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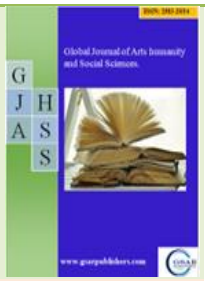

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NAVIGATING INDUSTRIAL DESIGN REGISTRATION IN NIGERIA: INNOVATION, COMMERCIALIZATION, OPPORTUNITIES, AND DIGITAL TRANSFORMATION

By

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Abstract

Industrial design protection occupies a paradoxical position within Nigeria's intellectual property landscape. While the Patents and Designs Act, Cap P2 Laws of the Federation of Nigeria 2004, establishes a formal registration framework, the regime remains underutilized, technologically antiquated, and disconnected from the exigencies of digital entrepreneurship. This paper advances the central thesis that Nigeria's industrial design protection framework should evolve from a predominantly administrative registration regime into a technology-driven innovation-commercialization ecosystem capable of supporting digital entrepreneurship, artificial intelligence-assisted creativity, blockchain-enabled ownership verification, smart-contract licensing, cross-border intellectual property exploitation, and the broader objectives of the Fourth Industrial Revolution. Employing doctrinal legal research methodology, the paper critically examines the opportunities arising from effective industrial design registration, identify and analyze obstacles to its commercialization, and explore transformative potential of digital technologies. Adopting Edmund Kitch's Innovation and Commercialization (prospect) Theory, the primary function of an intellectual property right is realized after the asset is created, granting a clear, exclusive legal right over an intellectual prospect allows the owner to safely share information, negotiate licenses, attract development capital, and coordinate commercial exploitation without fear of misappropriation. The paper engages substantively with some earlier works of Noel N. Udeoji, identifying both contributions and limitations in the analysis. Comparative analysis of the United Kingdom, European Union, United States, China, and South Africa reveals best practices adaptable to Nigeria.[1] The paper identifies significant research gaps in artificial intelligence-generated designs, blockchain-based ownership verification, smart-contract licensing, and protection of designs in virtual environments. It concludes with comprehensive recommendations for legislative reform, institutional digitization, and integration of emerging technologies to position Nigeria as a competitive destination for design innovation in the global digital economy.

Keywords: Industrial designs, digital transformation, innovation commercialization, blockchain, artificial intelligence, Industrial Revolution.

[1] *D Beldiman (ed), Design Law: Global Law and Practice (Edward Elgar Publishing 2024).*

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1.0 INTRODUCTION

The protection of industrial designs represents one of the most commercially significant yet academically neglected branches of intellectual property law in Nigeria. Industrial designs, the ornamental or aesthetic aspects of functional articles occupy a unique position at the intersection of art, commerce, and technology.[2] Unlike patents that protect functional innovations or copyright that protects artistic expression, industrial design protection safeguards the visual appeal of products that drives consumer preference and market differentiation.

Globally, industrial design protection has undergone profound transformation. The World Intellectual Property Organization (WIPO) reports increasing utilization of the Hague System for the International Registration of Industrial Designs, with design filings growing consistently across major economies.[3] The European Union's Community Design system, offering both registered and unregistered design rights, has demonstrated remarkable efficacy, with design rights often outperforming utility patents on validity and infringement metrics.[4] The United States design patent system has experienced renaissance following landmark jurisprudence that significantly enhanced the value of design protection.[5]

Nigeria, despite its giant status in Africa, presents a starkly different picture. *The Patents and Designs Act 1970 (Cap P2 LFN 2004)* remains the primary legislative instrument governing industrial design registration.[6] While the Act establishes a registration framework that nominally complies with international obligations under the Paris Convention and TRIPS Agreement, its provisions have not been substantively amended in over five decades.[7] The registration procedure remains largely manual, the registry lacks digitization, enforcement mechanisms are weak, and awareness among designers and entrepreneurs remains critically low.

The emergence of the Fourth Industrial Revolution, characterized by artificial intelligence, 3D printing, blockchain technology, and the metaverse, has rendered these deficiencies more acute.[8] Contemporary design creation increasingly involves computer-aided design (CAD) software, artificial intelligence tools, and collaborative digital platforms as advocated by Udeoji NN in his work.[9] Commercialization increasingly occurs through e-commerce, digital marketplaces, and virtual environments. Ownership verification and licensing increasingly demand blockchain-enabled solutions. Nigeria's current framework addresses none of these developments.

2.0 CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1 Meaning of Intellectual Property

Intellectual property (IP) refers to legal rights protecting creations of the human mind. The World Intellectual Property Organization defines intellectual property as *creations of the mind: inventions, literary and artistic works, symbols, names, images, and designs used in commerce*.[10] Intellectual property law grants exclusive rights to creators and owners, enabling them to control exploitation of their creations and receive economic benefits.

2.2 Industrial Property as a Branch of Intellectual Property

Industrial property is a branch of IP protecting industrial creations. Industrial property includes *patents, utility models, industrial designs, trademarks, service marks, trade names, and indications of source*.[11] Industrial property is distinguished from copyright, which protects literary and artistic works, though overlap exists.

2.3 Concept of Industrial Design

Industrial design is defined by the principal Act as "*any combination of lines or colours or both, and any three-dimensional form, whether or not associated with colours, if it is intended by the creator to be used as a model or pattern to be multiplied by industrial process and is not intended solely to obtain a technical result*".[12] This statutory definition incorporates three essential elements: visual features (lines, colours, forms), industrial multiplication, and non-functionality.

2.4 Nature and Characteristics of Industrial Designs

Industrial designs possess distinctive characteristics distinguishing them from other IP forms. First they are *aesthetic rather than functional*; protection does not extend to technical features. Again, they require *industrial application*; designs for unique, handcrafted items may be protected by copyright rather than design law. Third, they protect *appearance*; if the same appearance can be achieved through different functional structures, design protection is available. Modern industrial designs increasingly exhibit characteristics identified by Udeoji NN: *user-centered approaches, integration of technology, multidisciplinary collaboration, sustainability focus, and digital prototyping*.

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[2] *WR Cornish, Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights (9th edn, Sweet & Maxwell 2019) 45.*

[3] *World Intellectual Property Organization, 'WIPO IP Statistics Data Center' (2025).*

[4] *H Hartwig (ed), Research Handbook on Design Law (Edward Elgar Publishing 2021) 112-115.*

[5] *Ex parte Strijland 26 USPQ2d 1259 (Bd Pat App & Inter 1992).*

[6] *Patents and Designs Act (n 1) ss 12-26.*

[7] *Paris Convention for the Protection of Industrial Property (1883, as revised); TRIPS Agreement 1994, arts 25-26.*

[8] *K Schwab, The Fourth Industrial Revolution (Crown Business 2017) 12-15.*

[9] *NN Udeoji, 'Appraising the Prospect and Challenges of Modern Age Industrial Designs' (2025) 10(7) MSI Advanced Legal Journal 112, 120*

[10] *World Intellectual Property Organization, What is Intellectual Property? (WIPO Publication No 450, 2020) 18.*

[11] *Article 1(2) of the Paris Convention for the Protection of Industrial Property*

[12] *Patents and Designs Act, s. 12.*

2.5 Distinction between Industrial Designs, Copyrights, Patents and Trademarks

a. **Industrial Designs vs Copyright**: Copyright protects original artistic works regardless of industrial application. An original sculpture is protected by copyright regardless of production quantity. However, if the creator intends the sculpture to be multiplied by industrial process, design protection applies.
b. **Industrial Designs vs Patents**: Patents protect functional innovations, new products or processes that involve inventive step. Design protection extends only to appearance, not underlying functionality.
c. **Industrial Designs vs Trademarks**: Trademarks protect source-identifying symbols, not product appearance *per se*. However, product shapes may function as trademarks if they acquire distinctiveness. Overlap protection is possible; the Coca-Cola bottle is protected by both design registration and trademark law.

2.6 Economic Importance of Industrial Designs

Industrial designs drive economic value through multiple mechanisms. Designs differentiate products in competitive markets, enabling premium pricing. *Designs* build brand identity and consumer loyalty. Designs extend product life cycles through aesthetic refreshment. Udeoji identifies several economic prospects for Nigerian industrial designs: '*economic growth and export potential, innovation hub development, job creation, and promotion of local content and creativity'*.

2.7 Theoretical Justifications for Industrial Design Protection

Natural Rights Theory, associated with John Locke's labour theory of property, posits that creators have inherent rights to fruits of their labour.

Utilitarian Theory justifies intellectual property based on net social benefits: exclusive rights incentivize creation and disclosure, enriching the public domain.

Economic Incentive Theory emphasizes that intellectual property corrects market failures arising from public goods characteristics of information.

Innovation and Commercialization Theory, adopted for this study, integrates insights from utilitarian and economic theories while extending analysis to commercialization ecosystems.

2.8 Evaluation of the Theories and the most appropriate

Each theory offers insights and limitations. Natural rights theory provides moral foundation but cannot determine optimal protection scope. Utilitarian theory provides welfare framework but requires empirical calibration. Economic incentive theory provides market-failure rationale but assumes rational actor models. Innovation and commercialization theory best addresses the central aim of this work, evolution from administrative registration to technology-driven innovation-commercialization ecosystem. It best supports analysis of how Nigeria's design framework can be transformed to support digital entrepreneurship, AI-assisted creativity, blockchain-enabled verification, and cross-border exploitation.

3.0 LEGAL FRAMEWORK FOR INDUSTRIAL DESIGN REGISTRATION IN NIGERIA

3.1 Historical Development

Industrial design protection in Nigeria originated in the English Designs Act, applicable during colonial period. Following independence, Nigeria enacted its own Patents and Designs Act in 1970, replacing colonial legislation. The 1970 Act, now Cap P2 LFN 2004, remains the governing legislation.[13] While the Act has been formally re-enacted in various consolidations, its substantive provisions have not been amended since 1970.

3.2 Overview of the Patents and Designs Act

The Patents and Designs Act establishes a unified framework for patent and design protection. Part II (sections 12-26) specifically addresses industrial designs. The Act adopts a registration system with non-substantive examination, the Registry examines formal compliance but not novelty, leaving validity determinations to courts.[14]

3.3 Registrability Requirements

Under ***Section 13(1)(a)*** of the Act, a design must be *new* for registration. ***Section 13(3)*** provides: "*An industrial design is not new if, before the date of application for registration, it has been made available to the public anywhere and at any time by means of description, use or in any other way*."[15] This "absolute novelty" standard is stringent. ***Section 13(4)*** provides a limited grace period of *six months* for disclosures at official international exhibitions. ***Section 13(1)(b)*** requires that the design not be "contrary to public order or morality."[16]

3.4 Registration Procedures

Section 15 prescribes application requirements: a request for registration, applicant's name and address, specimen or representation of the design, indication of product kind or class, and prescribed fee.

Section 15(2) permits multiple designs in a single application not exceeding fifty.

Section 16(1) directs the Registrar to examine applications for conformity with formal requirements only: "the design shall be registered in accordance with the application without further examination and, in particular, without examination of the question whether the registration might be contrary to section 13(1)(a)."

3.5 Rights Conferred by Registration

Section 19(1) confers upon the registered owner "the right to preclude any other person from doing any of the following acts:

a. Reproducing the design in the manufacture of a product;

[13] *Patents and Designs Act (n 1).*
[14] *Patents and Designs Act (n 1) s 16(1).*
[15] *Patents and Designs Act (n 1) s 13(3).*
[16] *Patents and Designs Act (n 1) s 13(1)(b).*

b. Importing, selling or utilising for commercial purposes a product reproducing the design; and
c. Holding such a product for the purpose of selling it or of utilising it for commercial purposes."[17] Section 19(3) provides exhaustion after lawful sale in Nigeria.

3.6 Duration and Renewal

Section 20 provides that registration "shall be effective in the first instance for five years from the date of the application for registration" and "on payment of the prescribed fee may be renewed for two further consecutive periods of five years."[18] Maximum protection is therefore fifteen years.

3.7 Enforcement Mechanisms

The Act provides civil remedies for infringement but does not create criminal offences for design infringement (unlike copyright or trademark infringement).[19] The registered owner may institute proceedings in the Federal High Court, which has exclusive jurisdiction over intellectual property matters under *Section 251(1)(f)* of the Constitution.[20]

3.8 Remedies for Infringement

Available remedies include injunction (interlocutory and perpetual), damages or account of profits, delivery up or destruction of infringing articles, and costs. No statutory damages are prescribed; damages are assessed based on evidence of loss or reasonable royalty.

3.9 Judicial Interpretation of Industrial Design Rights

In ***Densy Industries (Nig) Ltd v Uzokwe (1999***), the court established principles for establishing prior publication, holding that the test for novelty requires comparison of the registered design with prior publications to determine if the design is substantially different. In ***West African Cotton Company Limited v Hozelock Exel*** (2020), the Federal High Court nullified registered designs based on prior publication established through shipping documents showing earlier importation of similar products.[21]

3.10 Critical Evaluation of the Existing Legal Framework

Strengths include compliance with international minimum standards under TRIPS, relatively low-cost registration, non-substantive examination enabling rapid registration, and exhaustion provisions limiting rights after first sale. On weaknesses, the Act is substantively yet to be amended since 1970, predating digital revolution; non-substantive examination creates uncertainty; limited duration (15 years) is short compared to some jurisdictions (EU: 25 years); no criminal sanctions for its infringement; no provisions addressing contemporary technologies.[22]

3.11 Legislative Gaps and Obsolete Provisions

Specific legislative gaps include: no provision for electronic filing or digital signatures; no provision for computer-generated designs; no provision for artificial intelligence as creator or tool; no provision for blockchain-based ownership records; no provision for virtual designs or metaverse protection; no provision for online marketplaces and digital exhaustion; no provision for cross-border digital exploitation.[23]

4.0 OPPORTUNITIES ARISING FROM INDUSTRIAL DESIGN REGISTRATION

4.1 Exclusive Proprietary Rights

Registration confers exclusive rights enabling the owner to preclude unauthorized reproduction, importation, sale, or commercial use.[24] This exclusivity creates market power and enables price premiums. Without registration, designers have no statutory protection against copying (though copyright may protect unique artistic works not intended for industrial multiplication).

4.2 Commercial Exploitation

The registered owner may commercially exploit the design directly through manufacturing and sales, or indirectly through licensing and assignment. Direct exploitation enables capture of design value through product sales. The exclusive right to preclude importation protects domestic markets from competing imported products.[25]

4.3 Licensing and Assignment

Section 19 does not explicitly address licensing or assignment, but as property rights, designs are transferable. Licenses may be exclusive or non-exclusive, limited by field of use, territory, duration, or product category. Licensing enables design owners to monetize rights without manufacturing capability.[26]

4.4 Franchising Opportunities

Industrial designs are valuable franchising assets, particularly for product-based franchises where product appearance drives consumer recognition. Registration provides nationwide protection, enabling franchise systems to maintain consistent product presentation across locations.[27]

4.5 Technology Transfer

Design rights can be transferred through technology transfer agreements. Section 6(1)(c) of the National Office for Technology

[17] *Patents and Designs Act (n 1) s 19(1).*
[18] *Patents and Designs Act (n 1) s 20.*
[19] *Patents and Designs Act (n 1) s 22.*
[20] *Constitution of the Federal Republic of Nigeria 1999 (as amended), s 251(1) (f).*
[21] *West African Cotton Company (n 21).*
[22] *Hartwig (n 4) 156-160.*
[23] *See C Okorie, 'West African Cotton Company Limited v Hozelock Exel' (2020) The IPKat (blog).*
[24] *Patents and Designs Act (n 1) s 19(1).*
[25] *Patents and Designs Act (n 1) s 19(3).*
[26] *Cornish (n 5) 50-52.*
[27] *B Sodipo, Piracy and Protection of Proprietary Rights in Developing Nations (Routledge 2022, 120-125.*

Acquisition and Promotion (NOTAP) Act requires registration of technology transfer agreements, including those involving design rights.[28]

4.6 Industrialization and Economic Development

Udeoji identifies economic growth and export potential as major prospects: "Industrial design is becoming increasingly important for boosting Nigeria's economy. By encouraging new ideas and making local products more competitive, it can increase sales at home and open up export markets."[29]

4.7 Foreign Direct Investment

Multinational corporations consider design protection when locating design-intensive activities. Nigeria's registration framework, despite limitations, provides formal protection that can attract foreign direct investment in design and manufacturing.[30]

4.8 Export Promotion

Registration supports export promotion through bilateral and multilateral arrangements. While Nigeria has not acceded to the Hague Agreement, registered designs can form basis for claiming priority under Paris Convention for subsequent foreign filings.

4.9 Competitive Advantage

Design registration provides sustainable competitive advantage. Unlike price competition, design differentiation is difficult to replicate without copying. Registered designs signal innovation capability to consumers and business partners.

4.10 Monetization of Intellectual Assets

Registered designs are balance sheet assets that can be valued, securitized, and used as collateral. Intellectual property valuation is developing in Nigeria, with commercial banks increasingly accepting IP as collateral for lending.[31]

4.11 Benefits to SMEs and Start-Ups

Small and medium enterprises particularly benefit from design protection. Udeoji notes that "initiatives like the Design & Innovation Hub in Lagos, Nigeria are speeding up Nigeria's industrial shift" through training, incubation, and prototyping support.[32] Design registration helps SMEs establish brand identity without expensive trademark litigation.

4.12 Contribution to Nigeria's Digital Economy

Design protection contributes to digital economy through protecting user interfaces, icons, and graphical user interfaces (GUIs). While the Act does not explicitly address digital designs, GUIs may be protected as two-dimensional designs comprising lines and colours.[33]

5.0 OBSTACLES T O INDUSTRIAL DESIGN REGISTRATION AND COMMERCIALIZATION IN NIGERIA

5.1 Legislative Deficiencies

The Patents and Designs Act contains provisions that impede effective protection. The 15-year maximum duration is insufficient for products with long commercial life cycles. The non-substantive examination system creates uncertainty. No criminal sanctions for design infringement limit deterrence. No provisions address digital designs, AI-generated works, or virtual products.[34]

5.2 Institutional Challenges

The Commercial Law Department operates with limited resources and digitization. Udeoji and Ozioko identifies that "the registration process under the Patents and Designs Act 1970" has "current inefficiencies."[35] Examiners lack specialized design training. Record-keeping remains partially manual. Electronic filing is limited.

5.3 Bureaucratic Delays

Registration timelines are unpredictable. Practical delays arise from manual processing, limited staffing, and bureaucratic procedures. Delays in registration delay enforcement, as rights accrue only from registration date.[86]

5.4 Low Awareness Levels

Udeoji emphasizes low awareness as a major obstacle: "industrial designs in Nigeria remain underutilized despite their economic potential."[36] Many designers and entrepreneurs are unaware of design protection or mistakenly believe copyright provides equivalent protection.

5.5 Cost and Accessibility Challenges

While official fees are relatively modest, costs of professional assistance (patent agents, attorneys) may be prohibitive for individual designers and small enterprises. Geographical concentration of IP professionals in Lagos and Abuja limits accessibility for designers in other regions.[37]

5.6 Weak Enforcement Structures

Udeoji and Obueze note enforcement challenges: "The need for the enforcement of Intellectual Property Rights (IPRs) in Nigeria is a reoccurring question that begs for answer."[38] Limited specialized IP judges, evidentiary difficulties, and high litigation costs impede enforcement.

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[28] *National Office for Technology Acquisition and Promotion Act, Cap N62 LFN 2004, s 6(1)(c).*
[29] *Udeoji (n 9) 118.*
[30] *Federal Ministry of Industry, Trade and Investment, National IP Policy and Strategy (2023) 15-18, 20-22.*
[31] *A Adewopo, Intellectual Property Law and Discourse in Nigeria (Nigerian Institute of Advanced Legal Studies 2021), 180-185*
[32] *Udeoji (n 9) 119.*
[33] *Beldiman (n 1) 200-205.*
[34] *Patents and Designs Act (n 1) s 20.*
[35] *NN Udeoji and KO Ozioko, 'An Overview of the Prospects and Challenges of Industrial Design Registration in Nigerian Setting' (2025) 2(8) MSI Journal of Civil Law and Jurisprudence, 48.*
[36] *Udeoji (n 9) 116.*
[37] *Udeoji and Ozioko (n 35) 50.*
[38] *NN Udeoji and CV Obueze, 'The Place of the Courts in the Enforcement of Intellectual Property Rights in Nigeria' (2025) African Journal of Commercial Law.*

5.7 Counterfeiting and Design Piracy

Counterfeiting undermines design value. Without criminal sanctions for design infringement, enforcement relies on civil proceedings, which are slower and more expensive than criminal enforcement available for trademarks and copyright.

5.8 Judicial Challenges

Nigerian courts face challenges in design cases. The non-substantive examination system requires courts to determine novelty in invalidation proceedings, essentially conducting examination that Registry did not perform. As noted in commentary on ***West African Cotton Company v Hozelock Exel***, "the question is whether a non-specialist court has the requisite expertise to make such comparisons."[91]

5.9 Technological Limitations

The Registry lacks digital search tools for prior art examination. No publicly searchable database of registered designs exists. Online filing is limited. Digital signature and electronic authentication are not fully implemented.[39]

5.10 Challenges Affecting SMEs

SMEs face particular challenges: limited resources for professional assistance, lack of in-house IP expertise, vulnerability to infringement, and difficulty enforcing rights against larger competitors.[40]

5.11 Critical Examination of Udeoji NN Arguments

Udeoji's analysis of obstacles identifies key challenges but has limitations requiring critical examination.

a. **Principal arguments identified**: Udeoji argues that low awareness, inefficient registration, weak enforcement, and limited digital adoption are primary obstacles.[94]
b. Methodological assessment: Udeoji employs primarily descriptive methodology, identifying challenges through observation rather than systematic empirical research or comparative analysis.[95]
c. **Strengths of contributions**: Udeoji correctly identifies key obstacles ignored in earlier scholarship, particularly importance of awareness and digital technology. His emphasis on commercialization beyond registration is valuable.
d. **Limitations requiring supplementation**: Udeoji does not analyze legislative history; no comparative analysis examines how other jurisdictions address similar obstacles; recommendations lack specificity; Udeoji does not address obstacles specific to digital designs, AI-generated works, or cross-border exploitation.[41]
e. **Applicability to Nigeria's digital economy**: Udeoji's recommendations, while acknowledging digital technology, do not specifically address AI-generated designs, blockchain verification, smart contracts, or metaverse protection.[42]
f. **Independent scholarly assessment**: This study finds that Udeoji's descriptive identification of obstacles provides useful foundation but requires extension through theoretical analysis, comparative examination, and detailed attention to emerging digital challenges.

5.12 Alternative Scholarly Perspectives

Alternative scholarship emphasizes institutional rather than awareness obstacles. Nwauche's analysis suggests that the absolute novelty standard and non-substantive examination create fundamental uncertainty that awareness campaigns cannot resolve.[43] Sodipo argues that enforcement credibility is essential: designers will not register if rights cannot be enforced.[44]

5.13 Emerging Challenges in the Digital Economy

Digital transformation creates new obstacles not addressed in existing scholarship.

a. ***AI-generated designs*** challenge novelty determination when AI systems have instant access to global design databases.[45]
b. ***3D printing*** enables decentralized reproduction circumventing traditional enforcement.
c. ***Blockchain*** offers verification opportunities but requires legal recognition.
d. ***Metaverse*** designs raise questions about territoriality and virtual enforcement.[46]

6.0 DIGITAL TRANSFORMATION OF INNOVATION COMMERCIALIZATION

6.1 Intellectual Property in the Digital Economy

Three key features of the digital economy, which are the move away from physical assets (dematerialization), the distribution of control away from central authorities (decentralization), and the removal of middlemen (disintermediation) make it difficult to apply traditional intellectual property frameworks." Designs may be created, used, and commercialized without ever being embodied in physical products. Virtual designs for virtual products require protection in virtual environments.[102]

6.2 Artificial Intelligence and Industrial Design Creation

AI systems increasingly participate in design creation. Generative AI can produce thousands of design variations. Human-AI collaboration raises ownership questions: Is the human designer

[39] *Udeoji (n 9) 120.*
[40] *Federal Ministry of Industry, Trade and Investment (n 30) 25-28*
[41] *Udeoji (n 9) 112-125.*
[42] *Udeoji (n 9) 120-122.*
[43] *ES Nwauche, 'Prior use and registration of designs in Nigeria' (2002) 5(5) Journal of World IP, 823.*
[44] *Sodipo (n 27) 150*
[45] *Thaler (n 3).*
[46] *Beldiman (n 1) 301-305.*

who prompts AI the creator? Does AI using training data infringe prior designs? Can AI be named as creator? Nigerian law provides no answers.[103]

6.3 Computer-Aided Design (CAD)

*Udeoji identifies CAD as transformative: "In this modern age, designers regularly use advanced tools like computer-aided design (CAD), 3D modelling, digital prototyping, and simulations. These technologies make the design process much faste*r."[47] CAD files themselves may constitute design representations for registration purposes.

6.4 3D Printing and Industrial Designs

3D printing enables decentralized manufacturing using digital files. While design registration confers rights to preclude reproduction, enforcing against distributed 3D printing is challenging. Infringers may download design files from jurisdictions without protection and print locally.[48]

6.5 Blockchain Technology and Ownership Verification

Blockchain offers immutable, timestamped records of creation and ownership. Designs can be hashed and recorded on blockchain, providing evidence of existence at specific times. Smart contracts can automate licensing and royalty payments. However, legal recognition of blockchain records requires legislative amendment.[49]

6.6 Smart Contracts and Licensing

Smart contracts are self-executing agreements with terms directly written in code. They could automate design licensing. Upon payment, smart contract could automatically grant license, transfer funds, and record transaction on blockchain. Nigerian law does not explicitly recognize smart contracts, though the Evidence Act may accommodate blockchain records.[50]

6.7 E-Commerce and Commercialization

E-commerce platforms enable global design commercialization. Registered designs can be licensed through online marketplaces. However, cross-border enforcement remains challenging when infringing products are sold through platforms operating from different jurisdictions.[51]

6.8 Digital Asset Management Systems

Digital asset management systems enable design owners to organize, store, and track design files. Integration with blockchain can verify authenticity and license compliance.[52]

6.9 Cross-Border Digital Commercialization

Digital commercialization transcends territorial boundaries. A design registered in Nigeria can be marketed globally through e-commerce. However, protection is territorial, registration in Nigeria does not confer rights in other countries. This necessitates strategic international filing, preferably through accession to the Hague Agreement.[53]

6.10 Industry 4.0 and Industrial Design Innovation

Industry 4.0 is characterized by cyber-physical systems, the Internet of Things, and cloud computing. This creates new design opportunities. Designs for smart products may incorporate both aesthetic and interactive elements, challenging traditional distinctions between form and function.[111]

6.11 Opportunities and Benefits

Digital transformation offers significant opportunities: reduced transaction costs through automation, enhanced enforcement through blockchain verification, expanded markets through e-commerce, improved design processes through AI assistance, and efficient record-keeping through digital registries.[54]

6.12 Risks and Regulatory Concerns

Risks include AI infringement through training data, 3D printing circumvention of enforcement, blockchain immutability conflicting with right to be forgotten, and smart contract rigidity unable to address unforeseen circumstances.[113]

6.13 Comparative Analysis

a. **United Kingdom**: The United Kingdom protects designs through registered designs (maximum 25 years) and unregistered design rights. The UK Intellectual Property Office maintains fully digital registration system. UK case law has addressed CAD files as design representations. The UK provides a 12-month grace period for pre-filing disclosures.[55]

b. **European Union**: The European Union Community Design system offers both registered and unregistered rights. Registered Community Designs undergo formal examination only, similar to Nigeria, but the EUIPO maintains sophisticated digital search tools. The EU is actively considering AIgenerated design protection.[56]

c. **United States**: The United States protects designs through design patents under 35 U.S.C. § 171. Unlike Nigeria's registration system, design patents undergo substantive examination. Protection lasts 15 years from grant. The US has covered digital interfaces since *Ex parte Strijland*.[57]

d. **China**: China has developed sophisticated design protection system with substantive examination. The

[47] *Udeoji (n 9) 120.*
[48] *NN Udeoji, CO Onumonu and CL Iguh, 'Applicability of Artificial Intelligence in the Development of Intellectual Property Rights in Nigeria' (2025) 7(2) ASUU Journal of Humanities, 228.*
[49] *Beldiman (n 1) 350-355.*
[50] *Udeoji, Onumonu and Iguh (n 47) 230.*
[51] *Hartwig (n 4) 210-215.*
[52] *Beldiman (n 1) 360-365.*
[53] *Hague Agreement (n 10).*
[54] *Udeoji, Onumonu and Iguh (n 47) 225.*
[55] *Registered Designs Act 1949 (UK), s 1(1).*
[56] *Hartwig (n 4) 156-160.*
[57] *Ex parte Strijland (n 5).*

CNIPA receives more design applications than any other office. China has amended design law to protect GUI designs and partial designs, and extended protection from 10 to 15 years.[58]

e. **South Africa**: South Africa's design system is particularly relevant for Nigeria as fellow African jurisdiction. Registration is non-substantive similar to Nigeria. South Africa has acceded to The Hague Agreement enabling international registration. The CIPC has implemented electronic filing and searching.[59]

6.14 Industrial Designs in the Metaverse

The metaverse creates novel design questions. Virtual products (clothing, accessories, buildings) require protection. Are virtual designs "used as a model or pattern to be multiplied by industrial process"? The Patents and Designs Act's industrial multiplication requirement assumes physical manufacture. Legislative amendment may be required.[60]

6.15 Protection of AI-Generated Designs

No jurisdiction has definitively resolved AI-generated design protection. International jurisprudence, notably ***Thaler v Comptroller-General*** *[2023] UKSC 49*, establishes that purely autonomous machine creations cannot claim patent or design authorship under traditional laws requiring human creators.[61] Nigeria should consider express provisions: designs generated autonomously by AI may be unprotectable, but human-AI collaborative designs where human exercise intellectual control may be protectable.

6.16 Ownership Challenges in Machine-Assisted Creativity

When AI significantly contributes to design creation, ownership questions arise. Default rules may allocate ownership to AI owner, AI user, or both. Nigerian law currently presumes human creator, but this becomes strained when AI generates designs independently.[62]

6.17 Regulatory Implications for Nigerian Intellectual Property Law

Digital transformation requires comprehensive regulatory response: amendment of Patents and Designs Act to address digital designs and AI; evidentiary rules for blockchain records; smart contract recognition; Hague Agreement accession; digital registry infrastructure investment; specialized examiner training.[63]

6.18 **Lessons for Nigeria:** Comparative analysis yields several lessons.

a. Non-substantive examination can work effectively when coupled with robust digital search tools (EU model).
b. Express provision for digital designs and GUIs enhances legal certainty (China model).
c. Hague Agreement accession simplifies international protection (South Africa model).
d. Specialized design courts or judges improve enforcement (EU model).
e. AI-specific provisions will eventually be necessary.[64]

7.0 CRITICAL APPRAISAL OF NIGERIA'S INDUSTRIAL DESIGN REGIME

7.1 Areas of Progress

Despite limitations, some progress is evident. Nigeria participates in WIPO technical assistance programs, including webinars on Hague System protection. The Federal High Court has demonstrated capacity to handle design cases, as shown in ***West African Cotton Company v Hozelock Exel***. NOTAP provides technology transfer oversight. Innovation hubs in Lagos are developing design talent.[65]

7.2 Regulatory and Institutional Gaps

Major gaps persist: no digital registry, no online filing, no public searchable database, no specialized design examiners, no design court, no Hague accession, no AI provisions, no blockchain recognition.[66]

7.3 Evaluation of Administrative Structures

The Commercial Law Department lacks autonomy and dedicated resources for design administration. Unlike autonomous patent offices in developed jurisdictions (EUIPO, UKIPO, USPTO, CNIPA), Nigeria's design registry operates within a ministry department with competing priorities.[67]

7.4 Lessons from International Best Practices

International best practices include: digital-first registration systems (EU, UK, China), express protection for GUIs (China, EU), Hague accession (South Africa), specialized design courts (EU), non-substantive examination with digital search (EU), unregistered design rights (UK, EU).[68]

7.5 Need for Legislative Reform

Legislative reform should address: extension of maximum term to 25 years, express protection for GUIs and virtual designs, criminal sanctions for design counterfeiting, provisions for AI-generated designs, blockchain record recognition, and smart contract enforceability.

[58] *Patent Law of the People's Republic of China (as amended 2021), art 2(4).*
[59] *Designs Act No 195 of 1993 (South Africa), s 1.*
[60] *Beldiman (n 1) 301-305.*
[61] *Thaler (n 3) para 45.*
[62] *Udeoji, Onumonu and Iguh (n 47) 228-230.*
[63] *Federal Ministry of Industry, Trade and Investment (n 30) 30-32.*
[64] *Beldiman (n 1) 400-405.*
[65] *Federal Ministry of Industry, Trade and Investment (n 30) 15-18.*
[66] *Udeoji (n 9) 120.*
[67] *Beldiman (n 4) 400-405.*
[68] *Hartwig (n 4) 156-160.*

7.6 Need for Digital Registration Infrastructure

Digital infrastructure investment is essential: electronic filing system, digital signature authentication, online fee payment, publicly searchable database, AI-assisted prior art search, blockchain integration for ownership verification.

7.7 Need for Specialized Intellectual Property Courts

Udeoji and Obueze recommend "training and re-training of judicial officers on IP matters... or establishment of specialized court towards effective IPRs enforcement."[69] Specialized IP courts with technically qualified judges would improve design case quality and efficiency.

7.8 Integration of Emerging Technologies

Nigeria should proactively integrate emerging technologies: blockchain-based registration and ownership records, AI-assisted examination and search, smart contract licensing platforms, digital asset management integration.[70]

7.9 Future of Industrial Design Protection in Nigeria

Without reform, design protection will remain underutilized and ineffective. With comprehensive reform, industrial design protection can become catalyst for innovation, entrepreneurship, and economic growth in Nigeria's digital economy.[71]

7.10 Proposed Model for a Nigerian Digital Innovation Commercialization Ecosystem

This study proposes a comprehensive model comprising:

a. **Legislative pillar**: Amended Patents and Designs Act addressing digital designs, AI, blockchain, and metaverse.
b. **Institutional pillar**: Autonomous Digital Design Registry with dedicated funding and specialized examiners.
c. **Technological pillar**: Fully digital registration system with blockchain verification, AI search, and smart contract integration.
d. **Commercialization pillar**: Integrated licensing platform, innovation hub linkage, export promotion integration.
e. **Enforcement pillar**: Specialized IP court division with technically qualified judges.
f. **International pillar:** Hague Agreement accession, bilateral cooperation agreements.[133]

8.0 RECOMMENDATIONS

Based on comprehensive analysis, this study makes the following recommendations:

1. **Legislative Reform**:
a. Comprehensive amendment extending maximum protection to 25 years.
b. Express provision for digital designs including GUIs and virtual designs.
c. Criminal sanctions for design counterfeiting.
d. AI-generated design provisions specifying human-AI collaborative designs are protectable.
e. Blockchain record recognition as prima facie evidence.
f. Smart contract enforceability.

2. **Institutional Reform:**
a. Establishment of autonomous Digital Design Registry.
b. Recruitment of specialized design examiners.
c. Establishment of specialized Intellectual Property Division of Federal High Court.
d. Creation of Design Registry Advisory Council.

3. **Digital Transformation**:
a. Fully digital registration system.
b. Publicly searchable design database.
c. Blockchain-based ownership verification.
d. Smart contract licensing platform.
e. AI-assisted prior art search.

4. **International Harmonization**:
a. Accession to Hague Agreement.
b. Bilateral cooperation agreements with major design offices.
c. Harmonization with Locarno Classification.[72]

5. **SME Support**:
a. Design registration subsidy program.
b. IP pro bono program.
c. Innovation hub design clinics.
d. Design-backed lending program.

6. **Capacity Building**:
a. National design awareness campaign.
b. Integration into university curriculum.
c. Judicial education program.
d. Annual design awards program.

9.0 CONCLUSION

This paper has advanced and defended the central thesis that Nigeria's industrial design protection framework should evolve from a predominantly administrative registration regime into a technology-driven innovation-commercialization ecosystem capable of supporting digital entrepreneurship, artificial intelligence-assisted creativity, blockchain-enabled ownership verification, cross-border intellectual property exploitation, and the broader objectives of the Fourth Industrial Revolution.

The doctrinal analysis has demonstrated that the Patents and Designs Act, while establishing a formal registration framework, has not been substantively amended since 1970 and fails to address contemporary technological realities. The non-substantive examination system creates uncertainty, the 15-year maximum duration is insufficient, criminal sanctions are absent, and

[69] *Udeoji and Obueze (n 38).*
[70] *Beldiman (n 1) 400-405.*
[71] *Federal Ministry of Industry, Trade and Investment (n 30) 30-32.*
[72] *See Recommendations 16-18.*

provisions for digital designs, AI-generated works, and virtual products do not exist.

Analysis of opportunities revealed that design registration can confer significant commercial benefits: exclusive rights enabling market differentiation, licensing and franchising opportunities, technology transfer facilitation, and contribution to industrialization and economic development. However, these opportunities remain largely unrealized due to legislative deficiencies, institutional challenges, low awareness, and weak enforcement.

Critical engagement with Udeoji's works identified valuable contributions including comprehensive description of registration procedures, identification of key obstacles, and recognition of digital technology's transformative potential. However, limitations requiring supplementation include descriptive rather than analytical methodology, absence of comparative analysis, lack of detailed attention to AI, blockchain, and metaverse issues, and recommendations lacking specificity.

Digital transformation analysis revealed significant potential: AI can assist design creation and examination; blockchain can provide immutable ownership verification; smart contracts can automate licensing; ecommerce can expand markets; digital registries can reduce transaction costs. Comparative analysis of the United Kingdom, European Union, United States, China, and South Africa identified best practices adaptable to Nigeria.

The proposed Nigerian Digital Innovation Commercialization Ecosystem model provides comprehensive framework for legislative reform, institutional digitization, technology integration, and international harmonization. Implementation would position Nigeria as a competitive destination for design innovation in the global digital economy. Industrial design protection, properly conceived and implemented, can become a catalyst for innovation, entrepreneurship, investment, technology transfer, and economic growth in Nigeria's digital economy. The transformation from administrative registration to technology-driven commercialization ecosystem is not merely desirable but essential for Nigeria to participate effectively in the Fourth Industrial Revolution.[73]

[73] *EW Kitch, 'The Nature and Function of the Patent System' (1977) 20 Journal of Law and Economics 265; Federal Ministry of Industry, Trade and Investment (n 30)* 30-32.