviction that patents reliably measure innovation, that temporary monopolies incentivize disclosure, and that the inventor behind every filing is a human being acting with creative intent. This article challenges each of these assumptions by examining three structural failures of the contemporary patent regime. The first is the weaponization of patents by non-practicing entities and dominant technology corporations, which has transformed intellectual property from a shield for genuine invention into a strategic instrument of market control, litigation, and competitive exclusion. The second failure concerns the inability of existing legal frameworks to accommodate inventions generated by artificial intelligence systems, a problem made visible by the DABUS patent applications and their rejection across the United States, the European Union, the United Kingdom, and Australia. The third failure is the persistence of pharmaceutical monopolies that restrict access to life-saving treatments through evergreening strategies, excessive pricing, and aggressive enforcement of patent rights in developing countries. Drawing on historical analysis, comparative jurisdictional review, and a critical evaluation of emerging reform proposals, the article argues that these dysfunctions are not isolated malfunctions but predictable consequences of a legal architecture designed for a world that no longer exists. The article evaluates five structural reform proposals: sector-specific patent terms calibrated to the pace of technological change, layered rights contingent on demonstrated utility rather than mere filing, blockchain-based registries for transparent priority verification, dynamic licensing models that adjust exclusivity based on public interest considerations, and a sui generis category of protection for machine-generated inventions. The article concludes that incremental procedural adjustments are insufficient and that the patent system requires foundational restructuring to restore the balance between private reward and collective benefit that originally justified its existence.

Keywords: artificial intelligence; Big Tech; dynamic licensing; inventorship; patent monopolies; patent reform; patent trolls

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1. Introduction

Before he became the most recognizable physicist of the twentieth century, Albert Einstein spent his days in the Swiss Federal Patent Office in Bern, reviewing applications submitted by inventors whose names have long been forgotten. He examined technical drawings, assessed claims of novelty, and measured the originality of mechanical devices against an expanding catalogue of prior art. The irony was considerable. The theoretical breakthroughs that would reshape the foundations of modern physics did not emerge from the patents he examined. They emerged from the mental space that reviewing them afforded him—the quiet intervals between bureaucratic decisions, where thought could move freely, unburdened by the legal apparatus of ownership (Kriger 2025).

Einstein's experience in that office has become a favored anecdote in histories of science, usually invoked to illustrate the unpredictability of genius. But it illuminates something else as well. It reveals the distance between the institutional machinery of intellectual property and the actual process of discovery. The patent office where Einstein worked was, by design, a place where ideas were categorized, bounded, and enclosed. The ideas that made him famous were, by nature, unbounded—resistant to the very act of legal definition that the system demanded. He inhabited both worlds, but belonged to neither.

That distance has widened considerably since 1905. The patent system that Einstein observed from the inside has grown into a global apparatus of extraordinary scale and complexity. Millions

of applications are filed each year. Hundreds of thousands of patents are granted. The archives now contain not merely mechanical drawings and chemical formulas, but software algorithms, gene sequences, business methods, and design elements so granular that they cover the curvature of a smartphone screen or the animation of a digital icon. The system has expanded to accommodate nearly everything that can be described in legal language, and in doing so, it has lost the capacity to distinguish between what matters and what merely fills the record.

This article examines three structural failures of the contemporary patent regime that, taken together, suggest the need for fundamental reform rather than incremental adjustment.

The first concerns the weaponization of patents by large technology corporations and non-practicing entities. In sectors such as consumer electronics, software, and telecommunications, patents are no longer primarily instruments of protection. They are instruments of control—deployed to block competitors, extract licensing fees, and construct barriers to market entry that have little to do with genuine invention. The phenomenon of the patent troll—an entity that holds patents without producing anything, and uses them exclusively for litigation—is the most visible symptom, but the underlying logic extends deep into the strategies of the world's largest corporations (Jaffe and Lerner 2004).

The second failure concerns the legal treatment of inventions generated by artificial intelligence. Current patent law, in virtually every jurisdiction, requires a natural person as the named inventor. This requirement, inherited from an era when the idea of a machine producing original output was confined to science fiction, has come under direct challenge from AI systems that now generate novel chemical compounds, engineering designs, and software architectures with minimal human direction. The rejection of the DABUS patent applications across multiple countries has made the problem visible, but the underlying tension—between a legal framework built for human creativity and a technological reality in which creativity is increasingly automated—remains unresolved (Kriger 2025).

The third failure is the moral and practical crisis created by pharmaceutical patents that restrict access to essential medicines. The HIV/AIDS epidemic demonstrated, at enormous human cost, that patent exclusivity can place life-saving treatments beyond the reach of those who need them most. The practice of evergreening—filing secondary patents on minor modifications to extend market exclusivity—has compounded the problem, ensuring that generic alternatives remain unavailable long after the original innovation has been fully recouped (Stiglitz and Jayadev 2010).

These three failures are not independent. They share a common root: a legal architecture that rewards the act of filing over the act of creating, that measures innovation by the number of claims held rather than the problems solved, and that treats every category of invention—from a smartphone animation to a cancer therapy—with the same blunt instrument of twenty-year monopoly protection. The article proceeds as follows. Section 2 examines the gap between the patent as a legal construct and the patent as a marker of genuine innovation. Section 3 analyzes the weaponization of patents through strategic litigation and portfolio accumulation. Section 4 addresses the AI inventorship problem. Section 5 discusses pharmaceutical monopolies and the ethics of exclusion. Section 6 evaluates structural reform proposals. Section 7 concludes.

2. The Patent as Legal Fiction: When Protection Replaces Proof

The popular understanding of the patent system rests on a comforting equation: patent equals innovation. If an invention has been granted official protection, it must be genuinely new, genuinely useful, and genuinely non-obvious. The document itself, stamped and certified, is taken as evidence of creative accomplishment. This assumption, though widely held, is largely incorrect.

A patent does not verify that an invention works. It does not confirm that it has been built, tested, or deployed. It does not guarantee that it solves a real problem or improves upon existing solutions. What it verifies, at most, is that the application has satisfied a set of formal criteria: that the claim is novel relative to the prior art available to the examiner, that it is described with sufficient specificity, and that it is not obvious to a person of ordinary skill in the relevant field. These are procedural thresholds, not substantive ones. They measure the quality of the filing, not the quality of the idea (Boldrin and Levine 2008).

The history of science offers instructive counterexamples. Wilhelm Röntgen, upon discovering X-rays in 1895, chose not to patent his method. He published his findings immediately, distributed copies of his paper to leading physicists across Europe, and made no effort to enclose the technology. Within months, radiology was born—a medical revolution enabled not by legal protection but by its deliberate absence. Alexander Fleming similarly declined to patent penicillin when he observed its antibacterial properties in 1928. The drug's industrial production and refinement came later, driven by wartime urgency and collaborative effort, unimpeded by proprietary claims (Kriger 2025).

These decisions were not naive. They reflected a different understanding of the purpose of discovery—one in which the value of knowledge lay in its capacity to be used, extended, and improved, rather than enclosed. The modern patent system, by contrast, operates on the opposite premise. It encourages early filing, often before an invention has been validated, and it rewards the act of claiming over the act of demonstrating. Research institutions, driven by competition and funding pressures, measure success in terms of patent counts rather than problems solved. Inventors, under constant pressure to secure priority, convert fluid ideas into rigid legal documents long before they have reached maturity.

The result is an archive that bears an increasingly tenuous relationship to genuine technological progress. Each year, patent offices around the world grant protection to thousands of claims that describe hypothetical mechanisms, untested processes, and designs so general that they apply to nothing in particular. These "paper inventions" serve as placeholders—legal territory staked out in advance of actual utility. They clutter the landscape, create ambiguity, and obstruct future work. Yet they remain enforceable, traded as assets, and deployed as weapons in disputes that have nothing to do with the ideas they nominally protect.

The structural incentives that produce this clutter are not difficult to identify. The system rewards volume. A corporation that holds a thousand unused patents holds not a thousand ideas but a thousand reasons for competitors to tread carefully. The filing itself becomes a strategic act—a preemptive move in a game where the objective is not to innovate but to control the space in which others might try to do so. In this environment, the distinction between genuine invention and legal positioning dissolves. The patent ceases to be a mirror of creativity and becomes, instead, a mask behind which the true origins of insight may disappear.

This confusion between protection and proof has practical consequences that extend well beyond the archives. It distorts investment decisions, channels resources toward defensive filing rather than productive research, and creates a false picture of technological health. A nation with a high patent count may appear innovative, but if the majority of those patents describe untested concepts held by entities that produce nothing, the count reveals very little about the actual state of its creative economy. The measure is not merely imprecise. It is misleading.

3. Weaponization: How Patents Became Instruments of Market Control

3.1 The Patent Troll Economy

The emergence of non-practicing entities as a significant force in the intellectual property landscape represents one of the most striking transformations of the patent system in recent decades. These entities—commonly referred to as patent trolls, though they prefer terms like "strategic licensors" or "patent assertion entities"—hold patents without any intention of manufacturing products, conducting research, or developing technologies. Their business model is built entirely on the legal right to enforce claims against those who do.

The mechanism is straightforward. The entity acquires a portfolio of patents, often purchased at discount from bankrupt companies, abandoned research programs, or individual inventors who lacked the resources to commercialize their work. The patents are typically broad, vaguely worded, or related to technologies that have since become standard practice. The entity then identifies active businesses whose products or services might, under a generous reading of the claims, constitute infringement. A letter is sent—sometimes a formal complaint, sometimes an invitation to negotiate. The implicit message is clear: pay a licensing fee, or face litigation (Bessen and Meurer 2008).

The economics of this transaction heavily favor the troll. Defending a patent infringement lawsuit through trial in the United States costs, on average, several million dollars. For a small software company or an independent developer, even the threat of such costs can be existential. The troll, meanwhile, bears minimal risk. It holds no products that can be counter-sued, no market share that can be competed away, no reputation that suffers from public controversy. Its sole asset is the patent, and its sole activity is enforcement.

Several cases illustrate the pattern with particular clarity. Lodsys, a patent-holding company, targeted individual iOS application developers over the use of in-app purchasing mechanisms—functions that were integral to Apple's own development platform. The developers had not designed the purchasing system; they had merely implemented Apple's officially provided tools. Yet Lodsys held patents broad enough to claim that the act of enabling in-app transactions constituted infringement. Many developers, unable to afford legal defense, settled.[1]

Intellectual Ventures, co-founded by Nathan Myhrvold, a former chief technology officer at Microsoft, assembled what is widely regarded as one of the largest private patent portfolios in history. The company held tens of thousands of patents spanning software, telecommunications, semiconductors, and biotechnology. Its stated mission was to create a marketplace for invention. In practice, it functioned primarily as a licensing and litigation operation, extracting royalties from companies that had independently developed the technologies in question.[2]

The costs imposed by this ecosystem are substantial, though difficult to quantify precisely. One widely cited study estimated that patent troll litigation cost defendant firms approximately twenty-nine billion dollars per year in direct costs alone in the early 2010s, with additional indirect costs in the form of reduced venture capital investment, delayed product launches, and diverted research spending (Bessen and Meurer 2008). These figures do not capture the less visible effects: the startups that were never founded because the legal risk was too great, the features that were never developed because a dormant patent might be revived, the collaborations that never materialized because the thicket of existing claims was too dense to navigate safely.

3.2 Corporate Patent Wars

The weaponization of patents is not confined to trolls. The largest technology corporations in the world have adopted strategies that, while more sophisticated in execution, rest on the same fundamental logic: that patents are most valuable not as protections for genuine innovation, but as instruments of competitive control.

The decade-long litigation between Apple and Samsung offers the most publicly visible illustration. The dispute, which unfolded across courtrooms in the United States, South Korea, Germany, Japan, the United Kingdom, and Australia, involved hundreds of individual patents covering design elements, user interface features, and software functions.[3] Many of the claims at issue were remarkably granular. Apple asserted patent rights over the "bounce-back" animation displayed when a user scrolls past the end of a document. Samsung countered with patents on wireless communication standards. The stakes were measured in billions of dollars, but the substance of the dispute often concerned features that consumers could not have identified individually and that contributed only marginally to the overall functionality of the devices in question.

The purpose of these battles was not to protect specific inventions. It was to establish dominance—to signal to competitors that entry into a market would trigger a legal response so costly and prolonged that it would deter all but the most resourced challengers. Patent portfolios, in this context, function as deterrents in much the same way that nuclear arsenals function in geopolitics: their value lies not in their use, but in their existence. The threat of mutually assured litigation keeps the largest players in a state of tense equilibrium, while smaller entrants are simply excluded (Dreyfuss and Zimmerman 2006).

This dynamic has created what scholars refer to as "patent thickets"—dense networks of overlapping claims through which any new product must navigate. In the smartphone industry alone, a single device may be subject to hundreds of patents held by

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1 Lodsys LLC v. Combay Inc. et al., No. 2:11-cv-272 (E.D. Tex. 2011).

2 For an overview of Intellectual Ventures' litigation strategy, see Bessen and Meurer (2008) and subsequent analyses in patent law reviews.

3 Apple Inc. v. Samsung Electronics Co., Ltd., 137 S.Ct. 429 (2016).

dozens of entities. The cost of clearing these claims before launch—or defending against challenges afterward—represents a significant barrier to entry that has nothing to do with the quality or novelty of the product itself. The thicket functions as a form of structural exclusion, invisible to the consumer but decisive for the competitor (Jaffe and Lerner 2004).

In biotechnology, the problem takes a different form but reflects the same underlying logic. Corporations, universities, and research laboratories have filed sprawling claims over genetic sequences, protein structures, and biochemical pathways. These claims often extend not only to the molecules themselves but to their possible functions, diagnostic applications, and manufacturing processes. Researchers seeking to develop new therapies or diagnostic tools frequently find themselves navigating a patchwork of existing patents, many of which are not actively used but remain enforceable. The cost of negotiating access—or the risk of proceeding without it—slows the pace of discovery and diverts resources from research to legal compliance.

3.3 The Chilling Effect

The cumulative impact of trolling and corporate patent strategy is not measured solely in litigation costs or settlement payments. It is measured in hesitation. Developers who pause before implementing a feature. Startups that restructure their products to avoid broad claims they cannot afford to challenge. Researchers who delay publication until the patent landscape has been mapped. Engineers who design around existing claims rather than pursuing the most efficient solution. These moments of restraint, repeated across industries and multiplied over years, represent a form of invisible drag on the pace of innovation—a tax on creativity that appears in no accounting ledger but is paid nonetheless (Graham 2004).

The irony is difficult to miss. A system designed to encourage the sharing of knowledge through the mechanism of disclosure has become a system in which the safest strategy is often silence. For inventors operating outside the protection of large institutional legal departments, the calculus has shifted. The cost of defending a patent—in time, money, and uncertainty—frequently exceeds its value. In such conditions, secrecy becomes the rational choice. The inventor who keeps a method private, who relies on trade secrets rather than patent filings, avoids not only the expense of prosecution but the risk of revealing exactly how the invention works to potential imitators who may have more resources to exploit it (Graham 2004; Lerner 2019).

4. The AI Inventorship Problem

4.1 The Legal Framework: A System Built for Humans

Patent law, across virtually every jurisdiction, rests on the assumption that the inventor is a natural person. This assumption was never controversial because, until recently, it was never tested. The law was written by humans, about humans, for humans. The notion that a machine might independently generate an invention—without specific human direction, without a flash of insight attributable to a particular mind—was simply not contemplated by the legislators who drafted the foundational statutes.

In the United States, the Patent Act defines an inventor as "the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[4] The use of "individual" has been consistently interpreted by the United States Patent and Trademark Office and by federal courts as referring exclusively to natural persons. The European Patent Convention, while not explicitly defining the inventor, presumes throughout its text that inventorship is a human activity.[5] The United Kingdom Patents Act 1977 similarly provides that a patent may be granted "primarily to the inventor," a term understood to denote a natural person.[6]

These provisions were drafted in an era when the most sophisticated tools available to inventors were calculators, microscopes, and reference libraries. They did not contemplate—and could not have contemplated—a world in which artificial intelligence systems would design novel molecular compounds, optimize engineering structures, and generate software architectures without meaningful human intervention. The law, built on the bedrock of human creativity, did not anticipate that the bedrock itself would shift.

4.2 The DABUS Cases: A Global Test

The most direct challenge to the human-inventor requirement came through the DABUS applications—a series of patent filings submitted by Stephen Thaler in multiple jurisdictions, listing an artificial intelligence system called DABUS (Device for the Autonomous Bootstrapping of Unified Sentience) as the sole inventor. The applications described two inventions: a food container designed using fractal geometry and an emergency light beacon that flashes in a pattern designed to attract attention. Thaler argued that both inventions were generated by DABUS autonomously, without specific human direction, and that honesty required listing the machine as the inventor rather than falsely attributing the inventive act to a human.

The response from patent offices was uniform in outcome, if varied in reasoning. The USPTO rejected the application on the ground that an inventor must be a "natural person," citing the plain language of the statute.[7] The European Patent Office reached the same conclusion, holding that the inventor designated in a European patent application must be a human being.[8] The United Kingdom Intellectual Property Office rejected the application on the basis that DABUS was not a person and therefore could not be an inventor under the Patents Act.[9] This decision was upheld by the UK Supreme Court, which held that the statutory framework requires a natural person as inventor and that the policy question of whether to extend inventorship to AI systems was a matter for Parliament, not the courts.[10]

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4 35 U.S.C. § 100(f).

5 European Patent Convention, Article 60.

6 UK Patents Act 1977, Section 7.

7 In re Application No. 16/524,350, Decision on Petition, USPTO (2020).

8 EPO Boards of Appeal, J 0008/20, decision of 21 December 2021.

9 BL O/741/19, UK Intellectual Property Office (2019).

10 Thaler v Comptroller-General of Patents, Designs and Trade Marks [2023] UKSC 49.

The sole exception, brief and ultimately reversed, occurred in Australia. The Federal Court of Australia initially held that an AI system could be named as an inventor under Australian patent law, reasoning that the Act did not explicitly require a human inventor.[11] This decision was overturned on appeal by the Full Federal Court, which held that an inventor must be a natural person, aligning Australia with the international consensus.[12]

The DABUS cases did not resolve the underlying question. They merely confirmed that existing law does not accommodate machine inventorship, while leaving open the far more consequential issue of how the law should respond to a technological reality in which machines are already generating patentable outputs at scale.

4.3 The Scale of the Problem

The AI inventorship question is not an academic curiosity. It is an immediate practical challenge driven by the accelerating deployment of generative artificial intelligence across industries where patent protection has traditionally been central.

In pharmaceutical research, AI platforms are already proposing novel molecular structures for therapeutic compounds. Insilico Medicine, a Hong Kong-based biotechnology company, used its AI platform to identify and develop INS018_055, a small molecule inhibitor for idiopathic pulmonary fibrosis, which entered clinical trials in 2023. The molecule was proposed by the AI system, not by human researchers, though humans supervised the process and made decisions about which candidates to pursue. The question of who "invented" the compound—the algorithm that generated it, or the scientists who selected it from a list of machine-generated options—has no clear answer under current law.

In materials science, DeepMind's GNoME model, announced in 2023, predicted the stability of over two million new crystal structures, dramatically expanding the known landscape of inorganic materials. No human mind conceived these structures individually. They emerged from the model's processing of existing crystallographic data, guided by parameters but not directed toward specific outcomes. If any of these structures prove commercially valuable, the question of inventorship will arise immediately.

In engineering design, generative AI tools such as those developed by Autodesk produce component designs optimized for specified constraints—weight, strength, material cost—that frequently take forms no human engineer would have proposed. The outputs are often counterintuitive, aesthetically unusual, and structurally superior to conventional designs. They meet every substantive criterion for patentability. They fail only the authorship test.

These examples illustrate a widening gap between what the technology produces and what the law recognizes. The gap will only grow as AI systems become more capable, more autonomous, and more deeply integrated into the research and development process.

4.4 Three Frameworks and Their Failures

The legal and academic literature has proposed three principal frameworks for addressing the AI inventorship problem. Each has significant weaknesses.

Framework A: Expanded Human Attribution

Under this approach, the human who designs, trains, deploys, or operates the AI system is designated as the inventor. This preserves legal continuity and avoids the need to amend existing statutes. It is the path of least resistance and, for precisely that reason, the most commonly discussed option in policy circles.

The difficulty is one of intellectual honesty. A researcher who sets parameters and waits for an AI system to propose molecular structures is contributing something real—expertise, judgment, curation—but is not performing the inventive act as traditionally understood. The "inventive step" lies in the machine's processing, not in the human's selection from a menu of options. Assigning inventorship to the operator inflates human credit and devalues the concept of invention itself. It also creates perverse incentives: if the operator is the inventor regardless of their contribution to the creative process, then the threshold for inventorship has effectively been eliminated for anyone who owns an AI system.

Framework B: Public Domain Default

Under this approach, machine-generated inventions receive no patent protection. If no human inventor can be identified, the output falls into the public domain. This has the virtue of logical consistency and simplicity. It avoids the philosophical awkwardness of treating machines as legal persons and prevents the concentration of AI-generated patent portfolios in the hands of a few large firms.

The practical risk is substantial. Without any form of protection, companies that invest heavily in AI research and development would have every incentive to keep their systems' outputs secret, relying on trade secrecy rather than patent disclosure. The entire rationale of the patent bargain—disclosure in exchange for exclusivity—would be undermined. Society would receive less information about new technologies, not more, and the collaborative, cumulative process of innovation would suffer (Kriger 2025).

Framework C: Sui Generis Protection

This approach proposes a new category of intellectual property rights specifically designed for machine-generated inventions. Such rights might be shorter in duration, narrower in scope, and subject to different rules of attribution, disclosure, and licensing. They would acknowledge the diminished human contribution while preserving some incentive for firms to invest in AI-driven research and to disclose the results.

The details of such a framework remain largely theoretical. Proposals vary in their specifics: some suggest five-year terms rather than twenty; others propose mandatory licensing at regulated rates; still others envision automatic disclosure requirements with no exclusivity at all, relying instead on recognition and attribution as incentives. None of these proposals has been adopted by

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11 Thaler v Commissioner of Patents [2021] FCA 879.

12 Commissioner of Patents v Thaler [2022] FCAFC 62.

any major jurisdiction, and the political obstacles to creating a new category of intellectual property are formidable. Existing stakeholders—particularly large technology firms that benefit from the ambiguity of the current system—have little incentive to support a framework that might limit their ability to claim ownership of AI-generated outputs through the existing human-attribution workaround.

5. Pharmaceutical Monopolies and the Ethics of Exclusion

5.1 The Access Crisis

The tension between patent protection and public health represents the most morally charged failure of the contemporary intellectual property regime. In no other domain does the granting of exclusive rights carry such immediate and measurable consequences for human welfare. A patent on a smartphone animation may annoy competitors and inflate consumer prices. A patent on a life-saving drug determines who receives treatment and who does not.

The HIV/AIDS crisis provided the most devastating illustration. During the late 1990s and early 2000s, effective antiretroviral therapies were available in wealthy countries at prices that reflected monopoly pricing under patent protection. In sub-Saharan Africa and Southeast Asia, where the epidemic was killing millions, those same drugs were unaffordable. The manufacturing cost of producing the treatments was a small fraction of the retail price. Generic manufacturers in India and Brazil had the capacity to produce them at a fraction of the cost. They were prevented from doing so by patent enforcement mechanisms embedded in international trade agreements, primarily the Agreement on Trade-Related Aspects of Intellectual Property Rights, administered by the World Trade Organization (Coriat, Orsi, and d'Almeida 2006).

The legal framework that enabled this outcome was not designed with malicious intent. TRIPS was negotiated in the early 1990s as part of the Uruguay Round of trade negotiations, driven largely by the interests of industrialized nations whose pharmaceutical and technology sectors sought stronger global protection for their intellectual property (Archibugi and Filippetti 2010). The agreement required all WTO member states to provide patent protection for a minimum of twenty years, to extend that protection to all fields of technology, and to limit the use of compulsory licensing to narrowly defined circumstances. For developing countries with limited pharmaceutical manufacturing capacity, the effect was to lock in dependence on patented imports at prices set by the rights holder.

The human cost was staggering. Millions of people died of treatable diseases while effective therapies existed but were priced beyond reach. The international response—including the Doha Declaration on TRIPS and Public Health in 2001, which affirmed the right of member states to use compulsory licensing for public health emergencies—represented a partial acknowledgment of the problem, but did not resolve it. The flexibilities granted under the Declaration were rarely invoked, and when they were, they were often met with political and economic pressure from the countries whose corporations held the relevant patents (Maskus 2022).

5.2 Evergreening and Strategic Extension

The practice of evergreening represents a more subtle but equally consequential form of monopolistic behavior within the pharmaceutical sector. When a drug's primary patent approaches expiration, the manufacturer files new patents on secondary features—a modified dosage form, an alternative delivery mechanism, a combination with an existing compound, a new indication for the same molecule. These secondary patents, often of limited clinical significance, serve to extend the period of market exclusivity and delay the entry of generic competitors.

The strategy is legal, routine, and remarkably effective. A single drug may accumulate dozens of secondary patents over its commercial lifetime, each one adding months or years to the period during which cheaper alternatives are excluded from the market. The result is that patients and healthcare systems continue to pay monopoly prices long after the original innovation has been fully amortized (Stiglitz and Jayadev 2010).

The justification offered by the pharmaceutical industry—that drug development is expensive and risky, and that monopoly pricing is necessary to recoup investment and fund future research—contains an element of truth that is routinely overstated. Clinical trials are costly. Regulatory hurdles are formidable. Most drug candidates fail. But these facts must be weighed against the significant contribution of publicly funded research to the foundational science behind major drug discoveries.

A substantial share of the basic research that leads to pharmaceutical breakthroughs is conducted in universities and government laboratories, funded by taxpayers through public research grants. The early-stage science—the most speculative and uncertain work—is disproportionately borne by the public sector. Private firms typically enter the process at a later stage, once a compound has shown sufficient promise to justify further investment. The resulting drug is then patented and marketed at prices that reflect the full cost of development, including the portion borne by the public. The public, in effect, pays twice: once through taxes that fund the underlying research, and again through prices inflated by the monopoly the patent confers (Mazzucato 2013).

5.3 Drawing the Ethical Line

The ethical challenge posed by pharmaceutical patents cannot be resolved by the application of a single principle. It requires a recognition that not all inventions belong to the same moral category. A patent on a manufacturing process does not carry the same consequences as a patent on a vaccine. Exclusive rights to a new engine do not pose the same ethical questions as exclusive rights to a cancer therapy. The law treats these categories identically—granting the same twenty-year term, the same scope of exclusivity, the same enforcement mechanisms. Conscience, however, cannot.

The question of where to draw the line between private property and the common good is inherently difficult, but certain principles provide orientation. If a patented product is essential to health, survival, or human dignity, its enclosure demands stronger justification than the mere recovery of investment. If an invention derives substantially from publicly funded research, the terms of exclusivity should reflect that public contribution. If a system rewards the extension of monopoly through trivial modification rather than genuine therapeutic advance, the system itself has departed from its stated purpose.

Mechanisms exist to enforce these principles—compulsory licensing, research exemptions, limitations on patentable subject matter, tiered pricing obligations—but they are applied reluctantly, inconsistently, and under political pressure from the very interests they are designed to constrain. The line, if it is to be meaningful, must be drawn with greater resolve.

6. Toward Structural Reform

6.1 Why Incremental Adjustment Is Insufficient

The failures described in the preceding sections are not amenable to incremental repair. Tightening examination standards will not address the strategic logic of patent trolling. Raising filing fees will not resolve the AI inventorship problem. Expanding post-grant review will not alter the moral calculus of pharmaceutical monopolies. These measures address symptoms while leaving the underlying architecture intact.

What is required is a rethinking of the principles that govern the system—not an abandonment of intellectual property protection, but a recalibration of its terms, scope, and conditions. Five proposals, each addressing a different dimension of the current dysfunction, deserve serious consideration.

6.2 Sector-Specific Patent Terms

The standard twenty-year patent term, established under the TRIPS Agreement and adopted globally, reflects the pace of industrial innovation in the late twentieth century. It bears no necessary relationship to the pace of innovation in any particular sector today. In software development, where product cycles are measured in months, a twenty-year monopoly is grotesquely disproportionate. In pharmaceutical development, where clinical trials may last a decade, a twenty-year term may be justified—but only if accompanied by mandatory access provisions.

A reformed system could offer sector-specific terms calibrated to the actual lifecycle of innovation in each field. Software patents might carry a five-year term. Pharmaceutical patents might retain a longer duration, contingent on demonstrated commercialization and subject to compulsory licensing in the event of public health emergencies. Engineering and manufacturing patents might occupy an intermediate position. The principle is proportionality: exclusivity should be commensurate with the time required to recoup investment and bring an invention to productive use, not with an arbitrary statutory default (Kriger 2025).

6.3 Layered Rights Contingent on Demonstrated Utility

Under the current system, a patent is granted based on the content of the filing, not on the demonstrated functionality of the invention. The applicant need not show that the invention works, that it has been built, or that it solves a real problem. The result, as discussed in Section 2, is an archive swollen with paper inventions that protect theoretical concepts rather than working technologies.

A layered rights model would restructure the process. An initial filing would establish priority and provide limited, provisional protection—sufficient to prevent competitors from filing identical claims, but insufficient to support litigation or demand licensing fees. Full exclusivity would be granted only after the invention has been independently validated: tested, prototyped, or demonstrated to function as described. This validation could be performed by designated third-party reviewers, by technical panels within patent offices, or by open peer evaluation processes.

The advantages of such a system are significant. It would reduce the volume of speculative filings, ensure that the patent archive reflects working technologies, and restore a connection between protection and proof that has been lost under the current regime. It would also reduce the power of patent trolls, whose strategies depend on the enforceability of claims that have never been tested in practice.

6.4 Blockchain-Based Registries for Priority Verification

One of the most persistent sources of friction in the patent system is the determination of priority—establishing who conceived an invention first, when it was disclosed, and how it evolved. Under the current system, these questions are resolved through documentary evidence, filing dates, and, in disputed cases, expensive litigation. The process is slow, opaque, and vulnerable to manipulation.

Blockchain technology offers a fundamentally different approach. A distributed, tamper-proof ledger could record the moment an idea is first articulated—as a sketch, a formula, a line of code—sealed in time and visible to all. Such a system would not replace formal patent examination, but it would simplify disputes over priority, reduce the room for manipulation, and weaken the tactics of entities that exploit ambiguity for strategic advantage.

Beyond priority verification, blockchain-based registries could support new models of intellectual property management. Smart contracts—self-executing agreements written into code—could automate licensing, ensuring that usage fees are distributed instantly and fairly without the need for prolonged negotiation. Creators could release inventions under predefined terms, allowing others to build upon them within a framework of transparent, enforceable conditions. The result would be a more dynamic, more accessible model of knowledge sharing—one in which protection is maintained but collaboration is facilitated rather than obstructed (Kriger 2025).

6.5 Dynamic Licensing

The current system offers a binary choice: full exclusivity or no protection at all. A more nuanced approach would adjust the terms of protection based on real-world factors that the binary model ignores.

Under a dynamic licensing framework, the scope and duration of exclusivity would be responsive to measurable conditions. An invention developed with substantial public funding might face a shorter exclusivity period or mandatory licensing at regulated rates. A product that achieves widespread market adoption—becoming, in effect, a de facto standard or essential infrastructure—might transition from exclusive rights to shared governance. A drug that addresses a public health emergency might be subject to automatic compulsory licensing at predefined terms, triggered by a declared health crisis rather than by a case-by-case negotiation.

Dynamic licensing does not eliminate protection. It makes protection conditional on contribution and responsive to context. It recognizes that a one-size-fits-all monopoly, applied indiscriminately across fields and circumstances, cannot adequately balance the interests of inventors, firms, consumers, and the public. The principle is adaptability: rights should evolve with the conditions that surround them, rather than remaining fixed for decades in a world that changes by the month.

6.6 A Sui Generis Framework for AI-Generated Inventions

As discussed in Section 4, the current legal treatment of AI-generated inventions is caught between fictions. Attributing inventorship to the human operator inflates credit where little is due. Denying protection altogether risks driving AI-driven innovation underground. Maintaining the status quo—in which the question is simply left unresolved—invites inconsistency, strategic gaming, and progressive erosion of the system's coherence.

A sui generis framework would create a distinct category of intellectual property for machine-generated outputs. The rights conferred would be narrower and shorter than those available for human inventions—perhaps five to ten years, with mandatory disclosure and reduced fees. Ownership would vest in the operator or developer of the AI system, not on the fiction of their inventive contribution, but on the pragmatic recognition that someone must bear responsibility for the quality and safety of the output. The framework would impose enhanced disclosure requirements, ensuring that the AI system's architecture, training data, and decision-making process are described with sufficient specificity to allow others to build upon the work.

Such a framework would not resolve every question raised by AI-generated invention. But it would provide a coherent legal basis for addressing a problem that the current system simply ignores—and it would do so without forcing the law into fictions that undermine its authority.

7. Conclusions

The patent system is not beyond repair, but it is past the point where minor adjustments to filing procedures, examination standards, or litigation rules will address its fundamental dysfunctions. The problems described in this article—the weaponization of patents by non-practicing entities and dominant corporations, the inability of existing frameworks to accommodate machine-generated inventions, and the moral failure of pharmaceutical monopolies that place treatment beyond the reach of those who need it most—are structural in nature. They arise not from the abuse of a well-designed system but from the design of the system itself. The reform proposals evaluated here—sector-specific patent terms, layered rights contingent on demonstrated utility, blockchain-based registries for transparent priority verification, dynamic licensing models responsive to public interest, and a sui generis framework for AI-generated inventions—are not utopian. Each addresses a specific, identifiable dysfunction. Each has precedents or analogues in existing legal practice. And each rests on a principle that the current system has abandoned: that protection should be proportional to contribution, responsive to context, and justified by benefit rather than enforced by default. The original purpose of the patent was to encourage the sharing of knowledge by offering a temporary reward for disclosure. That purpose has been obscured by decades of strategic gaming, institutional rigidity, and commercial pressure. Recovering it will require not only new rules, but a willingness to ask the questions the system has stopped asking. Not merely whether an invention is novel, but whether it is real. Not merely who filed first, but who contributed most. Not merely what can be owned, but what should be shared. The inventors who shaped the trajectory of modern science—Röntgen, Fleming, and countless others who chose openness over enclosure—understood that certain discoveries carry obligations that transcend the right to profit. Their example does not argue against intellectual property. It argues for a form of intellectual property that remembers its purpose: not to hoard knowledge, but to release it; not to reward filing, but to reward creation; not to enclose the future, but to open it.

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