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Rethinking the Protection of Patent Cooperation Treaty (PCT) in the Context of Digital Science and Internet Expansion – A Nigerian Perspective

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Abstract

The digital revolution has transformed intellectual property protection, making patent safeguarding through the Patent Cooperation Treaty (PCT) crucial for innovation. Established in 1978, the PCT simplified international patent applications via the World Intellectual Property Organization (WIPO). However, technological advances have exposed weaknesses in this framework, particularly for developing nations like Nigeria. This paper examined the PCT's effectiveness in protecting digital creations and identified its limitations in Nigeria's digital landscape. It investigated the legal and institutional obstacles Nigeria encountered when updating patent laws for digital and internet-based innovations, it explored how the country can modernize its intellectual property framework to align with international standards. This study employed doctrinal legal analysis. It was found that significant challenges stood as obstacles in Nigeria's ability to revise its patent legislation for digital innovations. Furthermore, various impediments hindered practical reforms needed to synchronize Nigeria's patent system with digital realities and global benchmarks. The study concluded that Nigeria's antiquated patent framework required comprehensive modernization to adequately protect digital inventions. The current system's inadequacy undermined Nigeria's capacity to harness digital science for economic development and sustainability. The paper recommended urgent reforms to rejuvenate the patent system, ensuring robust protection for digital innovations and positioning Nigeria competitively in the global digital economy.

Keywords: Patents, creation, digital, design, treaty, law.

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1. Introduction

Nigeria's intellectual property regime, particularly in terms of patents, has struggled to keep pace with the rapidly evolving landscape of digital science. Although the country is a member of the

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Patent Cooperation Treaty (PCT), its domestic laws, such as the Patents and Designs Act 1971, have not been significantly updated to meet the demands of digital inventions. This deficiency poses major challenges for inventors seeking to protect their creations in a digital environment, limiting both local and international investments in innovation. Digital science, characterized by advancements in software, algorithms, and internet-based solutions, creates challenges for traditional patent criteria of novelty, inventive step, and industrial applicability. Nigeria's patent system seems helpless to provide sufficient coverage for such inventions, which undermines the country's efforts to leverage digital science for economic growth and sustainable development. The question is, how does the PCT framework apply to digital creations, and what are its limitations in the context of the digital era? In its bid to align with international best practices in the digital era, how can Nigeria revise its intellectual property laws to effectively protect digital innovations?

The objectives of this paper are threefold. First, to articulate the typology and evolutionary trajectories of PCT creations. Second, to comparatively analyze how United States of America, the European Union, India, and Nigeria have attempted—successfully or otherwise—to establish legal framework for computer-implemented inventions. Third, to propose reforms for Nigeria's intellectual property regime.

The gap in Nigeria's intellectual property framework is hereby analysed by using doctrinal and comparative methodology. It draws from historical narratives, and scholarly literature to assess how these three countries have navigated while focusing on the impact of digital science on patent law. The findings will be valuable to policymakers, legal practitioners, inventors, and scholars by providing a detailed analysis of the shortcomings in Nigeria's current legal framework and offering practical recommendations for reform. The idea and solutions proffered is a continuing contribution to the broader discussion on how developing countries can align their Intellectual Property laws with the demands of the global digital economy. As digital inventions increasingly shape the future of innovation, countries like Nigeria must adopt proactive measures to ensure adequate legal protection, which in turn will foster economic growth and encourage local innovations.

2. Overview of the PCT and Impact of Digital Science/Internet on Intellectual Property

The Patent Cooperation Treaty (PCT) was established in 1970 and entered into force in 1978¹ with the aim of simplifying the patent application process for inventors seeking protection in multiple jurisdictions. The treaty, administered by the World Intellectual Property Organization (WIPO), offers a centralized procedure for filing patents. Inventors can submit a single 'international' application that is transmitted to the relevant national or regional patent offices for examination and grant decisions.² The PCT application serves as a basis for seeking patent protection in up to 156 contracting states. It simplifies the initial steps, allowing inventors to delay national filing procedures while determining the commercial potential of their inventions in different markets.³

According to Cornish, Llewelyn, and Aplin, the PCT has been effective in reducing the cost and administrative burden associated with filing patent applications in multiple countries. However, they note that the treaty was originally designed for a pre-digital era, and it now faces challenges in addressing the complexities of digital inventions, which often involve intangible assets such as

¹ World Intellectual Property Organization, Geneva, Switzerland 'Patent Cooperation Treaty (PCT)' (WIPO) <https://www.wipo.int/pct/en/> accessed 15 September 2024. The PCT was established in June 1970, at Washington Diplomatic Conference and entered into force in 1978; WIPO Publication, No.274 (E) 1.

² Patent Cooperation Treaty, Article 8.

³ Ibid, Articles 22 & 23.

software and algorithms.⁴ Moreover, the PCT system is fundamentally a procedural treaty, it does not grant a unified international patent, nor does it establish substantive rules for patent examination across jurisdictions. The responsibility for granting patents remains with individual national or regional patent offices, meaning that the PCT framework does not provide a consistent approach to emerging challenges, such as those presented by digital inventions.⁵

Digital science, driven by advancements in software, data, and artificial intelligence, has brought about profound changes to the way intellectual property, particularly patents, is perceived and protected. There seems to be a general understanding that digital technologies blur the lines between patentable and non-patentable subject matter, leading to complexities in defining the scope of patent protection.⁶ Samuelson highlights the challenges patent law faces in the digital age, particularly in defining the eligibility of inventions that are based on abstract ideas or algorithms.⁷ In many jurisdictions, inventions that involve computer programmes and artificial intelligence face different standards when compared to traditional physical inventions. The European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO) have established guidelines for computer-implemented inventions,⁸ while Nigeria's framework has lagged in providing similar clarity.

The revolution of digital science and the Internet has fundamentally transformed the landscape of Intellectual Property (IP) law, creating unprecedented challenges and opportunities for rights holders, users, and policymakers.⁹ This technological revolution has disrupted traditional IP frameworks, necessitating continuous legal adaptation to address the complexities of the digital age.¹⁰ Some of these disruptive tendencies across the different IP genres are explained below.

a. Copyright in the digital era

The instantaneous nature of the Internet has had a significant impact on copyright protection because it allows for the immediate, flawless replication and worldwide dissemination of creative

⁴ Cornish W, Llewelyn D, and Aplin T, *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights* (8th edn, Sweet & Maxwell 2013) 509-540.

⁵ Stefan Scheurer and Gustav Schubert, 'The Evolution of the Patent Cooperation Treaty (PCT) System: Foundations Revisited and Current Developments' (2025) *GRUR International*, available at: <https://doi.org/10.1093/grurint/ikaf129> accessed 29 December 2025.

⁶ DL Burk & M A. Lemley, "Is Patent Law Technology-Specific?" (2002)17 (4) *Berkeley Technology Law Journal*, 1158 –1175.

⁷ Schultz, J., & Samuelson, P. 'Clues for determining whether business and service innovations are unpatentable abstract ideas' (2011)15(1) *Lewis & Clark Law Review*, 109-155; Samuelson, P. 'Benson revisited: The case against patent protection for algorithms and other computer program-related inventions'. *Emory Law Journal*, (1990) 39(4) 1025-1154.

⁸ European Patent Office, *Guidelines for Examination in the European Patent Office*. Available at: <https://www.epo.org/law-practice/legal-texts/html/guidelines/Wbetal>. Accessed 29 December 2025. Computer-implemented inventions at the EPO are governed by Articles 52-57 of the European Patent Convention (EPC), which requires inventions to be new, involve an inventive step, and be susceptible of industrial application; United States Patent and Trademark Office. (2024). "2024 Guidance Update on Patent Subject Matter Eligibility, including on Artificial Intelligence." *Federal Register*, 89 Fed. Reg. 58128 (July 17, 2024). The 2024 Guidance Update confirms that AI inventions are patentable and emphasizes that many claims to AI inventions are eligible as improvements to the functioning of a computer or improvements to another technology or technical field. These guidelines represent the current frameworks for evaluating computer-implemented inventions in both jurisdictions, with the EPO focusing on technical character and the COMVIK approach, while the USPTO applies the Alice/Mayo test with its practical application integration requirement.

⁹ W M Landes and Richard A Posner, *The Economic Structure of Intellectual Property Law* (Harvard University Press 2003) 1–15.

¹⁰ Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (Penguin Press 2004) 83–99.

works.¹¹ Digital technology has eliminated the degradation inherent in analogue copying, making every copy identical to the original, which fundamentally challenges copyright's traditional economic model based on scarcity.¹² The ease of copying and sharing has led to widespread piracy, exemplified by the Napster controversy and subsequent peer-to-peer file-sharing platforms that undermined established content industries.¹³

Legislative responses, such as the Digital Millennium Copyright Act 1998 in the United States and the European Union's Copyright Directive 2019, have attempted to balance rights holder protection with legitimate uses.¹⁴ However, these measures remain controversial, with critics arguing they excessively restrict fair use and stifle innovation.¹⁵ The concept of Digital Rights Management (DRM) has emerged as a technological solution, though it raises concerns about consumer rights and interoperability.¹⁶

b. Patent law and digital innovation

Digital science has also complicated patent law, particularly regarding software and business method patents.¹⁷ The patentability of computer-implemented inventions remains contentious across jurisdictions, with divergent approaches in the United States, Europe, and Asia.¹⁸ The proliferation of software patents has been criticized for creating 'patent thickets' that impede innovation rather than promote it, contradicting patent law's fundamental purpose.¹⁹

Furthermore, the Internet has facilitated the rise of patent trolls—entities that acquire patents not to practice inventions but to extract licensing fees through litigation threats.²⁰ This phenomenon has generated significant transaction costs for technology companies and has prompted calls for patent reform.²¹

In the area of international patent protection, the global reach of the internet complicates jurisdictional matters for patent protection and enforcement. According to Heller, the nature of digital creations, which can be easily reproduced and distributed across borders, creates difficulties for enforcing patents internationally.²² The PCT system, while effective in unifying application processes, does not directly address enforcement challenges, which remain the responsibility of individual states.

¹¹ Jessica Litman, *Digital Copyright* (Prometheus Books 2006) 22–35.

¹² Pamela Samuelson, 'The Copyright Grab' (1996) 4 *Wired* 134.

¹³ *A&M Records, Inc v Napster, Inc* 239 F 3d 1004 (9th Cir 2001).

¹⁴ Digital Millennium Copyright Act 1998 (US); Directive 2019/790/EU on copyright and related rights in the Digital Single Market [2019] OJ L130/92.

¹⁵ Pamela Samuelson, 'Anti-circumvention Rules: Threat to Science' (2001) 293 *Science* 2028.

¹⁶ Dan L Burk and Julie E Cohen, 'Fair Use Infrastructure for Rights Management Systems' available at <https://scholarship.law.georgetown.edu/facpub/517/>; <http://jolt.law.harvard.edu/articles/pdf/v15/15HarvJLTech041.pdf> accessed on 30 December 2025.

¹⁷ James Bessen and Michael J Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* (Princeton University Press 2008) 145–168.

¹⁸ *Alice Corp v CLS Bank International* 573 US 208 (2014).

¹⁹ Carl Shapiro, 'Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting' in Adam B Jaffe, Josh Lerner and Scott Stern (eds), *Innovation Policy and the Economy* (MIT Press 2001) 119–150.

²⁰ Mark A Lemley and A Douglas Melamed, 'Missing the Forest for the Trolls' (2013) 113 *Columbia Law Review* 211. Available at <https://columbialawreview.org/content/missing-the-forest-for-the-trolls/> accessed on 30 December 2025.

²¹ *Ibid.*

²² Heller M, 'The Tragedy of the Anti-commons: A Concise Introduction' Available at: https://scholarship.law.columbia.edu/faculty_scholarship/1778/ accessed on 30/12/2025.

Additionally, the concept of ‘territoriality’ in patent law—which implies that patents are only enforceable within the jurisdiction that grants them—creates problems when dealing with digital inventions.²³ For instance, an invention created in Nigeria and distributed globally over the internet may face difficulties in securing and enforcing protection in other jurisdictions without local patent filings.

c. Trademarks and online commerce

The Internet has transformed trademark law by creating new forms of infringement and confusion.²⁴ Domain name disputes, cybersquatting, and keyword advertising have necessitated new legal mechanisms such as the Uniform Domain-Name Dispute-Resolution Policy.²⁵ Search engines and online marketplaces have become critical intermediaries whose liability for trademark infringement remains legally uncertain.²⁶

Digital platforms have also enabled counterfeit goods to reach global markets with unprecedented ease, challenging enforcement mechanisms designed for physical commerce.²⁷ The liability of intermediaries—whether Internet service providers, search engines, or e-commerce platforms—has become a central issue in IP enforcement.²⁸

d. Open access and collaborative innovation

Digital technology has paradoxically both strengthened and weakened IP protection. While DRM and surveillance technologies enhance enforcement capabilities, the Internet has also enabled alternative models such as open-source software, creative commons licensing, and open access publishing that challenge proprietary IP paradigms.²⁹ These movements reflect a fundamental tension between exclusionary IP rights and the Internet's ethos of information sharing and collaboration.³⁰

Wikipedia, Linux, and numerous scientific databases demonstrate that collaborative, non-proprietary models can produce high-quality innovations and knowledge resources.³¹ This has prompted scholars to question whether traditional IP protection remains optimal for promoting innovation in the digital age.³²

The Internet and digital science have necessitated a comprehensive reassessment of IP law's foundations. While technological protection measures and legislative updates have attempted to

²³ Peukert, A. ‘Territoriality and extraterritoriality in intellectual property law’. In G. Handl, J. Zekoll, & P. Zumbansen (Eds.), *Beyond Territoriality: Transnational Legal Authority in an Age of Globalization* (Brill Academic Publishing, 2012) 189–228.

²⁴ Graeme B Dinwoodie and Mark D Janis, *Trade Mark and Unfair Competition Law: Cases and Materials* (4th edn, Wolters Kluwer 2014) 567.

²⁵ ICANN, Uniform Domain-Name Dispute-Resolution Policy (1999).

²⁶ *Google France SARL v Louis Vuitton Malletier SA* (C-236/08) [2010] ECR I-2417.

²⁷ Organisation for Economic Co-operation and Development, *Trade in Counterfeit Goods and the Italian Economy* (OECD Publishing 2018).

²⁸ Directive 2000/31/EC on electronic commerce (2000) *OJ L178/1*, arts 12–15.

²⁹ Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (Yale University Press 2006) 59–90.

³⁰ James Boyle, *The Public Domain: Enclosing the Commons of the Mind* (Yale University Press 2008) 1–15.

²⁵ Eric von Hippel, *Democratizing Innovation* (MIT Press 2005) 93–120.

³¹ Mark A Lemley, ‘Property, Intellectual Property, and Free Riding’ available at <https://law.stanford.edu/publications/property-intellectual-property-and-free-riding/> accessed on 30/12/2025.

³² Niva Elkin-Koren, ‘Copyright in Cyberspace: Rights without Laws?’ (1998) 73 *Chicago-Kent Law Review* Available at <https://scholarship.kentlaw.iit.edu/cgi/viewcontent.cgi?article=3146&context=cklawreview> accessed on 30 December 2025.

preserve traditional IP frameworks, fundamental questions persist about whether these frameworks adequately serve innovation and creativity in the digital environment.³³ The ongoing challenge lies in crafting IP policies that incentivize creation while facilitating the free flow of information that characterizes the digital age.

3. Nigeria's Intellectual Property Framework in Global Context

Nigeria's intellectual property laws, including those covering patents, are primarily governed by the Patents and Designs Act of 1971.³⁴ Despite being a signatory to the PCT, Nigeria is grappling with updating its patent laws to address the evolving landscape of digital science and technology.³⁵ Adewopo argues that Nigeria's current IP framework is inadequate for protecting modern inventions, particularly those developed in the digital space, which require specific provisions and definitions to ensure adequate protection.³⁶

The framework for intellectual property (IP) in Nigeria is a complicated fusion of international commitments, colonial heritage, and developmental goals. Even while the nation has put in place fundamental legislative frameworks for intellectual property protection, there are still large disparities when compared to international norms and the requirements of a knowledge-based economy.

a. Legislative basis and global harmonization

The Patents and Designs Act (1971), the Trademarks Act (1990), the Copyright Act (2022), and the Merchandise Marks Act (1958) are the main legislations that make up Nigeria's intellectual property regime. First, Nigeria has shown its dedication to international IP standards by becoming a member of the World Intellectual Property Organization (WIPO) and signing the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).³⁷ Additionally, the nation has ratified the Berne Convention for the Protection of Literary and Artistic Works and the Paris Convention for the Protection of Industrial Property.³⁸

Nigeria does not really adhere to these international frameworks, nevertheless. One of the biggest issues facing the nation's intellectual property ecosystem is the discrepancy between the practical enforcement of laws and their implementation.³⁹ Although rules are in place in theory, they are

³³ Julie E Cohen, *Configuring the Networked Self: Law, Code, and the Play of Everyday Practice* (Yale University Press 2012) 122.

³⁴ Patents and Designs Act 1971 (Nigeria).

³⁵ Yauri, A, 'The Patent System in Nigeria' (2012) 34(3) *World Patent Information* 228. Available at <https://doi.org/10.1016/j.wpi.2012.05.005> accessed on 30 December 2025; Mondaq, 'The legal challenges encountered in protecting software applications in Nigeria', available at <https://www.mondaq.com/nigeria/patent/1532446/the-legal-challenges-encountered-in-protecting-software-applications-in-nigeria> accessed on 30 December 2025.

³⁶ Adewopo A, 'The Global Intellectual Property System and Sub-Saharan Africa: A Prognostic Reflection' (2002)33 *University of Toledo Law Review* 749 available at <https://heinonline.org/HOL/Page?handle=hein.journals/utol33&id=757&collection=journals> Accessed 30 December 2025.

³⁷ R. L. Okediji, *Developing Country Interests and TRIPS Dispute Settlement. Understanding Interfaces in Intellectual Property and Development* (Elgar Publishing, 2018) 45.

³⁸ WIPO, 'Berne Notification No. 147: Accession by the Federal Republic of Nigeria' (World Intellectual Property Organization, 14 June 1993) Available at https://www.wipo.int/wipolex/en/treaties/notifications/details/treaty_berne_147 accessed 30 December 2025.

³⁹ D. O. Oriakhogba, *Copyright, E-Commerce, and the Digitization Divide in Africa's Application of the WIPO Internet Treaties*, (Stellenbosch University Press 2017) 67.

frequently not applied effectively because of structural flaws that erode investor trust and inhibit innovation.⁴⁰

b. Important voids in the framework's enforcement shortcomings

Enforcement is arguably Nigeria's IP framework's most obvious flaw. Because there are no specific IP courts in the legal system, complicated technical disputes must be heard in normal commercial courts with judges who frequently lack specialized competence.⁴¹ This leads to drawn-out court cases, erratic rulings, and insufficient remedies. In contrast to the months it takes in countries like Singapore or the UK, the average IP dispute takes three to five years to conclude.⁴² In essence, this delay promotes violations and denies justice.

c. Limitations on institutional capacity

Chronic underfunding, a lack of manpower, and outdated technology plague the regulatory agencies, which include the Nigerian Copyright Commission, the Trademarks, Patents and Designs Registry, and the Standards Organization of Nigeria.⁴³ Because there aren't enough examiners with technical expertise, the patent examination procedure is very troublesome and has backlogs that last for years. Systems like those in South Korea or Japan, whose efficient procedures and digital technology allow for quick processing, stand in stark contrast to this.⁴⁴

d. Outdated laws and regulations

Even with recent changes to copyright, some IP laws are still outdated. Software patents, business method patents, and biotechnology advances are not clearly outlined in the Patents and Designs Act, which predates the digital revolution.⁴⁵ Similar to this, non-traditional marks that are becoming more and more well-known worldwide—like sound, aroma, or motion marks—are not covered by the Trademarks Act.⁴⁶ The creative sectors and new technologies are not sufficiently protected by this legislative standstill.

e. Poor border control procedures

Nigeria's open borders allow a huge flow of fake goods, which threatens customers and undermines respectable companies. For efficient IP enforcement at entry points, the Nigerian Customs Service is devoid of the necessary tools, training, and legal power.⁴⁷ Nigerian customs primarily function reactively, requiring rights holders to keep an eye out for and report violations, in contrast to the

⁴⁰ Nwosu C, 'The Legal Challenges Encountered in Protecting Software Applications in Nigeria' (Mondaq, 2 January 2025) available at <https://www.mondaq.com/nigeria/trademark/1532446/the-legal-challenges-encountered-in-protecting-software-applications-in-nigeria> accessed 30 December 2025.

⁴¹ O. A. Bankole, *Nigerian Intellectual Property Law and Practice* (Press Malthouse Limited 2015).

⁴² Correa, C. M. *Trade-Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* (2nd ed. Oxford University Press 2020) 59.

⁴³ Olubiyi IA, Emerole UA and Adetula AF, 'Contemporary Challenges to Intellectual Property Rights in Developing Countries: Looking Beyond the Laws (Nigeria as a Case Study)' (2022) 53 *IIC - International Review of Intellectual Property and Competition Law* 5, available at <https://link.springer.com/article/10.1007/s40319-021-01138-7> accessed 30 December 2025

⁴⁴ Maskus KE, *The Global Economics of Intellectual Property in the Twenty-First Century: Private Rights and Public Issues*, (International Economics Peterson Institute, 2012) 36.

⁴⁵ Idris K, *One Effective Tool for Economic Growth is Intellectual Property*, (WIPO Publication 2003)

⁴⁶ M. D. Janis and G. B Dinwoodie, *Laws pertaining to Trade Dress and Design*, (Wolters Kluwer Business & Law 2016) 78.

⁴⁷ Chidi OC, *The Impact and Remedies of Piracy and Counterfeiting in Nigeria*, (Business School in Lagos 2016).

US or EU, where customs officials have the authority to proactively seize suspected counterfeit goods.⁴⁸

f. Traditional knowledge is not fully protected

Nigeria lacks strong legal structures to protect its rich traditional knowledge and cultural expressions. Despite the Copyright Act's traditional protections, biopiracy is still uncontrolled and enforcement is lax.⁴⁹ Indigenous people are left open to exploitation by foreign organizations that patent variations of traditional remedies, farming methods, and genetic resources because there is no *sui generis* framework in place to protect traditional knowledge, unlike in nations like India.⁵⁰

g. Challenges of the digital economy

Nigeria's economy has rapidly gone digital, revealing weaknesses in the way domain name conflicts, internet piracy, and digital rights management are handled.⁵¹ Issues including app-based infringement, streaming piracy, and cross-border digital transactions are not sufficiently addressed by the legal framework.⁵² While industrialized countries have used tools like the EU Copyright Directive and the United States' Digital Millennium Copyright Act to adapt their IP regimes to the digital age, Nigeria's approach is still disjointed.

Comprehensive reform that includes judicial specialization, institutional strengthening, updated legislation, and increased public awareness is needed to close these gaps. Nigeria needs to create specialist IP tribunals, update its patent examination system, bolster border security, and create frameworks for the protection of traditional knowledge and emergent technology.⁵³

In order to fight counterfeiting, the government should also give priority to the development of digital infrastructure inside IP institutions, make investments in enhancing the skills of judges and law enforcement officers, and encourage public-private partnerships. Regional cooperation via institutions such as the African Regional Intellectual Property Organization (ARIPO) may be beneficial.⁵⁴

Despite being structurally sound, Nigeria's IP framework has execution issues that reduce its usefulness in the global knowledge economy. In addition to ensuring TRIPS compliance, closing these gaps is crucial for promoting innovation, drawing in foreign capital, and safeguarding Nigeria's innovative and creative output. Nigeria runs the risk of staying on the outside of the global innovation ecosystem while having a significant amount of human and creative resources if significant reforms are not made to address enforcement, institutional capacity, and legislative modernization. In comparison, other jurisdictions have proactively adapted their IP laws to accommodate digital innovations. The United States and the European Union have revised their patent examination guidelines to clarify the treatment of computer-implemented inventions and software. In contrast, Nigeria's lack of such guidelines leaves significant uncertainty for inventors and investors alike.

⁴⁸ Ibid.

⁴⁹ Asein JO and Nwauche ES (eds), *A Decade of Copyright Law in Nigeria* (Nigerian Copyright Commission 2002)

⁵⁰ Mgbeoji, *Global Biopiracy: Indigenous Knowledge, Patents, and Plants*. (UBC Press 2006) 12

⁵¹ C. Okuamanam, *Global Governance and Intellectual Property: A Development Issue*. (Routledge 2018)

⁵² Ibid

⁵³ Uchechukwu, Uguru and Umobong, Moses 'Appraising the Impact of the Nigerian Copyright Act and Regulations in Combating Piracy in Nigeria' (2022) 13 (2) Beijing Law Review 247 -264. Available at DO-10.4236/blr.2022.132016 accessed 30 December 2025.

⁵⁴ J. De Beer and associates, *The WIPO Development Agenda's implementation*. (University Press, Wilfrid Laurier 2017)

4. Comparative Study: Nigeria and Other Jurisdictions

The differences between developed and developing countries in handling digital inventions under the PCT are stark. Developed countries such as the United States, Germany, and the United Kingdom have instituted mechanisms to facilitate digital patent applications. These jurisdictions also have specialized patent courts and tribunals to handle complex digital patent disputes.⁵⁵

For instance, the European Patent Office (EPO) uses the European Patent Convention (EPC) to offer clear guidelines for examining digital patents.⁵⁶ Meanwhile, the United States Patent and Trademark Office (USPTO) has established practices for handling software patents, particularly those involving artificial intelligence and machine learning technologies.⁵⁷ Nigeria lacks such specialization, and the patent examination process remains cumbersome and ill-equipped to handle the complexities introduced by digital science. Some democratic countries with robust legal frameworks are selected for analysis and comparison with Nigeria.

4.1 United States and the European Union

The United States and the European Union have adapted their patent systems to accommodate digital inventions. The United States Patent and Trademark Office (USPTO) revised its patent examination guidelines following significant judicial decisions, such as *Alice Corp. v CLS Bank International*, which addressed the patentability of abstract ideas and computer-implemented inventions.⁵⁸ The USPTO has since clarified the eligibility requirements for software patents, creating a more predictable landscape for digital innovations.

Similarly, the European Patent Office (EPO) has adopted the European Patent Convention (EPC), which includes guidelines on the examination of computer-implemented inventions. According to Article 52 of the EPC, inventions involving computer programs may be patentable if they demonstrate a “technical effect” beyond the mere operation of the software itself.⁵⁹ This adaptation has allowed the EPO to handle a growing number of digital patent applications effectively. In addition, the European Union has pioneered the movement to harmonize patent laws across member states to address challenges presented by digital inventions. It explores the possibility of introducing a unitary patent that would provide uniform protection across the EU, streamlining the process for digital patents.⁶⁰

⁵⁵ United States Patent and Trademark Office, 'Patent Trial and Appeal Board' available at <https://www.uspto.gov/patents/ptab> accessed 30 December 2025; In Germany Federal Patent Court (Bundespatentgericht) Munich Hears appeals from the German Patent and Trade Mark Office decisions; handles nullity actions against patents, Patentgesetz (Patent Act) § 65-99.

⁵⁶ European Patent Office, *Guidelines for Examination in the European Patent Office* (2024) G-II, 3.6; The European Patent Office (EPO) analyzes "computer-implemented inventions" (CIIs) within the general patentability standard provided in the European Patent Convention (EPC) and fully explained in the *Guidelines for Examination in the European Patent Office* (EPC Guidelines). The core legal provision is Article 52 EPC, which excludes "programs for computers *as such*" from patentability. Available at https://www.google.com/search?client=firefox-b-e&q=provide+European+Patent+Convention+%28EPC%29+clear+guidelines+for+examining+digital+patents+in+OSCOAL+format&zxx=1767754097402&no_sw_cr=1 accessed 30 December 2025.

⁵⁷ United States Patent and Trademark Office, 'Patent Examination Guidelines' (2019); European Patent Office, 'Guidelines for Examination of Computer-Implemented Inventions' (2020).

⁵⁸ *Alice Corp. v CLS Bank International* [2014] 573 US 208. See also *Bilski v Kappos* [2010] 561 US 593; *Mayo Collaborative Services v Prometheus Laboratories, Inc.* [2012] 566 US 66.

⁵⁹ European Patent Convention 2000, art 52.

⁶⁰ European Commission, 'Unitary Patent & Unified Patent Court' (European Commission, 2020) https://ec.europa.eu/growth/industry/strategy/intellectual-property/patents_en accessed 15 September 2024.

4.2 India as a Developing Country

India, a developing country with similar challenges to Nigeria, offers a useful comparison. India has adopted measures to modernize its patent system and has implemented specific guidelines for computer-related inventions (CRIs). The Indian Patent Office's "Guidelines for Examination of CRIs" provide clarity on the eligibility of software patents, making it easier for inventors in the digital sector to seek protection.⁶¹

The Indian approach underscores the importance of updating domestic IP frameworks to address digital advancements. Unlike Nigeria, India has invested in capacity building and technological infrastructure to support its patent system. These efforts have improved the predictability and efficiency of the Indian patent process, making it more attractive for inventors, particularly those in the technology sector.

In Asia, Japan has revised its Patent Act to promote innovation in emerging technology sectors, including artificial intelligence, robotics, and the Internet of Things (IoT).⁶² The Japanese Patent Office has established guidelines specifically addressing the patentability of inventions in these fields, which have provided greater legal certainty for inventors and investors.⁶³

4.3 Nigeria's Patent System under the PCT

Nigeria acceded to the PCT in 2005, providing local inventors with an avenue to seek international protection for their inventions. Despite being a member of the PCT, Nigeria's domestic patent laws, governed by the Patents and Designs Act of 1971 (as amended), did not undergo significant reform to address the emerging challenges of digital technology. As a result, the country lacks a comprehensive legal framework that can effectively handle digital innovations, which often do not fit neatly into traditional patent classifications.⁶⁴

The Nigerian Patent Office, administered by the Commercial Law Department of the Federal Ministry of Trade and Investment, faces significant challenges, including limited capacity to examine patents, outdated examination guidelines, and insufficient digital infrastructure.⁶⁵ Unlike patent offices in developed countries, Nigeria lacks specialized expertise to deal with digital inventions such as software, algorithms, and artificial intelligence technologies.⁶⁶

The experiences of these jurisdictions provide valuable insights for Nigeria. First, Nigeria could benefit from establishing clear guidelines for examining digital inventions, as seen in India and the European Union. Updating the Patents and Designs Act of 1971 to accommodate the unique characteristics of digital science, including software and algorithms, would provide much-needed clarity for inventors. Furthermore, Nigeria's patent office would benefit from capacity-building initiatives that focus on training examiners in digital technologies. The adoption of digital infrastructure to facilitate online filing and examination of patents would also significantly enhance

⁶¹ Indian Patent Office, 'Guidelines for Examination of Computer Related Inventions (CRIs)' (2017).

⁶² Japanese Patent Office, 'Patent Examination Guidelines for Artificial Intelligence and Emerging Technologies' (2021).

⁶³ Ibid.

⁶⁴ Patents and Designs Act LFN 2004.

⁶⁵ FA Okpara, 'Towards a Proactive Review of Nigerian Patents Design Act' available at https://www.researchgate.net/publication/395273744_Towards_a_Proactive_Review_of_the_Nigerian_Patents_and_Designs_Act_2023, accessed 30 December 2025.

⁶⁶ A Adewopo, *According to Intellectual Property: A Pro-Development Vision of the Law and the Nigerian Intellectual Property Law and Policy Reform in the Knowledge Era*, available at nials-nigeria.org, Accessed 30 December 2025.

the efficiency of the patent process. Without these reforms, Nigeria risks falling behind in the global race for innovation, particularly in the fast-growing digital economy.

5. Challenges Facing Nigeria in Revising its Patent Laws in the Digital Era

5.1 Legal and Administrative Challenges

Nigeria faces significant legal and administrative challenges in revising its patent laws to effectively accommodate the evolving landscape of digital science and technology. The primary legislation governing patents in Nigeria, the Patents and Designs Act of 1971, has remained largely unchanged since its enactment. As a result, it lacks provisions that address the complexities of digital inventions, such as software, algorithms, and artificial intelligence technologies.⁶⁷

The Patents and Designs Act 1971 is rooted in traditional patent law principles, which prioritize physical inventions and tangible technological advances. It does not adequately address the unique characteristics of digital inventions, which often involve abstract elements that challenge traditional patentability criteria, such as novelty, inventive step, and industrial applicability.⁶⁸ For example, in the field of software and artificial intelligence, the boundaries of patentable subject matter remain unclear, leaving inventors without legal certainty about the scope of protection available for their inventions.

Comparatively, other countries have reformed their legislative frameworks to explicitly accommodate digital technologies. In the United States, the *America Invents Act* of 2011 introduced several changes to adapt the patent system to the realities of modern technology.⁶⁹ Meanwhile, Nigeria has yet to initiate such legislative reform, creating a legal environment that discourages investment in innovation and fails to protect local digital inventions adequately.

5.2 Institutional Limitations

The Nigerian patent office, administered by the Commercial Law Department of the Federal Ministry of Trade and Investment, also faces significant challenges in examining and granting patents for digital inventions. The lack of specialized expertise within the patent office, coupled with outdated examination guidelines, hinders the effective assessment of digital patent applications.⁷⁰

Further complicating the patent system is the absence of digital infrastructure. Unlike more advanced patent offices, such as the European Patent Office or the United States Patent and Trademark Office, the Nigerian Patent office has yet to implement an online filing system or digital examination tools. The lack of digital infrastructure results in a cumbersome, paper-based patent application process that is both time-consuming and prone to administrative inefficiencies.⁷¹

⁶⁷ Patents and Designs Act 1971 (Nigeria).

⁶⁸ Adewopo, (n 66).

⁶⁹ Leahy-Smith *America Invents Act* 2011, Pub L No 112-29, 125 Stat 284.

⁷⁰ W Egbewole, 'Patent Law and the Challenges of the Digital Economy in Nigeria' [2021] *The Digital Economy and the Law; Prospects and Challenges* available at https://www.researchgate.net/publication/354372697_THE_DIGITAL_ECONOMY_AND_THE_LAW_PROSPECTS_AND_CHALLENGES accessed 30 December 2025.

⁷¹ World Intellectual Property Organization, 'World Intellectual Property Indicators 2022' (WIPO, 2022) <https://www.wipo.int/publications/en/details.jsp?id=4562> accessed 15 September 2024.

5.3 Deficiency in Digital Science by the Informal Sector

The informal sector plays a significant role to national economy, contributing substantially to employment and GDP.⁷² Inventions and innovations in the informal sector often involve low-cost, locally developed digital solutions aimed at addressing everyday challenges. However, these informal innovations face significant obstacles in obtaining patent protection under Nigeria's current IP regime, which is more suited for formal, structured inventions that meet stringent patentability criteria.⁷³ Digital science has facilitated the emergence of informal, community-driven innovations, such as locally developed software and mobile applications. These inventions often do not fit neatly within the formal IP system due to the complexities associated with digital creations, such as overlapping ownership and the collaborative nature of development. Without adequate legal frameworks that recognize and protect these innovations, inventors in Nigeria's informal sector are left vulnerable to exploitation, limiting their ability to commercialize and benefit from their inventions.⁷⁴

5.4 Barriers in Accessing Patent Protection

Access to patent protection remains limited for inventors in the informal sector due to high filing costs, administrative bottlenecks, and a lack of awareness about intellectual property rights.⁷⁵ The cost of securing patent protection, particularly for inventions that require international coverage under the PCT, is prohibitive for many small-scale inventors.⁷⁶ This is further compounded by the absence of government incentives or support programs aimed at assisting inventors in navigating the patent process.⁷⁷ In addition, there is a lack of awareness about the importance of IP protection, particularly in rural and underserved communities. Without adequate knowledge of patent rights and the processes involved in securing protection, inventors in the informal sector are unable to take advantage of the benefits offered by the patent system.

6. Conclusion and Recommendations

The protection of digital inventions under the Patent Cooperation Treaty (PCT) and national patent systems is critical in the context of rapid advancements in digital science and the expansion of the Internet. For Nigeria, a member of the PCT since 2005, there is an urgent need to reform its patent system to address the unique challenges posed by digital inventions and ensure alignment with international best practices.

This research has highlighted several key issues in the current framework governing patent protection in Nigeria. The Patents and Designs Act of 1971, which forms the backbone of Nigeria's patent regime, is outdated and fails to accommodate the complexities of digital technologies such as software, algorithms, and artificial intelligence. Unlike other jurisdictions such as the United States and the European Union, which have revised their patent examination guidelines and legislation to address these challenges, Nigeria has yet to take significant steps in this direction.

⁷² J De beer et al, 'Informal Economy, Innovation and Intellectual Property – Concepts, Metrics and Policy' 2013 https://www.researchgate.net/publication/281723088_The_Informal_Economy_Innovation_and_Intellectual_Property_-_Concepts_Metrics_and_Policy accessed 30 December 2025.

⁷³ Ibid.

⁷⁴ J. De beer et al (n 72).

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ L Mulibana & Ravinder Rena, 'Establishing an Understanding of the Innovation Process of Informal Micro-enterprises' 2023 available at: <https://doi.org/10.1080/20421338.2022.2117588> Accessed 30 December 2025.

The challenges facing Nigeria's patent system are both legal and institutional. Legal issues include the lack of clarity in patentable subject matter for digital inventions, while institutional challenges revolve around the limited capacity of the patent office to examine complex digital applications. Moreover, the informal sector, which plays a significant role in Nigeria's economy, lacks adequate support to secure patent protection for its innovations, creating barriers to commercialization.

Comparative studies with jurisdictions like India and the United States provide valuable insights into how Nigeria could reform its patent system to accommodate digital inventions. Countries that have successfully revised their IP frameworks have done so by modernizing patent examination guidelines, establishing clear standards for patent eligibility, and investing in the capacity of their patent offices to handle digital inventions. Nigeria can learn from these experiences to develop a more predictable and supportive environment for digital innovation.

To ensure effective protection of digital inventions and enhance the role of intellectual property in fostering innovation in Nigeria, the following recommendations are proposed:

a. Amendment of the Patents and Designs Act of 1971

The first and most crucial step for Nigeria is to amend the Patents and Designs Act of 1971. The revised law should include provisions that explicitly address the patentability of digital inventions, such as computer software, algorithms, and artificial intelligence technologies. This can be achieved by adopting a definition of patentable subject matter that includes “computer-implemented inventions” and by establishing criteria similar to the “technical effect” requirement used by the European Patent Office.

b. Incorporating Flexibilities under TRIPS

Nigeria should also consider incorporating TRIPS flexibilities into its national IP laws to support local innovation, particularly in the digital sector. These flexibilities include provisions for compulsory licensing, research exemptions, and public interest safeguards, which can provide access to digital technologies while promoting domestic innovation. This approach would help balance the interests of inventors with the need to ensure that technological advances are accessible to the broader population.

c. Capacity Building for the Patent Office

To effectively protect digital inventions, Nigeria's patent office requires significant capacity building. This includes training patent examiners in the technical aspects of digital science and providing them with specialized skills to evaluate computer-implemented inventions. Capacity-building initiatives should also extend to the judiciary, ensuring that judges have the knowledge necessary to adjudicate IP disputes involving digital inventions.

d. Digital Infrastructure for Patent Administration

The Nigerian patent office should invest in digital infrastructure to facilitate online filing and examination of patents. The adoption of digital tools and systems, such as artificial intelligence-driven examination support systems, would enhance the efficiency and accuracy of patent processing. Implementing an online patent filing system would also make the patent process more accessible, particularly for innovators in the informal sector who face geographic and administrative barriers.

e. Government Assisted Programmes

The government should introduce assistance programs that provide financial and technical support to innovators in the informal sector. This could include subsidies for patent application fees, grants for the commercialization of innovations, and the establishment of local IP helpdesks to provide guidance on the patent process. Such support would help bridge the gap between formal and informal innovation, encouraging greater participation in the IP system.

f. Public Awareness Campaigns

Raising awareness about intellectual property rights is essential for promoting a culture of innovation in Nigeria. The government, in collaboration with non-governmental organizations and academic institutions, should undertake public awareness campaigns that educate inventors about the importance of IP protection and the process for securing patent rights. These campaigns should target underserved communities and innovators in the informal sector, who are often excluded from the formal IP system due to a lack of knowledge.

g. Regional Patent Cooperation

Nigeria should consider strengthening its cooperation with other African countries in the area of patent protection. Regional patent organizations, such as the African Regional Intellectual Property Organization (ARIPO) and the African Intellectual Property Organization (OAPI), offer mechanisms for regional patent filing and protection. By leveraging these regional frameworks, Nigeria could enhance the effectiveness of its patent system and promote cross-border innovation in the digital sector.

h. Participation in International Discussions on Digital IP

Nigeria should also increase its participation in international discussions on the evolving nature of IP in the digital era. Active participation in WIPO committees and international negotiations on IP policy would enable Nigeria to influence global IP norms in ways that align with its developmental interests. Such participation would also provide valuable insights into best practices for IP protection in the context of digital science and emerging technologies.

The effective protection of digital inventions is not only essential for fostering innovation but also for positioning Nigeria as a competitive player in the global digital economy. Moving forward, the Nigerian government must prioritize IP reform as a part of its broader innovation and economic development strategy. By addressing the challenges identified in this research and implementing the proposed reforms, Nigeria can create a more robust IP framework that supports local inventors, attracts foreign investment, and fosters sustainable economic growth.

A modern, well-functioning patent system that accommodates digital inventions will help unlock the potential of Nigerian innovators, enabling them to participate in and contribute to the digital transformation that is reshaping economies worldwide. Achieving this goal will require not only legislative and institutional reform but also a commitment to building an IP culture that values and protects innovation across all sectors of society.