

African Journal of Intellectual Property

Volume 7 Number 1 June 2026





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Volume 7 Number 1 June 2026



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Africa University (AU)

Fairview Rd, Off Nyanga Rd

P O Box 1320

Mutare

Zimbabwe

Telephone (+263-20) 66788, 60075

African Regional Intellectual Property Organization (ARIPO)

11 Natal Rd

Belgravia

P. O. Box 4228

Harare, Zimbabwe

Telephone (+263-242) 794054/65/66/68

VOIP: (+263) 8677005131/32

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Foreword

Intellectual property (IP) is increasingly central to Africa's development ambitions – not only as a mechanism for protecting creativity and innovation, but as an economic asset capable of generating revenue, attracting investment and strengthening homegrown enterprise. This issue of the AJIP Journal brings together four contributions that examine different dimensions of this relationship, from copyright remuneration and aid dependency to technology commercialisation and IP-backed finance.

The first article examines Private Copy Remuneration (PCR) as an underutilised copyright revenue stream. Drawing lessons from African jurisdictions that have established PCR systems, it highlights both the institutional challenges and opportunities associated with ensuring that creators are fairly compensated when their works are reproduced for private use. It highlights a central pertinent message that effective copyright infrastructure requires appropriate legal exceptions, transparent and credible mechanisms through which rights holders can derive value from.

The second contribution considers whether stronger IP systems can reduce foreign aid dependency in SADC countries belonging to ARIPO. Its empirical findings caution against assuming that improvements in IP performance alone will automatically translate into greater economic self-sufficiency. Rather, institutional capacity, enforcement, commercialisation and broader structural conditions remain critical to converting IP development into tangible economic outcomes.

This question of commercialisation is taken further in the third article, which explores how African economies can move from innovation to market value. Through comparative analysis and lessons from the Bayh-Dole framework, it argues for stronger technology-transfer institutions, clearer ownership arrangements, standardised licensing mechanisms and regional coordination. The emphasis is on implementation and that innovation must be supported by legal and institutional pathways that enable it to reach markets.

The fourth article turns to IP financing, examining how intellectual assets can unlock credit for innovative, asset-light enterprises. With particular relevance to Zimbabwe, it identifies credible enforcement, valuation, governance, specialised financial instruments and supportive public policy as important foundations for developing IP-backed lending markets.

These articles invite a broader understanding of IP as part of Africa's development infrastructure. They underscore the need to move beyond protection alone towards effective utilisation, commercialisation, financing and equitable remuneration of intellectual assets.

As the AJIP Journal continues to advance scholarship and dialogue on intellectual property, we are pleased to present this collection of research that engages with practical questions facing African economies and their knowledge, creative and innovation ecosystems.

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African Journal of Intellectual Property

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CONTRIBUTING AUTHORS FOR THIS ISSUE

Doreen Anthony Sinare (*Research Associate and PhD Candidate, Technical University of Munich (TUM), School of Management*)

Treassar Msokera (*Lecturer, Catholic University of Malawi and PhD scholar in Development Studies, University of Malawi*)

Yassin Hamed (*Founder, Nile Nova Creative House LLC | Independent Researcher, Nile Nova Creative House LLC (California, USA)*)

Onisimous Mumba (*DPhil Researcher/Operations & Finance Executive, Chinhoyi University of Technology*)

Mabvure Tendai Joseph (*Department of Accounting Science and Finance, Chinhoyi University of Technology, Zimbabwe*)

Mbizi Rangarirai (*Graduate School of Business, Zimbabwe Open University, Harare, Zimbabwe*)

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African Journal of Intellectual Property

GUIDELINES FOR AUTHORS

Manuscript preparation

Articles should be original contributions, not previously published and should not be under consideration to publish elsewhere. Articles should be between 4 000 and 5 000 words, set at 12 point font, in Book Antiqua, with 1½ lines spacing. An abstract of 150–200 words must be included.

Spelling

UK English spelling is preferred; and should conform to the most recent edition of the Concise Oxford English Dictionary.

Footnotes

Footnotes should be avoided and their content must be incorporated into the text. If notes are unavoidable, they must be brief and to the point. Convert them to endnotes.

Referencing style

Please follow the American Psychological Association (APA) referencing style in which:

-in-text citations should state author, date and sometimes page number; and
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Quotations

Short quotes of less than three lines (under 40 words) should run on as part of your sentence with “double quotation marks” to signal where the quote starts and finishes. The page where the quote comes from must be included. Long quotes known as block quotes or indented quotes (more than 40 words) should:

- start on a new line
- be set at 10 point font
- be indented about 5 spaces from the left hand margin
- be single spaced
- not have quotation marks.

Manuscript submission

Articles submitted to the African Journal of Intellectual Property will be reviewed using the double-blind peer review system. Note that plagiarism checks will be carried out on all articles submitted. To protect the author’s identity, do not include the author’s name in the main text or as running heads and footers.

Correspondence to: ajipjournal@africau.edu and ajipjournal@aripo.org

PRIVATE COPY REMUNERATION (PCR): A KEY DRIVER OF COPYRIGHT DEVELOPMENT IN AFRICA

Doreen Anthony Sinare
Research Associate and PhD Candidate,
Technical University of Munich (TUM), School of Management

Abstract

Private Copy Remuneration (PCR) was introduced under the “fair compensation” principle. It is designed to remunerate rights holders when their works are reproduced under an exception to the reproduction right for personal or private use. Tanzania, Kenya, and Nigeria have provisions for exceptions and have PCR collection and distribution systems in place. Tanzania (Mainland), Uganda, and South Africa have provisions for exceptions but lack PCR systems. The Private Copying Global Study has issued a copyright wake-up call. The report is a “key” to a “key for development” in Africa. The article provides an overview of the implementation status of the PCR system as a copyright revenue stream, the challenges in its implementation, and how best to tap into the revenue to strengthen the copyright infrastructure. It suggests reforms to the legal and institutional frameworks and the establishment of effective, clear, and transparent systems for the distribution of PCR. The data is collected through a review of applicable laws, a literature review, and interviews with offices implementing PCR systems & experts in PCR. With arguments for and against implementing the system, and although the Berne Convention allows countries to decide how the exceptions can be applied, the truth remains that this is one of the important revenue sources for the creative industry. African countries need to implement systems to strengthen the copyright industry and fairly contribute to national, regional, and global income.

Keywords

Private Copy Remuneration - Private use - Free Use - Collective Management Organisation - Levy.

1.0 Introduction

Copyright laws in some jurisdictions provide exceptions and limitations to reproduction of copyright works for personal or private use without the owner's authorisation. To compensate right holders for this legally permitted private copy, countries implement Private Copy Remuneration (PCR) systems or schemes. PCR is also known as the blank media levy or the copying levy in other jurisdictions. This is a system in which levies are imposed on blank media and devices; collections are distributed to right holders, and other copyright-related activities are carried out, with the aim of compensating right holders in an area that is under-researched yet represents an interesting and important source of copyright revenue in Africa.

The exceptions are provided for under the Berne Convention (World Intellectual Property Organisation, 1886) and the TRIPS Agreement (World Trade Organisation, 1994). These allow member States to provide exceptions and limitations to the exploitation of copyright works without the need for authorisation from the copyright holder/right holder, provided that the three-step test conditions are met. Granting permissions, monitoring, and policing private uses subject to the three-step test is practically impossible; hence, the establishment of a system that requires right holders to be compensated for loss of revenue or harm when consumers copy works for private use. (Wijminga et al., 2016, pp.4-5). Tanzania, Kenya, Uganda, Nigeria and South Africa are parties to these international instruments and have provisions in national copyright laws. The three-step test guides countries in implementing these exceptions and limitations, including exceptions for the reproduction of copyrighted works for personal or private use. In balancing the interests of right holders and the public, the set criteria require that the exceptions and limitations are allowed to the extent provided for by national laws to "permit the reproduction of such works in certain special cases, provided that such reproduction

does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author”, Berne Convention (World Intellectual Property Organisation, 1886, Art. 9(2)).

However, challenges remain in implementing the PCR system. PCR is one of the important income sources for rights holders coming from private copying. Some countries, such as Burundi, Niger, and Mali, have provisions in their laws that allow the implementation of the PCR, but it is not implemented. There are jurisdictions such as Tanzania (Mainland), Kenya, and Nigeria that have exceptions for private use, effective as of September 2023. Other jurisdictions have exceptions for private use, but without PCR provisions, such as Tanzania (Zanzibar), Uganda, and South Africa, and jurisdictions like Zambia, Sudan, and Somalia, where there are no private copy exceptions (CISAC et al., 2026, p. 29). (CISAC et al, 2026, p.29).

Implementation of PCR is a key driver of copyright development. This paper, therefore, examines the implementation of PCR in selected countries: Tanzania, Kenya, Uganda, Nigeria, and South Africa. Tanzania is the union between Tanganyika (Mainland) and Zanzibar. Intellectual Property matters are not among Union Matters; therefore, Tanzania Mainland and Zanzibar are referred to separately, as each has its own laws, institutions, and procedures, although the two sides maintain close collaboration.

2.0 Establishment of the PCR system

The PCR system originated in Germany in 1965, when a levy was imposed on tape recorders and blank tapes. Later, the extension included other digital media (Poort, 2013, p.235). Many countries in Europe, the United States of America, Latin America and Africa followed suit in implementing the system. The African countries with PCR systems are Algeria, Botswana, Burkina Faso, Cabo Verde, Ghana, Kenya, Malawi, Morocco, Nigeria, Tanzania, and Tunisia. In 2001, the European Union (EU), through Article 5(2) (b) of the Copyright Directive (2001/29/EC), harmonised the application of PCR systems, allowing copyright exceptions subject to fair compensation to the right holders in the EU.

The exceptions and limitations in copyright are there to balance users' and right holders' interests. Users can legally access copyrighted content, and creators can be remunerated when their works are privately/personally reproduced. Through the PCR system, blank devices/media such as flash drives, smartphones, printers, scanners, external hard drives, blank CDs/DVDs, tablets, and computers are charged. The levies can be based on a percentage of the sale price, a fixed rate, or a percentage of the Cost, Insurance, and Freight (CIF) value when imported or locally produced/assembled. These are collected by a dedicated office, normally the copyright offices, in cooperation with the Revenue Authorities. Once the levy is collected, it is distributed to the right holders as compensation for lost revenue, while the remaining percentage is allocated to various cultural and creative industry activities, depending on the law (Olubiyi, 2014, pp. 103-104).

Regional and International organisations invest in ensuring that Intellectual Property thrives to support sustainable development. The importance of PCR is clear, to the extent that it has underscored the urgency for every country, especially African countries, to implement the system effectively. The CISAC global report on PCR (CISAC, 2024, pp. 13, 19) presents important improvement trends in Africa's PCR systems: collection trends and legal and institutional support. It is represented that "while PCR in Africa continues to face structural and operational challenges, the past five years have demonstrated clear and measurable progress. Given such initiatives, such systems are now better positioned than ever to continue to harmonise and improve" (CISAC et al., 2026, p.29). Private Copying contributed EUR 405 m, equivalent to 3% of the Global collections report, an increase of 9.7%. PCR was the fourth-largest income source for creators, behind digital, TV, and radio, and live and background, but ahead of CD and video

In Africa, private copy grew by 28.5% to EUR12m, with "the largest driver a 24.5% rise in Morocco, where half of the year's collections were made. Income in Malawi increased by +79.2%. Côte d'Ivoire revenues grew more than threefold while Guinea made collections for the first time", (CISAC, 2024, p. 47). The legal and institutional support in these countries enabled these jurisdictions to create a noticeable impact in the global collections report. The statistics show that PCR is also an important copyright system that compensates

creators for private copies of protected works, a revenue source in Africa that could unlock development if fully implemented.

The African Regional Intellectual Property Organisation (ARIPO) has been working with member States and other organisations to strengthen intellectual property rights in Africa. One of the efforts was the preparation of the ARIPO Regional Strategy on PCR, adopted at the 48th Session of the Administrative Council in October 2024. This was developed in collaboration with member States and strategic partners, including the World Intellectual Property Organisation (WIPO), the International Confederation of Societies of Authors and Composers (CISAC), the International Federation of Phonogram Industry (IFPI), the International Federation of Reprographic Rights Organisations (IFRRO), and the Societies' Council for the Collective Management of Performers' Rights (SCAPR). The strategy is a guide in the operation of PCR systems, facilitating access to copyright content, mitigating infringement, harmonising the administration of PCR, diversifying royalty collections and enhancing social and cultural development. The strategy supports member States in fully and effectively implementing PCR systems. The strategy highlighted the positive impact of PCR: between 2021 and March 2024, Malawi collected USD 8,755,516, and between 2022 and 2024, Cabo Verde collected USD 2,371,044 (African Regional Intellectual Property Organisation [ARIPO], 2025, pp. 7, 9). It is a positive move that a few countries have made strides toward implementing the system. There are still opportunities for countries that have started to do better, and for those that have not, to introduce and implement the system in cooperation with rights holders and stakeholders.

At the African Union (AU) level, PCR implementation aims to realise the objectives of the African Continental Free Trade Area (AfCFTA), namely, accelerating intra-African trade and boosting Africa's position in the global market (African Union, 2018). PCR facilitates and promotes innovation and creativity, supports job creation and facilitates sustainable development. The readiness to apply the PCR system signals a readiness to implement Articles 11 and 22(d) of the Phase II AfCFTA Protocol on Intellectual Property, which require member countries to ensure the protection of copyright and related rights and to strengthen copyright, aiming to balance rights, access, and use of copyright. Adopting and harmonising PCR systems

across African jurisdictions will strengthen copyright systems and support creative industries, trade, innovation, and cooperation. This will align with the AfCFTA framework by compensating creators and providing access to copyrighted content, while addressing legal and institutional differences in implementing the PCR.

2.1 PCR Legal and Institutional Frameworks in Tanzania, Kenya, Uganda, Nigeria and South Africa.

2.1.1 Tanzania Mainland

(a) Legal Basis

Section 12 of The Tanzanian (Mainland) Copyright and Neighbouring Rights Act (Chapter 218, Revised Edition 2023) contains provisions on exceptions for personal use. Section 53 (1) and (2) provides for the PCR known as Copyright Levy introduced in 2022. PCR implementation is carried out under the Copyright and Neighbouring Rights (Copyright Levy on Blank Devices) Regulations, 2023 (as amended in 2023 & 2025).

(b) Collection Mechanism

The Copyright Office of Tanzania (COSOTA), in cooperation with the Tanzania Revenue Authority (TRA), collects PCR. The Radio set enabling recording, the TV set enabling recording, analogue audio recorders, analogue video recorders, the copier, the digital jukebox, vinyl, mini disc, Compact Disc (CD), Digital Versatile Disk (DVD), SD Memory and MP3 player are charged 1.5% of the sale price; Regulation 4 of the 2023 Regulations, as amended by Regulation 6 of the regulations Copyright and Neighbouring Rights (Copyright Levy on Blank Devices) amendment Regulations, 2023 (Government Notice No.772 published on 3/11/2023). The levy is paid by the manufacturer of blank devices for devices manufactured, produced, or assembled in Tanzania. For imported blank devices, the importer pays the levy at the point of entry. Collections are finally deposited into the bank account maintained by COSOTA for distribution.

(c) Distribution Formula

The 2023 Regulations provide the distribution keys as follows: 20% to COSOTA for administration; 10% dividend to the Government and 70% to right holders (10% Culture and Arts Trust Fund regulated

by the Tanzania Arts and Culture Fund an Independent Office under the Ministry of Information, Culture, Arts and Sports; 60% distributed equally among all CMOs or directly to the right holders). COSOTA conducted an evaluation and stakeholder consultation on the implementation of the PCR, which led to amendments to the regulations. The Copyright and Neighbouring Rights (Copyright Levy on Blank Devices) Amendment Regulations, 2025 (Government Notice No.684 of 12/12/2025) amended the previous Regulation 2 regarding the distribution of 60% by providing a new set; 20% to music, 10% literary works, 15% films, 7.5% for performances and 7.5% for arts and crafts.

2.1.2 Kenya

(a) Legal Basis

The Kenyan Copyright and Neighbouring Rights Act 2001 (Chapter 130, Revised Edition 2022) Second schedule, Part A (1) (a) provides exceptions for private use. Sections 28(3), 30(6), and 30B of the Copyright Act introduce a PCR, known as blank tape royalties, for the rights of owners of copyright in a sound recording and in the fixation of their performance.

Audiocassette, audiocassette mini disc, audio-CD-R/RW (Sh.5); Video cassettes (VHS, Hi8, Mini DV, Video8) (Sh.5); DVD-R, DVD+ RW, DVD+ R, DVD + RAM, DVC, mini-DVD, Blu Ray disk, PC diskettes, DDS tapes, Trevan disc, CD-R, CD-RW (Sh. 10); DVD writer external (PC), CD – ROM recorder external (PC); and another recording device for audio-CD RJRW whether integrated with a hard disc (3% of cost price net of taxes); Television with HD recorder, DVD – HD recorder, Video –HD recorder (cameras), Digital recorders (MP3), I-pods, MP4, etc (Sh. 100); VHS recorders, digital receivers with HD (PVR), hard Drive media players, Blu – Ray recorder external, digital camcorders, digital cameras with SD cards, digital recorders for IPTV and VOD services (5% of purchase price net of taxes); Game consoles, media boxes, minidisks, compact flash memories, memory stick, smart media memory cards, portable hard discs (externals, ZIP drives, data, USB Flash disk (Shs. 200); Audio recorders and video recorders (4% of purchase price net of taxes); Photocopy/Printing (Sh.20); Personal Laptops/computers, mobile phones, smart watches (1.5% of purchase price net of taxes); Modulators, decoders/signal receivers, digital jukeboxes (3% of purchase price net of taxes); Photocopy machine, printing plates,

printers/printing machines (2% of purchase price net of taxes Sh. 300); Computer external hard drives (Sh. 300).

(b) Collection Mechanism

These are payable at the point of first manufacture/entry by the manufacturer/importer for commercial purposes of such equipment or media. Kenya Copyright Board (KECOBO) is responsible for the collection and distribution of PCR through the Kenya Revenue Authority or any other entity designated by KECOBO.

(c) Distribution Formula

The Schedule to the Act, Legal Notice No.88, provides the distribution keys. KECOBO retains 20% for Administration, automation, advocacy and enforcement; Agency Commissions 10% (8% towards contracted Agent Commission and 2% for Kentrade inclusive) and Creative Sectors 70% Administration, distribution towards members' welfare or grants (Music and Sound Recording 37%, Audiovisual 15% and Literary works 18%). The 37% is for music and sound recording, with 46.5% for authors, composers, publishers, arrangers, and other related music and sound recording right holders, 29.5% for Producers of sound recording, and 24% for Performers of Sound recording. 15% for audiovisual breakdown, 50% Film producers, including animators and gamers; 30% Performers or actors; 20% Script writers. 18% id for Literary works breakdown 30% Book authors, 50% Book publishers and 20% Visual arts and related creative sectors.

2.1.3 Nigeria

(a) Legal Basis

Section 20 (a) of the Nigerian Copyright Act 2022 provides exceptions on fair dealing for private use. Section 89 introduces the PCR, the levy on copyright material. According to Section 89(3), the Nigeria Copyright Commission (NCC) is responsible for the collection and distribution of PCRs to CMOs or other representatives of right owners.

(b) Collection Mechanism

According to Order 2 (a) and (b) of the Copyright (Levy on Materials) Order 2012, the levy is paid by the importer (materials imported), manufacturer (materials manufactured or produced) and assembler (materials assembled) in Nigeria. The Schedule to the Copyright

Order provides that 3% is charged on Audio cassettes, Mini Discs, Hi-MD, Compact Disks (CDs), Digital Versatile Disks (DVDs), Video Cassettes, Blu-Ray, SD Memory cards, USB Flash Drives, and i-Pods. Two percent is charged on Photocopying papers, Digital Jukebox, MP3 Player, Mobile phones, CD Recorder, DVD Recorder, Blu Ray recorders, Computer External Hard Drive, Analogue Audio recorders, Analogue Video recorders, Personal computers, Printing Plates, Radio/TV set enabling recording, Camcorders and Decoder/signal receivers. One percent is charged on Photocopy machines, Printers/Printing machines.

(c) Distribution Formula

The distribution keys are as follows: 10% for administrative costs, 20% for anti-piracy activities, 10% for the promotion of creativity, and 60% to right holders, equally distributed among all approved Collecting societies.

2.1.4 Tanzania Zanzibar, Uganda and South Africa

Legal Basis on Exceptions and Limitations, absence of a collection mechanism and a distribution formula in Zanzibar, Uganda and Nigeria

In Zanzibar, Section 9 of the Copyright and Neighbouring Rights Act 2003 provides exceptions and limitations for private reproduction for personal purposes. The law does not yet have a provision on PCR.

Section 15 (a) of the Ugandan Copyright and Neighbouring Rights Act 2006 provides for fair use of works protected by copyright for personal use. The Uganda Parliament passed the Copyright and Neighbouring Rights (Amendment) Bill, 2025, on 17th and 18th March 2026, but it does not include provisions on PCR.

Section 13 of the South African Copyright Act 1978 (Revised in 2002) provides for general exceptions in respect of reproduction of works for personal or private use. South Africa does not have provisions on PCR. In the process of amending the Copyright Act, the bill was referred to the court for a determination of its constitutionality on an *ex parte* application by the South African President, brought under the Constitution. The Constitutional Court's Judgment of

26 June 2026 on South Africa’s Copyright Amendment Bill upheld the introduction of the fair use doctrine in education, replacing the more restrictive fair dealing system. The court also declared unconstitutional the broad copyright exception that permitted excessive copying of materials for educational institutions (Cashdan, 2026). Although the new draft bill presents fair use that balances right-holder and public interests across different uses, including personal copying, education, research, and creativity, and aligns with constitutional values, including access to knowledge, it does not include provisions on PCR.

Due to the absence of provisions, there are no collection mechanisms or a distribution formula.

Table 1 below presents the information on the list of devices charged with PCR.

Table 1: Items charged PCR in Tanzania, Kenya, Uganda, Nigeria and South Africa

No	Item description	Tanzania (Mainland)	Tanzania (Zanzibar)	Kenya	Uganda	Nigeria	South Africa
1.	Audio cassette	Nil	Nil	5 Kshs.	Nil	2%	Nil
2.	Video-Cassette (VHS, Hi8, Mini DV, Vide08)	Nil	Nil	5 Kshs.	Nil	3%	Nil
3.	Vinyl	1.5%	Nil	Nil	Nil	Nil	Nil
4.	Mini Disc	1.5%	Nil	10 Kshs.	Nil	3%	Nil
5.	Hi-MD	Nil	Nil	Nil	Nil	3%	Nil
6.	Compact Disc (CD)	1.5%	Nil	10 Kshs.	Nil	3%	Nil
7.	Digital Versatile Disc (DVD)	1.5%	Nil	10 Kshs.	Nil	3%	Nil
8.	I-Pod	Nil	Nil	Nil	Nil	3%	Nil
9.	Modulator	Nil	Nil	Nil	Nil	Nil	Nil
10.	MP3 Player	1.5%	Nil	100 Kshs.	Nil	2%	Nil
11.	Blu-Ray	Nil	Nil	10 Kshs.	Nil	3%	Nil
12.	Digital Jukebox	1.5%	Nil	3% of purchase price net Taxes	Nil	2%	Nil
13.	USB Flash Disc/, Memory Stick/, Flash Drive	Nil	Nil	200 Kshs.	Nil	3%	Nil
14.	SIM Card	Nil	Nil	Nil	Nil	Nil	Nil
15.	SD Memory Card/Smart media memory cards	1.5%	Nil	200 Kshs.	Nil	3%	Nil

16.	CD/DVD Copier	1.5%	Nil	3% of cost price net of taxes	Nil	Nil	Nil
17.	Cell Phone/ mobile phones	Nil	Nil	1.5% of purchase price net taxes	Nil	2%	Nil
18.	Personal Computer/ Laptop	Nil	Nil	1.5% of purchase price net taxes	Nil	2%	Nil
19.	CD Writer	Nil	Nil	3% of cost price net of taxes	Nil	Nil	Nil
20.	Photocopier	Nil	Nil	20 Kshs.	Nil	1%	Nil
21.	Printer	Nil	Nil	20 Kshs.	Nil	1%	Nil
22.	Scanner	Nil	Nil	Nil	Nil	Nil	Nil
23.	Camcorder	Nil	Nil	3% of cost price net of taxes	Nil	2%	Nil
24.	Digital Camera	Nil	Nil	5% of purchase price net of taxes	Nil	Nil	Nil
25.	Computer External Hard Drive	Nil	Nil	300 Kshs.	Nil	2%	Nil
26.	Radio/TV Sets enabling recording	1.5%	Nil	100 Kshs	Nil	Nil	Nil
27.	Decoders/Signal receivers/digital recorders for IPTV and VOD services	Nil	Nil	3% of purchase price net of taxes	Nil	2%	Nil
28.	Printing Plates	Nil	Nil	2% of purchase price net of taxes	Nil	2%	Nil
29.	Analog audio recorders	1.5%	Nil	5% of cost price net of taxes	Nil	2%	Nil
30.	Analog video recorders	1.5%	Nil	5% of cost price net of taxes	Nil	2%	Nil
31.	Digital audio recorders	Nil	Nil	4% of cost price net of taxes	Nil	2%	Nil
32.	Digital video recorders	Nil	Nil	4% of cost price net of taxes	Nil	2%	Nil
33.	Smart Watches	Nil	Nil	1.5% of purchase price net of taxes	Nil	Nil	Nil
34.	Photocopy Papers	Nil	Nil	Nil	Nil	2%	Nil
35.	Music player	Nil	Nil	Nil	Nil	2%	Nil
36.	Blu Ray recorder	Nil	Nil	Nil	Nil	2%	Nil
37.	External Drive	Nil	Nil	200 Sh.	Nil	Nil	Nil
38.	Tablet	Nil	Nil	Nil	Nil	Nil	Nil
39.	Camera Drones/ Video Camera	Nil	Nil	Nil	Nil	Nil	Nil

40.	CCTV Camera	Nil	Nil	Nil	Nil	Nil	Nil
41.	Fax Machine	Nil	Nil	Nil	Nil	Nil	Nil
42.	Cinematographic Projector	Nil	Nil	Nil	Nil	Nil	Nil
43.	Cinematographic Camera	Nil	Nil	Nil	Nil	Nil	Nil
44.	Android Tv Box	Nil	Nil	Nil	Nil	Nil	Nil
45.	Wi-Fi Router	Nil	Nil	Nil	Nil	Nil	Nil

2.2 Implementation of PCR Systems in Tanzania, Kenya and Nigeria.

Tanzania’s land area as 885,800km² with a population of 72,563,780 and a GDP of 94.89 billion USD; Kenya has a land area of 569,140km² with a population of 58,636,412 and GDP of 147.26b USD, and Nigeria has a land area of 910,770km² with a population of 242,431,832 and GDP of 377.46b USD (Wordometer 2026). The land area, population, and GDP are relevant to PCR implementation because PCR relates to the number of imported, domestically-produced, or assembled devices and their consumption. The increase in internet use and in digital devices like mobile phones, tablets, and smartwatches creates demand for these devices, thereby driving revenue potential.

Tanzania has expanded its telecom tower network to 10,084 towers to serve and connect areas with low or no connectivity. The country, like other African countries, has witnessed a 15.3% increase in internet usage to 932 PB and a 1.5% increase in internet subscriptions to 58.9 million. The increase has also impacted other areas like the smart devices, which are also connected with other services or products, such as smartphone penetration, mobile money services, data consumption, decoder subscriptions, cable TV subscriptions, broadcasting licenses, in the 3rd Quarter 2025/2026 (Tanzania Communications Regulatory Authority [TCRA], 2026). The same is true for Kenya (Communications Authority of Kenya [CA], 2026), where it is reported that, in the same third quarter, Mobile data/ internet subscriptions increased by 1% to reach 62.6 million, of which 84.4% were on mobile broadband. Mobile phone devices connected to mobile networks totalled 78.7 million, with mobile phones accounting for 63.7%. Mobile penetration increased by 8.2% points to 157.7%, and growth was observed in mobile money services, mobile data consumption, and broadband services. In Nigeria, the same is reported (Nigerian Communications Commission [NCC],

n.d.): internet subscribers in April 2026 numbered 154,724,088; broadband penetration was 120,684,625 (55.67%); and internet usage totalled 1,414,848.70 Terabytes. The high penetration of internet services and the availability of smart devices, as well as other devices used to store, access (stream, download), distribute, and communicate copyrighted content, indicate why these devices have an impact on collections of PCR if the right devices and the right levies are charged and collected.

COSOTA in Tanzania has collected 2,303,685,502.97 Tshs (equivalent to 867,567.96 USD) (Copyright Office of Tanzania [COSOTA], n.d.) from 1st September 2023 until June 2026. According to information received in March 2026, KECOBO in Kenya has collected 170,000,000 Kshs from 15 September 2023 until March 2026. (equivalent to 1,313,250 USD). Under Nigerian law, which provides that 60% goes to the CMOs, NCC has disbursed N1,205,956,580.20 billion (equivalent to 863,464.91 USD) to the Musical Collection Society of Nigeria (MCSN) for distribution to musical and sound recording right holders (BusinessDay Nigeria, 2026). The same amount was remitted to The Reproduction Rights Society of Nigeria (REPRONIG) for the authors and publishers of literary works (Oluokun,2026) and the same amount to the Audiovisual Rights Society of Nigeria (Audiovisual Rights Society of Nigeria, n.d.). Totalling 3,617,869,740.60 Naira (equivalent to 2.637.427,04 USD), is the amount which is presumed to have been collected by NCC in Nigeria from September 2023 until March 2026 when the distribution was made. The author could not obtain the documents specifying the period for the amount collected in Nigeria and Kenya, as they were for Tanzania.

2.3 Discussion on collections and distribution of PCR in Tanzania, Kenya and Nigeria.

2.3.1 Difference in the items levied and tariff on each item

As shown in Table 1, different items and charges apply: Tanzania and Nigeria charge 1.5%-3%, and Kenya charges 1.5%-5%, in line with fixed prices for some items. The same issue was identified by ARIPO (ARIPO, 2025, p.45). ARIPO recommends that countries charge between 5% and 15% of the CIF value, depending on their

national economies. Ghana is among the African countries that charge 5% to 15% of the CIF value; the list must be exhaustive and forward-looking, with regular review. The author recommends that Tanzania, Kenya, and Nigeria should charge 5% across all jurisdictions, with the rate increasing to 10% upon agreed terms. The author believes that sufficient revenue will be collected if all devices, especially those heavily used in the digital environment, are subject to the levy.

The evaluation conducted by COSOTA in 2025/2026 shows that, if Tanzania had added 25 devices to the list in 2024/2025, with the same 1.5% charge, the collections would have been 8.38 billion Tshs. equivalent to USD 3,174,344. With an increase of 1.5% to 5%-10%, the collections will be 27.95b Tshs and 55.89b Tshs, respectively. equivalent to 10,568,520 & 21,171,132 USD respectively. Proposal was made on 5% and 10% increase and adding the following devices to the list: mobile phone, computer & Laptop, External drive, USB Flash Disc, Printer, Scanner, Tablets, Photocopier, Smart watches, Camcorder, Digital camera, video cameras, and camera drones, Printing plates, SIM Card, Decoders/Signal receivers/ digital boxes, CCTV Cameras, iPods, Fax machines, Cinematographic projector, Cinematographic camera, iPad, Modulator, Hi-MD, Android Tv Box and Wi-Fi Router.

It is crucial that Kenya and Nigeria conduct evaluations, in cooperation with right holders and stakeholders, to strengthen PCR. As shown in Table 1, Kenya and Nigeria's collections will increase if charges are set between 5% and 15% and devices are added. Tanzania (Zanzibar), South Africa, and Uganda can learn from existing systems when establishing PCR systems.

2.3.2 PCR collected

The collections in Kenya, Tanzania and Nigeria are not aligned with the population. These three countries' income levels, workforce and tax systems are not far apart. The difference is caused by the number of devices charged and the rates charged on each device. In all available literature, none has indicated a complaint about how the levy is collected before reaching COSOTA, NCC, or KECOBO, but rather that these institutions reach CMOs and right holders. It is the author's presumption that it may be because PCR

is collected through a specific set of automated systems, which are equivalent to normal tax collection systems, rather than through the normal collections by CMOs covering other rights, such as public performance, broadcasting, and communication to the public, and income streams.

2.3.3 Distribution of PCR royalties

Each country has its own way of distributing PCR. Although Tanzania, Kenya and Nigeria have the 20%, 10%, 70% style. The 70% distribution varies depending on the percentage of royalties allocated to each category of works, rights, and right holders. Regarding the distribution of royalties, PCRs are yet to be distributed for various reasons explained below.

Tanzania is expected to distribute PCR to all right holders across all rights and categories of works. The delays were caused by the 2023 Regulations, which required that the 60% be distributed equally among licensed CMOs. However, until June 2025, only one CMO existed, and it was underperforming. Right-holders and Stakeholders were engaged, and the amendment was made in December 2025.

KECOBO has not yet distributed the royalties due to a pending case regarding the distribution of PCR and an interim order in *Reuben Kigame Lichete & 2 others v Kenya Copyright Board & 4 Others* (2023) eKLR. The Kenyan Constitutional and Human Rights Division, Milimani (Nairobi), issued temporary interim orders on 13 September 2023, blocking KECOBO from releasing the funds collected until the case is heard. The pending case concerns how the collections will be distributed. It does not challenge the legality of the levy collection.

MCSN received PCR N1, 205, 956,580.20 from NCC. The Record Labels Proprietor Initiative (RePLI), a not-for-profit organisation dedicated to protecting record labels, including major music labels such as Sony Music, Universal Music, Mavins, and Chocolate City in Nigeria, questioned MCSN's credibility in distributing the royalties in question. They seek that NCC invoke Section 89(3) of the Copyright Act, which states that NCC shall disburse funds to

“the approved CMOs or other representatives” to issue them a PCR. IFPI questioned the same (BusinessDay Nigeria, 2026).

2.3.4 Not having a PCR system in Tanzania (Zanzibar), Uganda and South Africa.

Tanzania Zanzibar, Uganda and South Africa don't have PCR provisions. Stakeholders and the government in Uganda debated on the inclusion of PCR in the Copyright and Neighbouring Rights (Amendment) Bill, 2025 (Ssentongo, 2026). The bill passed by parliament on 17th March 2026 did not include PCR provisions. Zanzibar is considering the inclusion of PCR in the ongoing review of the Copyright Act. The distribution rules should be inclusive, transparent, evidence-based, and developed in consultation with all affected categories of right holders, including visual artists, photographers, audiovisual creators, performers, authors and publishers.

2.3.5 Not having CMOs in some categories of works, rights holders and rights

Countries without systems to collectively collect and distribute royalties are missing out. Tanzania has licensed The Music and Sound Recording Society of Music Advocacy Limited (SOMA) and Tanzania Reproduction Rights Society Limited (TANRRS) in reprography (Copyright Office of Tanzania, 2025), and Tanzania Audiovisual Collections Society (TAVIC) to administer audiovisual works (movies). Kenya has licensed KAMP Copyright and Related Rights Limited and Performing and Audiovisual Rights Society of Kenya (PAVRISK) (Kenya Copyright Board, 2025). Uganda has licensed the Uganda Performers Rights Society (UPRS) for musical works, the Uganda Federation of Movie Industry (UFMI) for audiovisual works, and the Uganda Reproductive Rights Organisation (URRO) for literary works (Uganda Registration Services Bureau, n.d.). Nigeria has licensed MCSN for music and sound recording (Music Copyright Society of Nigeria, n.d.) and the Reproduction Rights Society of Nigeria (REPRONIG) for reprography (Reproduction Rights Society of Nigeria, n.d) and the Audiovisual Rights Society of Nigeria (AVRS).

In South Africa, the CMOs are the Southern African Music Rights Organisation (SAMRO), which administers performance rights; the Composers, Authors and Publishers Association (CAPASSO), with a mandate in mechanical rights in music composition; South African Music Performance Rights Association (SAMPRA) administers neighbouring rights; Independent Music Performance Rights Association (IMPRA); Recording Industry of South Africa's Audio Visual (RISA) collects public performance royalties for music video and the Association of Independent Record Companies of South Africa (AIRCO). There are also the Motion Picture Licensing Company (MPLC) and Christian Copyright Licensing International (CCLI) (Mdakane, 2025). They also had the Dramatic, Artistic and Literary Rights Organisation (DARLO), but it is not currently operating.

CMOs are very important in operating on behalf of right holders. If a CMO for specific categories or works, rights, and right holders is missing, alternative systems must be established to ensure right holders continue to receive royalties. National Copyright Offices have to nurture the established ones so they can fully perform their duties, especially when they are new/starting.

2.3.6 Investment in good governance, transparency and accountability

CMOs and Copyright Offices have to invest heavily in implementing and practising good governance, transparency and accountability. Investment in technology, capacity building, awareness, and closer cooperation with right holders, stakeholders, Sister societies, and Regional and International Organisations such as WIPO, ARIPO, CISAC, IFPI, SCAPR, IFRRO, and OAPI will improve the systems.

2.3.7 Absence of clear and transparent distribution systems by CMOs

Right holders and stakeholders in Tanzania, Kenya, and Nigeria do not oppose PCR collections, but the distribution must reach the rightful rights holders. It is, however, noted that Nigeria's PCR covers music (music and sound recording) and Literary works;

Kenya covers music (performers and sound recording), audiovisual and literary works; and Tanzania covers all works, rights, and right holders. This highlights the need to strengthen existing systems to include rights holders such as photographers and painters, as well as others whose rights are affected by private uses, so that they are equally remunerated. CMOs must engage right-holders and stakeholders to prepare the royalty distribution systems. The introduction of PCR also formalises the industry, raises awareness, and builds trust in the government and CMOs, as more right holders register their works and expect to receive PCR for their creativity (Audiovisual Rights Society of Nigeria, n.d.).

3.0 Conclusion and recommendations

PCR is one of the important revenue streams to authors, producers, performers and publishers. Fully implementing PCR systems will strengthen the copyright industry in Africa, given that copyright piracy is rampant and a mindset of freely accessible content prevails, leaving creators empty-handed. The existence of PCR in Tanzania, Kenya and Nigeria has proved that it can be done, and it has to be done. The rise in the number of right holders registering their works to benefit from remuneration is self-evident: PCR is a key to development. The author recommends that countries without PCR systems implement legal reforms by amending their copyright laws to include PCR systems, ensuring that right holders are compensated. Countries with the system should review their laws to include all devices that are prone to copyright infringement for private use.

Tariff setting: It is important to align the tariff percentage levied on devices with the royalty percentage allocated to each category of work, which ranges from 5% to 15%. Tanzania, Kenya, Uganda, Nigeria, South Africa, and other African countries.

Institutional Reform: should ensure more vibrant, functioning CMOs across all categories of work.

More institutional coordination: If no CMO is in place for a given category of work, the government must establish a system to ensure

that PCR reaches right holders whose organisations are not yet established.

Distribution Rules: The established CMOs or systems for distributing the PCR to the right holder must be clear and transparent. The rules must be followed to ensure that the collections reach the intended right holders in a timely and justifiable manner.

Governance: Copyright offices and CMOs must regularly publish PCR collections and ensure that remuneration is distributed immediately upon receipt at the first revenue-collection point. Timely distribution and publication through the Copyright Offices, CMOs' websites, and their annual reports will facilitate transparency, good governance, and accountability. Regional Harmonisation and implementation of PCR systems across all African jurisdictions will facilitate trade and development in Africa and will eventually significantly contribute to the global share of creative industries collections.

Copyright Offices, CMOs, right holders, and stakeholders must cooperate to realise this important revenue stream to improve the creative industries. Tanzania, Kenya and Nigeria are already implementing PCR systems, while Tanzania (Mainland), Uganda and South Africa have not yet started. Given the available challenges and arguments for and against implementing and strengthening the systems, the truth remains that this is one of the important revenue sources for creators.

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DOES INTELLECTUAL PROPERTY REDUCE FOREIGN AID DEPENDENCY? EVIDENCE FROM SADC MEMBER STATES IN ARIPO PANEL DATA (2010–2022)

Treassar Msokera

Lecturer, Catholic University of Malawi

and PhD scholar in Development Studies, University of Malawi

Abstract

Many African countries remain heavily reliant on foreign aid, yet questions persist about whether this dependence hinders homegrown innovation, creativity and economic self-sufficiency. This study explores a key aspect of that puzzle, whether intellectual property (IP) helps reduce foreign aid dependency in Southern African Development Community (SADC) member states that belong to the African Regional Intellectual Property Organisation (ARIPO). Using panel data from 2010 to 2022, taken from the World Intellectual Property Organisation's Global Innovation Index (GII) and World Bank indicators, the relationship was examined through pooled Ordinary Least Squares (OLS), Random Effects, and Fixed Effects models. The analysis focused on net official development assistance (ODA) as a share of gross national income, with IP scores from the GI as the main predictor and GDP per capita as a key control. Across all models, higher IP scores showed a negative but statistically insignificant association with ODA aid dependency. GDP per capita reduces aid reliance significantly only in the pooled OLS model. These results suggest that, within this context, IP progress alone does not lessen aid dependence, likely due to institutional constraints, limited commercialisation of innovations, and rooted structural factors. The findings call for greater investment in domestic capacity, stronger enforcement of ARIPO-aligned IP rules, and aid strategies that actively support local innovation ecosystems to raise more independent, knowledge-driven growth across SADC-ARIPO economies.

Keywords

foreign aid dependency, intellectual property, SADC, ARIPO, panel data, economic growth

1. Introduction

Africa remains the world's largest recipient of foreign aid. In 2023, the continent received approximately \$73.6 billion in official development assistance (ODA), making it the top regional recipient despite a declining share of global ODA over the past decade (Mo Ibrahim Foundation, 2025). Donors provide these resources annually to alleviate hunger, reduce poverty, promote economic development, strengthen democratic governance, and uphold the rule of law. Yet, progress has been limited. Socio-economic and political advancements in areas such as rule of law and democratic governance remain modest, and Africa continues to rank as the poorest continent by gross national income (GNI) per capita and Human Development Index (HDI) metrics. Sub-Saharan Africa in particular, shows persistently low GNI per capita (around \$1,652 in recent World Bank estimates) and dominates global lists of the least developed countries. (OECD, 2024). Foreign aid undeniably offers financial resources and holds potential to support governance and growth. However, debates persist about whether aid truly drives sustainable development or fosters dependency that strangles IP from local initiative. This raises a deeper question for many African nations such as could heavy reliance on external assistance undermine the utilisation of IP as a driver of indigenous creativity, innovation and economic self-reliance?

This paper addresses that question empirically by examining whether IP reduces foreign aid dependency in SADC member states that are also members of ARIPO, using panel data covering the period 2010 to 2022. The study makes three contributions. Firstly, it provides empirical evidence on the IP and ODA relationship in a regional context that has received limited quantitative attention. Secondly, it amalgamates John Locke's natural rights theory and Andre Gunder Frank's dependency theory to construct a conceptual framework linking IP utilisation and aid reliance. Thirdly, it uses multiple panel estimation strategies which are pooled OLS,

Random Effects, and Fixed Effects with appropriate diagnostic tests to ensure robustness.

2. Literature Review

2.1 The Aid Growth Debate

Economists continue to debate the true impact of foreign aid on growth. Supporters argue that aid supplements domestic resources, boosts savings, and strengthens both the economy and political institutions. A landmark study by Burnside and Dollar (2000) demonstrated that when economic policies are sound, aid can deliver meaningful gains in per capita GDP growth. Lensink and Morrissey (2000) found a positive average effect of aid on growth and identified aid volatility as a key constraint on its effectiveness. Sachs (2005) sees aid as a serious catalyst for breaking poverty traps in the least developed economies. Opponents counter that aid often crowds out domestic savings, breeds long-term dependency, and slows genuine progress. Moyo (2009) argued forcefully that aid in Africa has perpetuated poverty by weakening governments and distorting incentives. Bauer (2000) maintained that development assistance shifts attention away from the domestic institutions and effort that truly drive growth. In Africa especially, scholars have observed that prolonged reliance on aid weakens confidence in local capacities and promotes a culture of dependence across society (Prah, 2002; Karikari, 2002; Bangladesh Association of Young Researchers, 2014).

2.2 Intellectual Property as a Development Tool

IP covers innovations and creations of the mind which are inventions, literary and artistic works, symbols, names, and images used in commerce (WIPO, 2008). At its best, IP acts as an engine for sustainable development by creating incentives for innovation, enabling investment recovery, and facilitating technology transfer. Sattar and Mahmood (2011) studied IP across 38 countries from 1975 to 2005 and found a positive and significant contribution to economic expansion, with stronger IP protection linked to higher per capita GDP. Lesser (2001) quantified the relationship between IP and foreign direct investment (FDI) in 44 developing countries, finding that approximately a 10 percent rise in an IP score translated into an average \$1.5 billion increase in FDI inflows.

Goans (2014) explains that at the firm level, patents and copyrights allow innovators to recover their investments, sparking new products and ventures. At the macroeconomic level, strong IP rules encourage domestic innovation, attract FDI as a pathway for technology sharing, and help create jobs, boost exports, and build a prosperous private sector. Ezell and Cory (2019) further demonstrated how countries influence IP strategically to enhance economic competitiveness in knowledge-intensive sectors such as technology, agriculture, and healthcare.

In Africa's colonial past, IP systems were largely imported from colonising powers and designed to shield the interests of external owners rather than to improve local technological progress (The Republic of Malawi, 2019). Even today, IP often sits at the margins of national development strategies, leaving its potential for growth largely untapped. Mondlane (2024) and Tsaurai (2024) highlighted that the relationship between IP, FDI, and development in Africa is context-dependent, shaped by institutional quality, legal strength, and sectoral characteristics.

While the literatures on aid effectiveness and on IP as a development tool are each well developed, the intersection between the two remains underexplored. A key question is whether aid dependency contributes to the underutilisation of IP, limiting shifts toward self-sustained, innovation-led development. It has been argued that reducing aid reliance could enable African nations to prioritise indigenous innovations and knowledge-based economies without donor conditionalities that often reflect external interests, and that IP protections could safeguard local creations, nurture entrepreneurship, and drive growth (Wanjowo, 2020; Mangwanya, 2022). This study addresses this gap directly by examining the IP and ODA relationship in SADC-ARIPO countries through formal panel econometrics. A second gap concerns the potential role of IP in reinforcing aid dependency cycles. Weak IP systems discourage private investment and endogenous innovation, reducing domestic revenue and reinforcing reliance on external assistance (Maskus, 2000; UNCTAD, 2014). On the other hand, weak IP systems could sustain aid dependency, which in turn weakens IP development.

However, IP regimes in developing countries have also pointed out that stringent IP protection can restrict access to technology and

raise the cost of knowledge-intensive goods (Correa, 2000).

3. Methodology

The study used quantitative Panel study to assess and establish the prevailing status of IP, economic growth and foreign aid between 2010 to 2022 in SADC member states that belong to ARIPO. This design was particularly useful as it enables the analysis of changes, relationships, and interactions over time, while accounting for differences between subjects. It also helps reduce bias by observing the same subjects repeatedly, allowing for more accurate and consistent results. (Baltagi 2021). Positivism was adopted as the research philosophy because the study viewed the reality objectively, observed and described from an impartial standpoint. The study took a deductive approach that starts with a theory or hypothesis and designs a research strategy and test the hypothesis through empirical observation (Creswell & Creswell 2018). The study was guided by a researcher-proposed conceptual framework that links foreign aid dependency, the contribution of IP to GDP, and overall economic growth. John Locke's natural rights theory (1690) assumes creators' inherent ownership over intellectual labour, justifying IP protections for use, exclusion, or transfer. Andre Gunder Frank's dependency theory (1960s-1970s) argues core countries exploit peripheries through aid, perpetuating underdevelopment. True progress required reducing reliance for internal innovation. These two theories were deliberately selected for their complementary strengths. Locke's natural rights theory (1690) provides the normative justification for IP rights as a fundamental entitlement arising from individual's labour and creativity, applicable across all contexts. Frank's dependency theory (1960s-1970s) explains the structural constraints imposed by external dependence on aid-dependent economies in the Global South, where prolonged reliance often crowds out local innovation and IP utilisation. Together, they support a vision of sustainable, people-centered development that emphasises internally-driven progress over externally-imposed models.

Building on these theoretical foundations, the conceptual framework settles on two core assumptions:

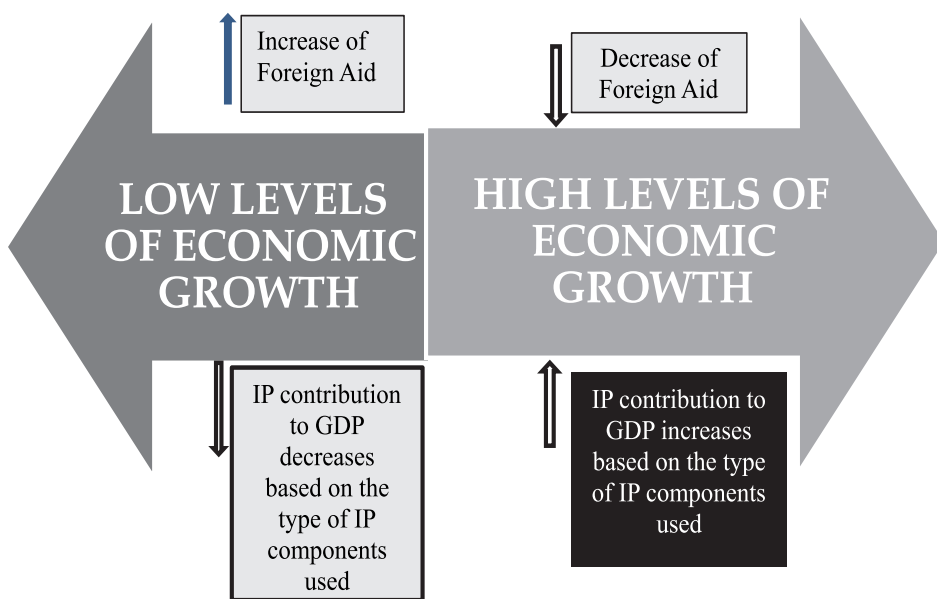


Figure 1: Conceptual Framework: Economic Growth through IP and Aid Management

Source: The Researcher's construct (2025)

Economic growth remains low when foreign aid increases, resulting in a low contribution of IP to GDP. Low growth also occurs when the contribution of IP to GDP decreases while foreign aid increases. High economic growth is achieved when the contribution of IP to GDP increases and foreign aid decreases. A decrease in foreign aid leads to an increase in the contribution of IP to GDP, which results in high economic growth.

The study was conducted in SADC member states of ARIPO, targeting all the developing countries in the same region and that were guided by similar legal instruments in developing IP policies that influence the management of the IP for economic growth in their countries. The SADC region was selected because according to the WIPO Global Innovation report of 2019, Sub-Saharan Africa has a significant number of countries ranked at the lowest level due to the heterogeneous performances on innovations. As of the time of the research, ARIPO member states were 22 from Africa and out this figure, 10 countries were from the SADC region. Therefore, the total sample of the study consists of 10 SADC member countries

of ARIPO. However, after reviewing the dataset, two countries, Lesotho and Seychelles, were excluded due to incomplete data on the Global Innovation Index. Therefore, the researcher examined the following eight countries and analysed their similarities and differences.

Table 1: Countries categorised by income levels

No	Country Name	Income level
1	Botswana	Upper Middle Income
2	Malawi	Low Income
3	Mauritius	Upper Middle Income
4	Mozambique	Low Income
5	Namibia	Upper Middle Income
6	Tanzania	Low Income
7	Zambia	Lower- Middle Income
8	Zimbabwe	Low Income

Source: *World Bank income classifications. Note: Lesotho and Seychelles excluded due to incomplete GII data.*

This adjustment ensured that the analysis was based on complete and reliable data, thereby enhancing the validity of the study’s findings. Secondary Panel data covering the period from 2010 to 2022 for SADC member states of ARIPO was utilised. The data was obtained from WIPO Global Innovation Index and World Bank sources.

Data analysis was conducted using Stata, a statistical software well-suited for panel data analysis. The regression analysis was done using three primary estimation models; Fixed Effects (FE), Random Effects (RE), and pooled OLS. The FE model was used to focus on within-entity disparities, assuming that unobservable individual-specific effects, are correlated with explanatory variables. The RE model, on the other hand, assumed these effects are uncorrelated with explanatory variables, allowing for both within- and between-entity differences. Pooled OLS was included for comparison, assuming homogeneity across entities without accounting for individual or temporal effects (Wooldridge, 2002). To select the

most appropriate model, two diagnostic tests were conducted; the Hausman test, which assessed the validity of the RE model by testing for correlation between individual effects and explanatory variables, and the Lagrange Multiplier (LM) test, which determined whether individual or time-specific effects were present, guiding the choice between pooled OLS and RE. To ensure the reliability of the panel data analysis, pre-diagnostic tests were conducted to address potential issues such as non-stationarity, heteroskedasticity, and autocorrelation. Stationarity was tested to confirm that variables' statistical properties (mean, variance, autocorrelation) remain constant over time, preventing spurious regression.

The relationship between intellectual property and foreign aid dependency was modeled using the following panel regression specification:

$$ODA_{it} = \beta_0 + \beta_1 IP_{it} + \beta_2 GDP_{it} + \mu_i + \epsilon_{it} \quad \text{Equation 1 FE\&RE Model 1}$$

$$ODA_{it} = \beta_0 + \beta_1 IP_{it} + \beta_2 GDP_{it} + \epsilon_{it} \quad \text{Equation 2 Pooled OLS 2}$$

Where:

- ODA_{it} : Dependent variable representing foreign aid, measured as the official development assistance, received by country i at time t.
- β_0 : Intercept term.
- β_1 : Coefficient for the IP indicator.
- β_2 : Coefficient for GDP per capita.
- IP_{it} : IP indicator for country i at time t.
- GDP_{it} : GDP per capita for country i at time t.

- μ_i : Unobservable country-specific effects.
- ε_{it} : Error term.

The model was estimated using pooled OLS, random effects, and fixed effects techniques to ensure robustness. This approach facilitated an in-depth analysis of the extent to which IP could contribute to reduction of foreign aid dependency while controlling for economic development. Multicollinearity was also assessed using the Variance Inflation Factor (VIF) test while serial correlation and heteroskedasticity were controlled for by estimating robust standard errors.

Results and Discussion

Table 2: Descriptive Statistics for IP, ODA and Economic Growth 2010-2022

Variable	Observations	Mean	Std. Dev.	Min	Max
GDP	104	30.7422	36.39294	2.35	191.6
GDP per capita	104	7034.782	7995.665	164.67	49228.68
IP	104	27.4053	5.896928	15	41.85714
ODA	104	5.536596	5.004895	0.1041139	18.91976
Institutions	104	56.46436	16.30029	15.4	130
Human Capital & research	104	26.44455	22.17359	0.7	122
Infrastructure	104	34.24653	22.88975	12.9	128
Market Sophistication	104	42.85644	16.58625	16.2	118
Business sophistication	104	30.81485	19.09856	13.6	132

The table shows considerable variation across the variables. GDP has a mean of 30.74 with a wide standard deviation (36.39), ranging from 2.35 to 191.6, indicating large disparities in economic size among the countries observed. GDP per capita also reflects high inconsistency, averaging 7,034.78 but ranging from 164.67 to 49,228.68, suggesting uneven levels of individual economic welfare. IP has a mean value of 27.41 with moderate distribution, while official development assistance (ODA) averages 5.54 but varies

substantially across observations. The interaction term between IP and foreign aid (IP_FA) displays very high variability, with a mean of 143.46 and values ranging from 3.63 to nearly 695, highlighting divergent country experiences. Institutional quality averages 56.46, while human capital and research, infrastructure, market sophistication, and business sophistication exhibit wide ranges, reflecting heterogeneity in structural and developmental capacities among SADC member states.

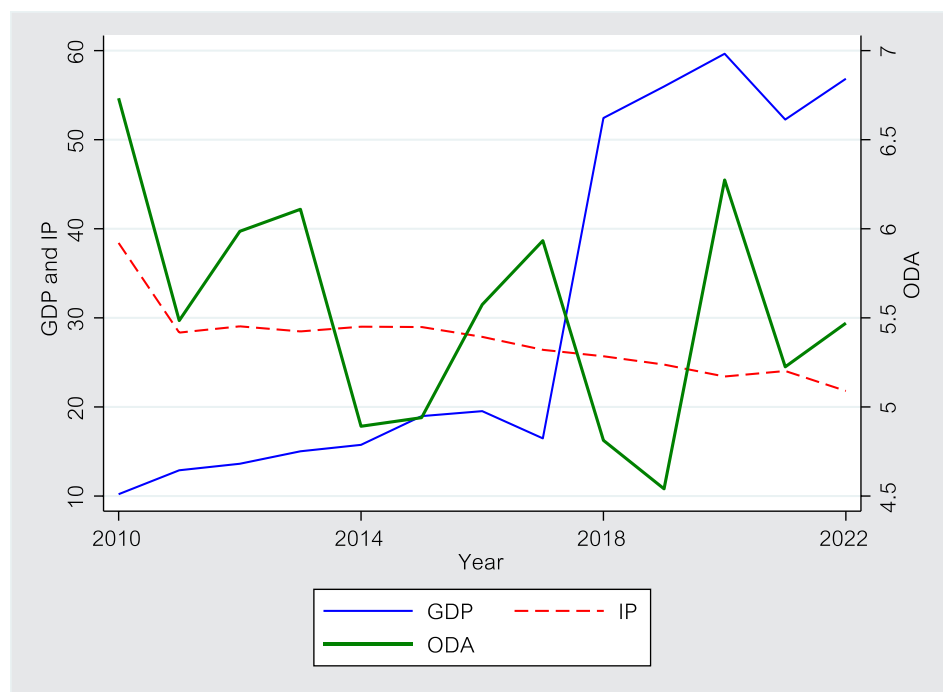


Figure 2: Graph 1 GDP, IP and ODA Trend 2010 to 2022

The differences in the movement of the three lines imply that increases in GDP and IP scores are not necessarily driven by changes in aid inflows. Increase in ODA does not automatically stimulate immediate growth or institutional change, their impact depends on how the funds are used, the sectors they support, and a country's ability to absorb them effectively. The relationship between economic growth (GDP), IP, and ODA may not be linear because each of these factors influences development in different ways and at different speeds. The variable nature of ODA's impact likely results from differences in fund allocation, targeted sectors, and the capacity of recipient countries to effectively utilise aid. This suggests that economic growth during the period was driven by factors other than IP enhancements or aid, underscoring the

complex dynamics of development and the need for targeted policy measures to strengthen innovation systems.

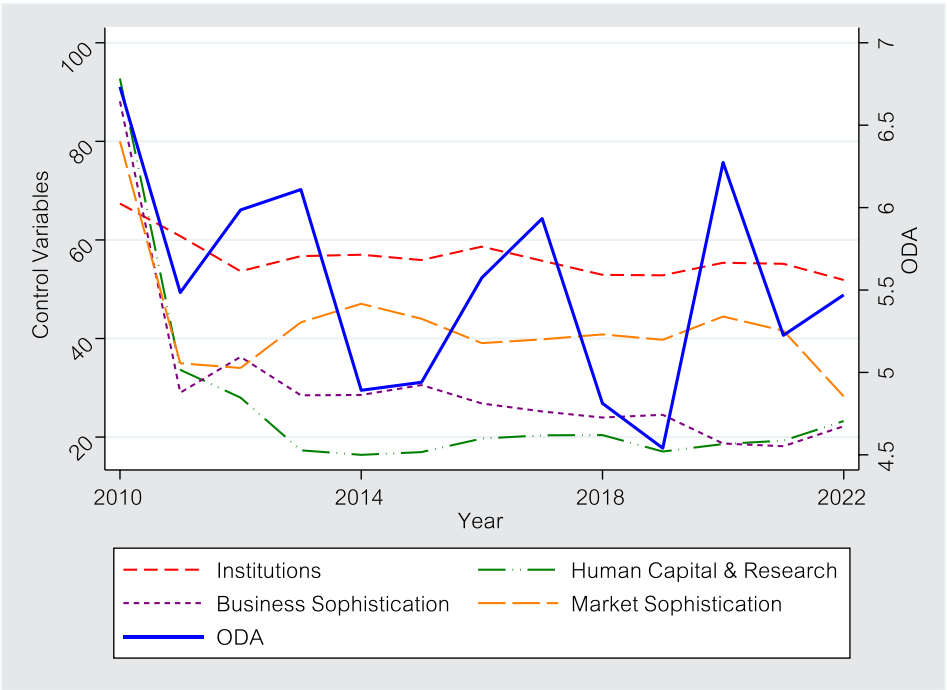


Figure 3: Graph 2 ODA with control variable (Human Capital and Research, Institutions, Market Sophistication and Business Sophistication) Trend 2010 to 2022

Graph 2 illustrates the trends of ODA alongside control variables which are Institutions, Human Capital & Research, Business Sophistication, and Market Sophistication from 2010 to 2022, with ODA values plotted on a secondary scale ranging from 4.5 to 7 and control variables on a primary scale up to 100. The analysis shows that ODA fluctuates over the period, peaking around 2018 at approximately 6.5 before declining slightly toward 2022, suggesting variability in aid inflows without a consistent pattern. Among the control variables, Institutions starts at a high value near 100 in 2010 but declines sharply, stabilising around 50–60 from 2014 onward, indicating a significant deterioration in governance quality and rule of law. Human Capital and Research shows a gradual decline from an initial value near 80 to around 20 by 2022, reflecting a reduction in education and research capacity. Business Sophistication follows a similar downward trend, dropping from approximately 60 to 20, suggesting a decline in business efficiency. Market Sophistication,

starting around 40, fluctuates but generally remains low, indicating limited progress in market development. These trends suggest a lack of correlation between ODA and improvements in the control variables, as the decline in institutional quality, human capital, business sophistication, and market sophistication occurs despite variable aid inflows. This might represent that ODA's impact may be limited by factors such as poor absorption capacity or ineffective allocation, raising questions about its effectiveness in supporting structural development over the period. This aligned with Andre Gunder Frank's "development of underdevelopment" theory, which suggested that reliance on external aid and resources from core countries entrenches dependency rather than fostering genuine development in the periphery. The observation that increases in ODA did not directly contribute to economic growth or institutional strengthening illustrates this dynamic, as aid flows often advance the strategic and economic interests of donor nations while perpetuating structural inequalities. This supports the broader dependency theory statement that developing countries remain subordinated within a global system that systematically extracts value from them when they rely heavily on external assistance. Consequently, the results suggest that sustainable development cannot be realised through aid dependency alone; instead, it requires investment in internal capacity-building, efficient resource allocation, and autonomous development strategies that reduce vulnerability to external control and deepen self-reliance.

Pre-Estimation Diagnostic Test Results

Table 3: Pre-Estimation Diagnostic Test Results for Foreign Aid (ODA)

Test	Hypothesis	Statistic	P-Value	Conclusion
Breusch-Pagan LM Test	Random effects preferred over Pooled OLS	360.78	0.0000	Random Effects model is preferred over Pooled OLS
Hausman Test	Difference in coefficients not systematic	8.37	0.0152	Fixed Effects model is preferred over Random Effects

The Breusch-Pagan LM test produced a highly significant result ($p < 0.01$), indicating that the Random Effects model is preferred over the Pooled OLS model for analysing foreign aid (ODA). However,

the Hausman test revealed a statistically significant difference in coefficients ($p = 0.0152$), favoring the Fixed Effects model. This implies that the individual-specific effects are correlated with the explanatory variables, necessitating the use of Fixed Effects estimation to provide consistent and reliable results.

Table 4: Estimated Test Results for Foreign Aid (ODA) 2010-2022

Note: (*), (**), (***) are significant at 10%, 5%, and 1% level respectively.

Variable	Pooled OLS	Random Effects	Fixed Effects
IP Score	-0.0004 (0.0882)	0.0002 (0.0433)	0.0068 (0.0438)
GDP per Capita	-0.0004 (0.0001) ***	-0.0001 (0.0001)	-0.0001 (0.0001)
Constant	8.13 (2.31) ***	6.06 (2.75) *	5.75 (1.34) ***
R-Squared (Overall)	0.3438	0.3438	0.3415
R-Squared (Within)		0.0198	0.0202
R-Squared (Between)		0.4528	0.4664
Prob > F / Wald Chi2	0.0001	0.3918	0.5237

The estimation results indicate that the relationship between IP and ODA is not statistically significant across the models. The coefficient for IP Score remains insignificant in Pooled OLS (-0.0004 , $p = 0.996$), Random Effects (0.0002 , $p = 0.997$), and Fixed Effects (0.0068 , $p = 0.880$), suggesting that IP development has limited direct influence on reducing dependency on foreign aid within the studied context.

GDP per Capita shows a significant negative relationship with ODA in the Pooled OLS model (-0.0004 , $p < 0.01$), implying that higher

economic development reduces reliance on foreign aid. However, this effect is not significant in the Random Effects or Fixed Effects models. The findings highlight that while GDP per Capita has some impact on aid dependency, IP's role remains inconclusive.

The findings revealed that IP has no statistically significant impact on foreign aid dependency across the models, while GDP per capita only shows a negative effect under Pooled OLS. The results for Fixed Effects estimation were chosen as the final for this paper. These indicate that IP has a positive but statistically insignificant association with ODA (0.0068, $P = 0.880$). Similarly, GDP per capita shows a negative but statistically insignificant relationship with ODA under the Fixed Effect model. This might mean that changes in IP and economic growth with SADC-ARIPO countries over the study period do not produce statistically significant changes in foreign aid dependence after controlling for unobserved country specific effects.

Although the theoretical framework suggests that improvements in IP may enhance innovation, stimulate economic growth and eventually reduce reliance on foreign aid, the empirical fixed effect results do not provide statistical support for this relationship. This means the expected transmission mechanism from increase in IP to reduce foreign aid may be weak or delayed in the context of these economies of the SADC-ARIPO countries.

Despite this, the study recognised that the relationship between foreign aid dependency and the underutilisation of IP in recipient countries is complex and multifaceted. Several factors contribute to this phenomenon, including economic, political, and institutional dynamics that shape the environment in which IP operates. The following are further reasons:

The relationship between foreign aid, globalisation, and IP in Africa reflects deeper structural challenges that have long shaped the continent's development trajectory. Classical dependency theorists argued that underdevelopment is not an internal failure alone but is produced through unequal global economic relations. Frank (1966) linked underdevelopment to the expansion of global capitalism led by the Global North, while Bauer (2000) maintained that development aid brings up dependency by shifting attention away

from domestic effort, institutions, and incentives. As a result, the natural rights that people have towards owning their IP are not fully used. African scholars similarly observed that prolonged reliance on aid weakened confidence in local capacities and promoted a culture of dependence across society (Prah, 2002; Karikari, 2002). These dynamics provide an important lens for understanding the weak production and utilization of IP in aid-dependent economies.

Although globalisation has generated growth in many regions, Africa has remained in the margins of global trade and production systems, reinforcing economic vulnerability (Daouas, 2001; Arrighi, 2002; African Union, 2002). This marginalisation is particularly visible in IP, which increasingly governs access to markets, technologies, and value chains. Aid-dependent states often prioritise short-term funding needs over long-term investments in innovation systems and IP institutions, thereby reducing incentives for firms to invest in Research and Development (R&D) and protect their knowledge assets (Wanjowo 2020; Mangwanya, 2022). Weak governance and corruption further undermine the effectiveness of aid and IP policies, limiting the translation of external resources into sustainable IP outcomes (Jaber, 2022; Incoom, 2024).

Institutional capacity and absorptive ability are central to this challenge. Countries with strong IP protection and innovation systems are better positioned to attract FDI and benefit from technology spillovers, while weak IP frameworks deter investment and learning (Tsaurai, 2024). In many African economies, limited human capital, underfunded research institutions, weak university-industry linkages, and poor infrastructure constrain the ability to absorb and commercialise knowledge, even when donor-funded innovation programmes exist (Cohen & Levinthal, 1990; Castellacci & Natera, 2013; Etzkowitz & Leydesdorff, 2000). Volatile aid flows further disrupt long-term planning for patent offices, R&D systems, and industrial property administration (Lensink & Morrissey, 2000; Moyo, 2009).

Importantly, the relationship between aid and IP is circular. Weak IP systems discourage private investment and endogenous innovation, reducing domestic revenue and reinforcing reliance on aid (Maskus, 2000; UNCTAD, 2014). However, regional cooperation offers a viable pathway out of this cycle. WIPO (2009) emphasises

that regional IP frameworks can facilitate trade, harmonise rules, and enhance value creation. Within SADC and ARIPO, strengthening IP commercialisation, harmonising legal frameworks through instruments such as the Harare Protocol, supporting SMEs, expanding technology transfer platforms, and improving IP awareness can help convert innovation into income-generating assets (Adebola, 2020; ARIPO, 2014; ARIPO, 2024; UN, 2023). These findings support the argument that aligning aid with domestic innovation goals and treating IP as a strategic development tool are essential for reducing aid dependence and fostering sustainable, innovation-driven growth in Africa.

Conclusion and Recommendations

The panel results from SADC-ARIPO countries (2010–2022) provide empirical evidence that there is no relationship between IP and foreign aid. The Fixed Effect estimation indicated a positive but statistically insignificant association between IP and ODA. Changes in IP improvements within countries over the time were not statistically linked to reduction in foreign aid dependence.

The study recommends governments to support public–private partnerships by institutionalising regular engagement between policymakers, businesses, universities, and research institutions through innovation councils, sectoral clusters, and co-funding schemes, ensuring that IP and innovation policies are market-responsive and practically implementable. At the same time, ODA should be strategically aligned with national IP development goals, safeguarded through TRIPS-compliant provisions, and directed toward building domestic capacity such as technology transfer offices, skills development, and local IP ownership to support long-term innovation and reduce aid dependency.

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COMMERCIALISING INNOVATION IN SUB-SAHARAN AFRICA: LICENSING, BAYH-DOLE-STYLE OWNERSHIP, AND REGIONAL IP PATHWAYS UNDER ARIPO/OAPI

Yassin Hamed

Founder, Nile Nova Creative House LLC | Independent Researcher

Abstract

This article examines how Sub-Saharan African economies can convert rising innovation capacity into development outcomes by embedding commercialisation within enforceable intellectual property (IP) frameworks. Using the World Intellectual Property Organisation’s Global Innovation Index (2025) as an empirical anchor, it analyses Namibia, Nigeria, Rwanda, and Senegal to show that strong inputs – education investment, fintech dynamism, policy coherence, and grassroots entrepreneurship – do not automatically yield market value without legally robust licensing and technology-transfer pathways. Drawing comparative lessons from the United States, the paper highlights how the Bayh–Dole regime’s combination of clear institutional ownership and a public-interest safeguard (“march-in”) catalysed university technology transfer and venture formation. It then evaluates African statutory tools already on the books – such as license-registration requirements (e.g., Namibia; OAPI/Bangui), technology-transfer approvals (Nigeria/NOTAP), and structured licensing provisions (Rwanda) – and explains why outcomes hinge on institutionalisation through technology transfer offices, standard contracts, and regional coordination. The article proposes a hybrid model that pairs Bayh–Dole-style certainty over title with African procedures and multilateral disciplines (e.g., TRIPS, Paris Convention), delivered via ARIPO/OAPI templates and cross-border registries. It concludes that deliberate, legally-grounded implementation – rather than new legislation per se – is the pivotal step to transform innovation momentum into durable, inclusive prosperity.

Keywords

Intellectual Property Law; Licensing; Technology Transfer; Bayh-Dole; ARIPO/OAPI; TRIPS.

1. Introduction

Innovation has become a central driver of economic growth and competitiveness in the 21st century. For regions like Sub-Saharan Africa, which are striving to diversify their economies and build knowledge-based industries, the link between innovation and intellectual property (IP) protection is increasingly critical. The World Intellectual Property Organisation's (WIPO) Global Innovation Index (GII) 2025 highlights this momentum: 10 Sub-Saharan African economies improved their rankings, with notable achievements such as Namibia leading the world in education spending, Nigeria topping global unicorn valuations, and Rwanda maintaining its position as a consistent "innovation overperformer" (WIPO 2025a; WIPO 2025b).

Yet, progress in innovation does not automatically translate into sustainable growth without adequate mechanisms for licensing and technology transfer. IP law provides the framework through which inventions, creative works, and technological solutions can move from research institutions and startups into broader commercial and social use. The absence of robust IP and licensing frameworks risks underutilising innovation, stifling entrepreneurship, and limiting Africa's ability to compete globally (WIPO 2025b).

By contrast, the United States offers valuable lessons on how statutory clarity in IP ownership, paired with well-designed licensing and technology transfer systems, can stimulate innovation. The Bayh-Dole Act of 1980 fundamentally altered the disposition of federally-funded inventions by allowing universities and small businesses to retain ownership of "subject inventions" (35 U.S.C. § 202(a)), rather than assigning them to the federal government. At the same time, it preserved government "march-in rights" to ensure public access where private parties fail to commercialise inventions (35 U.S.C. § 203). This balance of ownership incentives and public-interest safeguards catalysed the growth of university technology transfer

offices (TTOs), creating pathways for startups, venture capital investment, and industry partnerships (Mowery et al. 2001: 99–100). Programs such as Stanford University’s Office of Technology Licensing further demonstrate how statutory frameworks can serve as a bridge between research and commercialisation.

This paper argues that Sub-Saharan Africa can benefit from adapting lessons from U.S. IP law—particularly licensing and technology transfer mechanisms under the Bayh-Dole framework—while tailoring them to the continent’s institutional, cultural, and economic realities. Drawing on insights from the GII 2025 and comparative perspectives from U.S. practice, it explores how African countries can “bridge” innovation momentum with effective IP frameworks to accelerate sustainable, knowledge-driven development.

2. Background: Innovation & IP Landscape

Sub-Saharan Africa’s recent gains on the Global Innovation Index indicate a growing capacity in education, entrepreneurship, and knowledge creation; however, the drivers and constraints behind these gains vary across countries and sectors. This section sets the stage by (i) summarising the 2025 GII results for selected economies (2.1), (ii) outlining how core IP doctrines and international treaties structure incentives and enforcement (2.2), and (iii) explaining why licensing and technology-transfer mechanisms—together with statutory formalities such as license registration—are decisive for moving from research inputs to marketable outputs (2.3). Read together, these elements provide the legal and policy context required to interpret Africa’s innovation momentum and to identify where institutional reforms will yield the highest returns (WIPO 2025b).

2.1 WIPO GII 2025 Findings for Sub-Saharan Africa

The Global Innovation Index (GII) 2025 provides clear evidence that Sub-Saharan Africa is building momentum in innovation. Ten economies in the region improved their rankings in 2025: Mauritius, South Africa, Seychelles, Botswana, Senegal, Namibia, Nigeria, Rwanda, Malawi, and Lesotho (WIPO 2025b). These advances signal progress in institutional capacity, entrepreneurship, and knowledge creation across diverse national contexts.

Among them, several stand out as case studies:

- **Namibia** advanced 11 places, leading the world in education spending and excelling in public-private research collaboration.
- **Nigeria** became the top-ranked country globally for unicorn strength, reflecting the dynamism of its fintech and digital startup ecosystems.
- **Rwanda** continued its record as Africa's longest-standing "innovation overperformer," consistently achieving outcomes above its development level.
- **Senegal** rose three places, expanding access to microfinance and showing strength in unicorn companies.

These examples demonstrate that Africa's innovation story is no longer about latent potential – it is about measurable progress that demands supportive legal and policy frameworks.

2.2 The Role of Intellectual Property in Innovation Ecosystems

Innovation becomes economically and socially-valuable when it is protected and translated into usable outcomes. IP plays a foundational role in this process:

- **Patents** secure exclusive rights over technological inventions, encouraging investment in R&D and enabling commercialisation. In Namibia, for example, patent rights are conferred under Section 16 of the *Industrial Property Act 2012*, while licensing contracts must be registered under Sections 71–74 to ensure validity and enforceability.
- **Copyrights** protect creative works in music, literature, and film—crucial for Africa's creative industries. Senegal, as a member of OAPI, applies the Bangui Agreement, which incorporates the Berne Convention's protection of exclusive reproduction rights (Berne Convention, Art. 9).
- **Trademarks** safeguard brand identity, helping startups and established firms compete in regional and global markets. Nigeria requires foreign licensing and technology transfer agreements involving trademarks to be registered with the National Office for Technology Acquisition and Promotion (NOTAP Act, Secs. 4, 7).
- **Trade secrets** protect valuable know-how, especially in manufacturing and services (Uniform Trade Secrets Act

1985). While African jurisdictions lack harmonised trade secret legislation, TRIPS Article 39 establishes a baseline obligation for protection against unfair disclosure or misuse.

Internationally, multilateral treaties shape the minimum standards and enforcement mechanisms for these rights. The Paris Convention (Art. 2) guarantees national treatment for foreign rightsholders, TRIPS Articles 27 and 31 establish global rules for patentability and compulsory licensing, and the Berne Convention (Art. 9) provides uniform minimum standards for authors' exclusive rights.

A balanced IP ecosystem, therefore, requires both national statutory implementation and compliance with international treaties to provide incentives for innovators and assurances for investors. Without this dual anchoring, African innovation risks stalling at the stage of knowledge creation, without sufficient pathways for commercialisation.

2.3 Importance of Licensing and Technology Transfer

While IP protection is essential, innovation alone does not automatically create impact. Licensing and technology-transfer mechanisms ensure that knowledge generated within universities, startups, and research laboratories reaches the market and benefits society.

Licensing enables IP holders to grant rights to third parties, typically private firms, which are capable of scaling inventions into commercial products and services. Technology transfer, in turn, connects research institutions with industry through spin-offs, joint ventures, and public-private partnerships (PPPs). In mature innovation ecosystems, these mechanisms serve as the bridge between inputs (education, R&D, entrepreneurship) and outputs (products, startups, and societal solutions). Without them, innovation risks being underutilised, leaving entrepreneurship stifled and economic potential unrealised.

In many African jurisdictions, the validity and enforceability of licensing agreements depend on strict compliance with statutory registration and formal requirements. For example:

- **Namibia:** Under the *Industrial Property Act* 2012, Sections 71–74 require that licensing contracts be registered with the Registrar of Industrial Property to be legally effective. Unregistered licenses are unenforceable in court, which

limits commercialisation when institutions or entrepreneurs fail to complete formal registration.

- **Senegal and other OAPI member states:** The *Bangui Agreement* (Annex I, Art. 33) stipulates that voluntary licenses must be in writing and registered. At the same time, Articles 24–30 authorise compulsory licenses in cases of public interest or abuse of rights. Failure to observe these formalities risks invalidating agreements and undermining investor confidence.

Thus, effective licensing and technology transfer in Africa are not only matters of policy but of legal enforceability. A stronger innovation ecosystem requires both:

1. **Institutional capacity** (technology-transfer offices, contract-management expertise); and
2. **Statutory adherence** (ensuring licenses are duly registered and recognised under national and regional IP laws).

The progress reflected in the Global Innovation Index 2025 underscores the urgency of strengthening not only innovation capacity but also the legal and institutional systems that give innovation economic effect. Bridging scientific creativity with enforceable IP frameworks is the decisive step toward transforming Sub-Saharan Africa’s innovation momentum into sustained development and global competitiveness (WIPO 2025b).

Appendix: Innovation Rankings Data (2020–2025)

This appendix tracks the GII rankings for 10 Sub-Saharan African economies from 2020 to 2025. While Mauritius, South Africa, Botswana, Namibia, Rwanda, Senegal, and Nigeria appear consistently across the dataset, Malawi, Seychelles, and Lesotho enter intermittently.

- **Malawi:** ranked in 2020 and 2021, absent in 2022–2024, re-entered in 2025 (125th).
- **Seychelles and Lesotho:** absent from 2020–2024, entered in 2025 (75th and 132nd, respectively).

These coverage gaps reflect WIPO’s evolving methodology rather than a decline in national performance. They illustrate a broader limitation: longitudinal comparisons of African innovation data must be interpreted cautiously, since ranking shifts may result

from changes in inclusion criteria as much as from underlying improvements in innovation capacity.

Figure 1: GII Rankings for Selected Sub-Saharan African Economies, 2020–2025

Country	2020	2021	2022	2023	2024	2025
Mauritius	52	52	45	58	56	74
South Africa	60	61	61	59	70	60
Botswana	92	104	85	84	85	88
Namibia	93	107	97	98	99	90
Rwanda	94	96	95	95	96	91
Senegal	101	100	97	93	101	95
Nigeria	114	115	111	108	113	97
Malawi	111	109	N/A	N/A	N/A	125
Seychelles	N/A	N/A	N/A	N/A	N/A	75
Lesotho	N/A	N/A	N/A	N/A	N/A	132

Source: WIPO (2025b), *Global Innovation Index 2025: The Human Factor in Innovation*.

Legal Relevance

This methodological note highlights why policy and legal reforms — such as the adoption of enforceable licensing regimes and the institutionalisation of TTOs — should be evaluated in parallel with GII metrics.

Understanding whether observed changes in innovation performance stem from substantive institutional improvements or merely expanded inclusion rules is crucial for drawing accurate policy conclusions. This distinction enables IP policymakers, researchers, and regional organisations (e.g., ARIPO and OAPI) to design legal frameworks that reinforce—not merely reflect—measurable progress in innovation.

3. The U.S. Model (Stanford Insights)

The United States provides a paradigmatic example of how IP law — anchored in statutory clarity and institutional mechanisms — can transform publicly-funded research into sustained economic and societal value. At the center of this transformation lies the Bayh-Dole Act of 1980, a statute that codified ownership, disclosure, and licensing rules for federally-funded inventions and established the foundations of modern technology-transfer governance.

3.1 Bayh-Dole Act (35 U.S.C. §§ 200–212)

Before 1980, inventions developed under federal research grants generally defaulted to government ownership, resulting in fragmented patent administration and low commercialisation rates. The Bayh-Dole Act addressed these inefficiencies by creating a uniform and legally enforceable framework that balanced private incentives with public accountability.

Section 202(a) authorises universities, small businesses, and nonprofit institutions receiving federal research funding to “elect to retain title to any subject invention.” This statutory election right vested ownership directly in research performers, replacing inconsistent agency waiver practices with a general rule of institutional ownership. The result was a predictable chain of titles that universities could protect, license, or assign — forming the basis of modern university patent portfolios.

Section 202(c) imposes conditions on this ownership: the institution must (1) disclose inventions to the funding agency, (2) file patent applications within prescribed deadlines, and (3) grant the U.S. government a non-exclusive, royalty-free license for governmental purposes. These statutory safeguards embody Congress’s intent to secure public benefit while enabling private-

sector commercialisation – an equilibrium between exclusivity and accountability.

Section 203, the *march-in rights* provision, empowers the federal government to compel additional licensing if the contractor or its licensee fails to achieve “practical application,” or where public health, safety, or national needs are not reasonably satisfied. Although rarely invoked, § 203 serves as a latent public-interest mechanism ensuring that exclusive rights do not obstruct access to socially essential technologies.

Collectively, §§ 202–203 established a dual-incentive system: universities gain proprietary control and commercial motivation, while the government retains a residual regulatory check. Jurisprudentially, Bayh–Dole replaced administrative discretion with statutory certainty – transforming IP from a bureaucratic byproduct into a legally tradable innovation asset (Mowery et al. 2001: 99–100).

3.2 University Technology Transfer Offices (TTOs)

The Bayh–Dole Act’s transparent allocation of ownership created the need for institutional capacity to manage and commercialise those rights. In response, universities established TTOs to assume the legal and commercial functions once handled by federal agencies – such as patent filing, licensing negotiation, compliance monitoring, and disclosure under § 202(c).

Stanford University’s Office of Technology Licensing (OTL), founded in 1970, predates Bayh–Dole but has since become its archetype. The OTL’s administration of the Cohen–Boyer recombinant-DNA patents demonstrated that structured licensing could reconcile research openness with proprietary control. The university granted numerous non-exclusive licenses under transparent royalty terms, generating over USD 250 million while catalysing the biotechnology industry (Hughes 2001: 541–43).

Legally, this model operationalises § 202(a): universities, as statutory titleholders, act as licensors under private law while fulfilling public obligations under § 202(c). It also exemplifies institutional due diligence – internal governance systems that ensure patents are maintained, licenses registered, and reporting obligations satisfied.

In this sense, TTOs function as the compliance arm of Bayh-Dole, translating statutory mandates into enforceable private contracts and institutional accountability.

3.3 Licensing Practices and Legal Structure

Licensing serves as the doctrinal bridge between ownership and exploitation—a private-law mechanism that gives effect to the statutory rights conferred by § 202(a). U.S. universities have developed diverse licensing architectures:

- Exclusive licenses (common in pharmaceuticals, advanced materials, and medical devices) provide investors the exclusivity required to justify high-risk R&D, consistent with Bayh-Dole’s objective of achieving “practical application.”
- Non-exclusive licenses (often for software, data, or research tools) facilitate diffusion and cumulative innovation, aligning with § 200’s policy goal of fostering broad utilisation of inventions.
- Field-limited or humanitarian licenses balance revenue generation with equitable access—a contractual analogue to § 203’s march-in safeguards.

Financially, these contracts typically combine up-front fees, milestone payments, running royalties, and occasionally equity stakes in spin-off companies. Such equity participation aligns institutional and entrepreneurial incentives and is now regarded as a standard feature of university practice (Eisenberg 1996: 1671–72; Siegel, Waldman & Link 2003: 30–33).

Legally, the enforceability of university licensing agreements rests on traditional contract-law principles—consideration, capacity, and compliance—alongside federal disclosure obligations. The AUTM licensing guidelines and standard-form agreements that emerged after Bayh-Dole have created a quasi-regulatory environment, ensuring transparency, uniform royalty structures, and consistent reporting.

3.4 Implications for Start-ups and Venture Capital

The statutory clarity established by Bayh-Dole transformed IP into bankable collateral. Start-ups founded on university IP benefit from defined ownership and a clean chain of title, reducing due diligence risk for venture capital investors.

This dynamic is most visible in Silicon Valley, where the interplay between Stanford's licensing practices, entrepreneurial faculty, and venture networks illustrates how law and policy can enable the formation of a self-sustaining innovation ecosystem (Shane 2004: 46–50).

From a legal-economic perspective, Bayh–Dole's combination of statutory ownership (§ 202), public-interest oversight (§ 203), and private-contract enforcement has produced an innovation infrastructure – a system in which IP rights are not merely protective but constitutive of economic organisation.

Although contemporary debates now focus on access, equity, and benefit-sharing, the Act remains a cornerstone of comparative innovation law. For Sub-Saharan Africa, the lesson is both jurisprudential and practical: that statutory certainty in IP ownership and licensing, combined with institutional compliance mechanisms, can convert research potential into sustainable economic development.

4. Africa's Position: WIPO Data and Legal Case Studies

The GII 2025 confirms that innovation in Africa is no longer aspirational but empirically measurable. Ten Sub-Saharan African economies improved or entered the global rankings, with Namibia, Nigeria, Rwanda, and Senegal providing particularly instructive examples of how legal frameworks mediate the transition from research activity to economic performance (WIPO 2025b).

Although these countries differ institutionally, they share a common policy tension: strong innovation inputs—such as education, entrepreneurship, and digital infrastructure—must be matched by robust legal mechanisms for ownership, licensing, and enforcement if innovation is to translate into tangible market value.

4.1 Namibia: Education Investment and Research Commercialisation

Namibia advanced eleven places in 2025, ranking first worldwide

in education expenditure and performing strongly in university-industry collaboration and international co-publications (WIPO 2025b: 170–72). However, the translation of this human capital investment into commercial outcomes depends on the effective application of the Industrial Property Act 2012.

- Section 16 defines the exclusive rights conferred by a patent, granting the owner the right to prevent unauthorised exploitation for 20 years.
- Sections 71–74 regulate licensing contracts, imposing requirements of written form and registration with the Registrar to ensure validity against third parties.
- Failure to register a license under §72 renders it unenforceable, limiting both private contracting capacity and the ability of universities to monetise inventions.

Thus, while Namibia’s education system produces significant research potential, the legal infrastructure for technology transfer remains under-institutionalised. Establishing TTOs to manage compliance with §§ 71–74 would operationalise the statutory framework, transforming research outputs into enforceable IP assets and integrating academic innovation into national industry.

4.2 Nigeria: Unicorn Strength and Global IP Expansion

Nigeria leads globally in unicorn valuation and fintech dynamism (WIPO 2025b: 178–80), yet legal bottlenecks continue to constrain cross-border scalability. The governing statute – the National Office for Technology Acquisition and Promotion (NOTAP) Act, Cap N62 LFN 2004 (original 1979; amended 1992) – conditions the validity of all foreign technology-transfer or licensing contracts on registration with NOTAP.

- Section 4 mandates that “every contract or agreement for the transfer of foreign technology” be submitted for registration and approval.
- Section 7 authorises NOTAP to refuse registration if contractual terms are “inconsistent with the national interest,” granting the regulator broad discretion to reject royalty rates or territorial limitations.

This dual-control model safeguards Nigeria against exploitative transfers but can inadvertently slow high-tech partnerships that depend on rapid global integration. For fast-growing startups such

as Flutterwave or Interswitch, non-compliance with § 4 may render outbound licensing unenforceable, while prolonged approval timelines deter foreign investors.

Potential reform options include:

1. Establishing procedural time limits for NOTAP registration to enhance predictability;
2. Introducing risk-based exemptions for university spin-offs and SMEs to encourage innovation; and
3. Aligning registration criteria with TRIPS Article 27 (non-discrimination in patent rights) to increase legal certainty and investor confidence.

Such reforms would preserve Nigeria's public-interest safeguards while fostering a more efficient and innovation-friendly regulatory environment for technology transfer and foreign direct investment.

4.3 Rwanda: Policy Consistency and IP Infrastructure

Rwanda remains Africa's most consistent "innovation over-performer," maintaining this status for thirteen consecutive years (WIPO, 2025b, pp. 185–87). Law No. 31/2009 on the Protection of IP, as amended in 2018, provides a comprehensive licensing framework that integrates provisions for patents, utility models, and compulsory licensing.

- Article 5 defines protectable subject matter, establishing the statutory threshold for patent and utility-model protection.
- Articles 111–117 regulate voluntary and compulsory licensing, detailing formalities for written agreements, registration procedures, and the government's authority to issue compulsory licenses in the public interest.

Despite this sound legislative foundation, most Rwandan universities lack TTOs capable of implementing Articles 111–117. The gap lies not in legislative content but in institutional execution. To sustain its record of innovation over-performance, Rwanda must translate statutory provisions into administrative practice—mirroring Bayh–Dole's § 202(c) disclosure and reporting framework. Linking innovation policy with enforceable IP governance would ensure that research outputs are legally protected, licensed, and integrated into the national innovation ecosystem.

4.4 Senegal: Microfinance and Grassroots IP Protection

Senegal advanced three places in 2025 and ranks among the world's top 10 economies for microfinance lending and foreign direct investment inflows (WIPO 2025b: 160–62). As a member of the Organisation Africaine de la Propriété Intellectuelle (OAPI), Senegal's IP regime operates under the Bangui Agreement, which establishes a unified regional system.

- Annex I, Article 33 requires that voluntary licenses be in writing and registered with OAPI to be effective against third parties.
- Articles 24–30 authorise compulsory licenses where a patent is insufficiently exploited or required for public health or national security.

These provisions create a clear statutory pathway for grassroots innovators—including artisans, agricultural cooperatives, and local SMEs—to obtain enforceable IP rights. However, awareness and access remain limited: few micro-enterprises understand the necessity of written and registered licenses under Article 33, leaving community innovations unprotected. Integrating IP literacy components into microfinance programs could operationalise these existing OAPI rules, aligning small-scale innovation with regional IP law and enhancing participation in formal licensing systems.

4.5 Structural Challenges and Treaty Alignment

Despite notable progress, Africa's innovation governance still faces systemic fragmentation:

- Licensing enforceability frequently depends on formal registration (e.g., Namibia § 72; Bangui Art. 33), but procedures vary across jurisdictions.
- Cross-border recognition of IP rights remains inconsistent, discouraging regional investment and technology exchange.
- Limited awareness of treaty obligations—particularly under the TRIPS Agreement (Arts. 27 & 31) and the Paris Convention (Art. 2)—weakens compliance and undermines investor confidence.

A coordinated response should leverage ARIPO and OAPI to harmonise procedural standards, develop model license templates, and maintain shared databases. Such coordination would ensure that compulsory licensing provisions remain consistent with TRIPS

Article 31 safeguards and that the Paris Article 2 national treatment obligation is fully observed.

Comparative Legal Insight

Across all four jurisdictions, a common pattern emerges: statutory formalism without institutional integration. Each state has enacted licensing or registration clauses that, if operationalised, could replicate the functional equilibrium achieved under Bayh–Dole §§ 202–203 – balancing:

1. Ownership certainty,
2. Public-interest oversight, and
3. Commercialisation pathways.

The next phase for African innovation law is not further legislative drafting but institutional embedding: establishing TTOs, digitised registries, and judicial capacity to interpret and enforce these laws consistently within regional and multilateral frameworks.

5. Bridging the Gap: Comparative Insights

The comparative examination of the United States and African innovation systems demonstrates how legal design—rather than purely economic capacity—determines whether research outputs become market assets. IP law, when embedded within enforceable licensing and disclosure structures, converts invention into investment. Yet, direct transplantation of the U.S. model, shaped by a mature institutional ecosystem, is neither feasible nor desirable. Instead, the task for Africa is legal adaptation: aligning national statutes and regional frameworks with the principles that made the Bayh–Dole regime successful while preserving local policy autonomy.

5.1 Lessons from U.S. IP Law

The Bayh–Dole Act of 1980 (35 U.S.C. §§ 200–212) transformed U.S. innovation policy by granting universities and nonprofit institutions title to inventions arising from federally funded research (§ 202(a)). This ownership rule created a predictable allocation of rights, enabling universities to patent and license technologies with confidence.

Simultaneously, Congress preserved a public-interest safety valve through § 203, the “march-in rights” clause, which allows the government to require additional licensing if the invention is not made available on reasonable terms or is needed to meet health, safety, or national security objectives. The coexistence of these two provisions—private ownership and public oversight—illustrates a dual-function innovation model: it stimulates commercialisation while ensuring that exclusive rights remain subordinate to societal interests.

For African jurisdictions, the legal lesson is clear: certainty of ownership, combined with conditional accountability, is the cornerstone of effective technology-transfer law. Such a balance attracts investors, empowers universities, and legitimises the outcomes of public funding.

5.2 Limits of Direct Transplantation

Despite its normative appeal, the Bayh–Dole framework cannot be simply replicated in Sub-Saharan Africa. As Okediji (2003: 330–34) observes, IP reform in developing countries must take account of structural asymmetries in research financing, administrative capacity, and market integration.

Most African universities lack TTOs with the authority or expertise to negotiate, register, and enforce licensing contracts. Even where such offices exist, resource constraints and limited access to venture capital inhibit their effectiveness (AUTM, 2023).

Moreover, U.S. innovation law operates within a dense network of complementary institutions—federal granting agencies, patent law jurisprudence, venture capital ecosystems, and specialised IP courts—that cannot be replicated overnight. Transplanting statutory text without corresponding institutional adaptation risks creating “paper compliance”: laws that replicate Bayh–Dole’s language but fail to deliver its substantive outcomes.

Accordingly, reform in Africa must proceed by functional analogy, not verbatim duplication—adopting the underlying principles of Bayh–Dole while aligning them with domestic legal and economic realities.

5.3 Opportunities for Hybrid Approaches

A pragmatic strategy for African jurisdictions is to pair Bayh–Dole–style clarity of ownership with existing statutory mechanisms, using them as anchors for a hybrid regional framework.

- **South Africa** – IP Rights from Publicly Financed Research and Development Act 51 of 2008
 - o Section 4 vests ownership of publicly funded IP in the research institution, ensuring institutional title akin to 35 U.S.C. § 202(a).
 - o Section 7 mandates disclosure of inventions to the National IP Management Office (NIPMO), creating a domestic analogue to Bayh–Dole’s federal reporting obligations.
Effective implementation of § 7 through standardised disclosure forms and NIPMO oversight could strengthen accountability while preserving national sovereignty.
- **Nigeria** – NOTAP Act (Cap N62 LFN 2004, §§ 4 & 7) Requires registration and approval of foreign technology-transfer agreements. Streamlining registration timelines and adopting objective refusal criteria would align the Act with TRIPS Article 27’s non-discrimination rule, while preserving public-interest control analogous to the Bayh–Dole Act’s Section 203.
- **Rwanda** – Law No. 31/2009 on the Protection of IP (as amended 2018, Arts. 111–117). Regulates voluntary and compulsory licensing but remains underutilised. Embedding standardised TTO templates that operationalise these provisions would create a disclosure–licensing pipeline like Bayh–Dole’s institutional model.
- **Senegal/OAPI** – Bangui Agreement (Annex I, Arts. 24–30, 33) Requires written and registered licenses and authorises compulsory licenses in the public interest. Simplifying registration under Article 33 and integrating pro-development clauses (e.g., humanitarian access) would adapt Bayh–Dole’s § 203 public-interest safeguard to regional realities.
- **Namibia** – Industrial Property Act 2012 (Secs. 71–74) Mandates registration of licensing contracts for enforceability. Institutionalising compliance through university-level TTOs trained in contract drafting would prevent unregistered – and thus unenforceable – agreements, enhancing transparency and legal certainty.

At the regional level, ARIPO and OAPI could consolidate these efforts by:

1. Developing model license clauses and cross-border registries;
2. Establishing standard disclosure formats; and
3. Ensuring harmonisation with TRIPS Article 31 (conditions for compulsory licensing) and Paris Convention Article 2 (national treatment).

Such coordination would promote legal predictability, facilitating investment and technology transfer across national boundaries.

5.4 Normative Implication

Comparative analysis demonstrates that legal architecture—not policy rhetoric—determines the outcomes of innovation. African legislators need not replicate Bayh–Dole’s wording; they must internalise its logic:

1. Assign ownership clearly.
2. Mandate disclosure and registration.
3. Retain a public-interest override.
4. Institutionalise enforcement through TTOs and regional coordination.

By synthesising U.S. statutory mechanisms (§§ 202–203) with African provisions (South Africa §§ 4–7; Nigeria §§ 4–7; Rwanda Arts. 111–117; OAPI Annex I; Namibia §§ 71–74) and aligning them with TRIPS and Paris obligations, Africa can establish a home-grown “Bayh–Dole 2.0.”

Such a framework would bridge innovation capacity with enforceable commercialisation rights, encouraging countries across the continent to strengthen their institutional IP systems, harmonise regional governance, and convert innovation momentum into durable prosperity.

6. Policy Recommendations

The comparative legal analysis confirms that Africa’s innovation potential will remain under-realised unless licensing and technology-transfer frameworks are grounded in enforceable

statutory and institutional mechanisms. Drawing from both the U.S. Bayh-Dole framework and African IP statutes, this section translates those lessons into concrete legal and policy measures.

6.1 Establish and Fund University TTOs

Universities across Africa should be legally required to adopt institutional IP policies that ensure ownership certainty over publicly-funded research, mirroring the principles of the U.S. Bayh-Dole Act while remaining consistent with domestic law.

- In South Africa, Section 4 of the IP Rights from Publicly-Financed Research and Development Act (2008) vests ownership in the institution.
- In Namibia, Sections 71-74 of the Industrial Property Act (2012) mandate the registration of licensing contracts for validity.

Implementing similar mandates region-wide would harmonise title, disclosure, and registration practices. Governments, regional bodies, and donors should also allocate dedicated funding and professional training to ensure the operational sustainability of university TTOs.

6.2 Incentivise Public-Private Research Partnerships

Governments should link tax incentives and research grants to the disclosure of inventions and the use of standardised license clauses consistent with national and regional IP frameworks.

- Section 7 of South Africa's IPR Act requires disclosure of inventions to the National IP Management Office (NIPMO).
- Article 33 of the Bangui Agreement (Annex I) requires that all voluntary licenses be written and registered.

Conditioning public funding on compliance with such provisions would improve transparency, institutional accountability, and the reliability of technology-transfer agreements.

6.3 Develop Regional Licensing Frameworks

Africa's fragmented IP markets demand harmonised licensing standards, coordinated through regional organisations such as ARIPO and OAPI. These bodies could:

1. Issue model license templates and standard contractual clauses;
2. Maintain a cross-border license registry; and
3. Provide guidance on TRIPS-compliant public-interest use under Article 31.

Embedding these tools within a regional legal framework would facilitate mutual recognition of registered licenses and enhance investor confidence. Moreover, adherence to Paris Convention Article 2 (national treatment) would ensure equitable cross-border access to IP-protected technologies.

6.4 Encourage Open and Field-Limited Licensing Models

Open innovation should complement exclusivity by promoting knowledge diffusion in socially significant sectors such as software, agriculture, and public health. Governments can adopt non-exclusive or field-limited licensing schemes that include humanitarian-use clauses, ensuring registration where required by law (e.g., Bangui Agreement Annex I, Art. 33; Namibia Industrial Property Act §§ 71–74).

As Eisenberg (1996: 1671–72) notes, such flexible licensing frameworks balance private incentives with public benefit, expanding access without undermining commercialisation.

6.5 Build IP and Licensing Capacity Among Entrepreneurs

IP and licensing literacy must extend beyond academic and research institutions. Targeted training programs – covering:

- NOTAP registration requirements in Nigeria (§ 4 of the NOTAP Act),
- OAPI licensing formalities (Annex I, Art. 33), and royalty or equity structuring for SMEs – are essential to ensure contract enforceability and market readiness.

WIPO's Capacity-Building Platform could be expanded to support regional training hubs, integrating modules on contract drafting, technology valuation, and ADR mechanisms through the WIPO Arbitration and Mediation Center.

Together, these measures form the foundation of a Regional Innovation Compact that unites ownership certainty, transparent licensing, and public-interest safeguards. Embedding these mechanisms within both national and regional IP systems would enable African states to transform their growing innovation momentum into a legally protected, investment-ready innovation economy.

7. Conclusion

The GII 2025 confirms that innovation in Africa is no longer an aspiration but a measurable and accelerating reality. Ten Sub-Saharan African economies improved their rankings, signaling notable progress in education investment, digital entrepreneurship, and policy coherence. Yet innovation, without a corresponding legal and institutional framework, remains an incomplete story. Absent effective systems for licensing and technology transfer, much of Africa's intellectual output risks remaining under-exploited — confined to universities, research institutes, or emerging start-ups rather than driving national development.

The United States' experience — particularly the implementation of the Bayh–Dole Act of 1980 and the institutionalisation of university TTOs — demonstrates how IP law can function as an enabling infrastructure for commercialisation, venture-capital formation, and the growth of regional innovation clusters. However, the Bayh–Dole model cannot be imported wholesale into African jurisdictions; it must instead be adapted within the continent's existing statutory and economic contexts.

For Africa, the central challenge lies in embedding legal certainty and regional coordination within its innovation ecosystem. Statutory provisions already in force — such as Namibia's Industrial Property Act 2012 (§§ 71–74), Nigeria's NOTAP Act (§§ 4, 7), South Africa's IP Rights from Publicly Financed Research and Development Act 2008 (§§ 4, 7), Rwanda's Law on the Protection of IP (as amended 2018, Arts. 111–117), and the Bangui Agreement (OAPI Annex I, Arts. 24–33) — provide a solid foundation upon which governments, universities, and industry can build enforceable licensing and technology-transfer practices.

A legally-grounded and regionally-coordinated approach—implementing these existing statutory licensing provisions alongside Bayh–Dole-style clarity on ownership—offers the most direct path to converting Africa’s innovation momentum into durable prosperity. If reinforced by sustained investment in institutional capacity, harmonisation through ARIPO and OAPI, and a deliberate balance between exclusivity and accessibility, such a framework could transform Africa’s innovation surge into a lasting engine of economic growth, social inclusion, and technological self-reliance (WIPO 2025a; WIPO 2025b).

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INTELLECTUAL PROPERTY FINANCING IN LEADING GLOBAL MARKETS: A SYSTEMATIC LITERATURE REVIEW OF BEST PRACTICES AND IMPLICATIONS FOR DEVELOPING FINANCIAL SYSTEMS

Onisimous Mumba
Maboure Tendai Joseph
Chinhoyi University of Technology, Zimbabwe

Mbizi Rangarirai
Zimbabwe Open University, Zimbabwe

Abstract

Intellectual Property (IP) financing has emerged as a strategic mechanism for unlocking credit for innovative asset-light SMEs, and this review synthesises global best practices while deriving implications for developing financial systems, with particular reference to Zimbabwe. Four objectives guide the review: to identify dominant critical success factors enabling sustainable IP financing markets; to analyse institutional, legal and valuation mechanisms that distinguish best-practice ecosystems; to assess governance and risk-management conditions mediating the link between judicial IP protection and IP-backed lending; and to translate synthesised evidence into actionable policy lessons for Zimbabwe. Following the PRISMA-ScR checklist, 21 peer-reviewed articles and two World Intellectual Property Organisation (WIPO) reports published between January 2024 and February 2026 were identified across Google Scholar (198 records), ScienceDirect (18 records) and Taylor & Francis (4 records) using a Boolean search string, and narrative synthesis organised findings around four research questions. Findings: judicial protection of IP rights and credible enforcement dominate as critical success factors; technical and legal patent quality governs the volume, maturity and pricing of IP-collateralised loans; government guarantees and subsidies materially expand IP-backed credit supply by shifting risk from private to public agents; mature corporate governance moderates the financing-efficiency disadvantage of asset-light IP-dependent firms; statutory regimes with IP-specific implementation generate measurably deeper IP-

backed credit markets than general movable-collateral statutes alone. This review recommends specialised IP courts, online IP registries, dedicated loan instruments, recapitalising distressed-asset resolution vehicles such as the Zimbabwe Asset Management Company, and integrating IP commercialisation in the Education 5.0 framework.

Keywords

IP collateralisation; judicial protection; patent pledging; PRISMA-ScR; UNCITRAL; resource-based view.

1. Introduction

1.1 Background and Purpose of the Review

IP financing is the practice of pledging patents, trademarks, copyrights and utility models as collateral security to obtain credit from the banking sector (Basu, 2025; Wang, 2025; Yu et al., 2025). It has become a defining feature of innovative financial systems in leading global markets, converting intangible innovation assets into bankable collateral and providing the most convenient source of financing for technology-driven startups and innovative small and medium enterprises (Dong & Li, 2025; Zhao et al., 2025). The purpose of this systematic review is to consolidate fragmented global evidence on best practices in IP financing and to derive actionable lessons for developing financial systems, particularly Zimbabwe.

The scale of the practice justifies this review. The WIPO reports that intangible-asset financing expanded by more than 1,300% over the past two and a half decades to USD 80 trillion in 2020. Intangible assets now account for more than 90% of brand value among S&P 500 corporates, equivalent to USD 13 trillion. Despite this scale, intangible assets remain largely unrecognised in conventional credit assessment in developing economies, even though SMEs account for roughly 90% of global businesses and 50% of global employment (Lohrey & Willoughby, 2025; WIPO, 2025).

1.2 Problem Statement

Financial markets in developing economies operate within distinct ecosystems that make the transfer of best practices from leading IP financing markets difficult. The empirical problem motivating this review is the persistent exclusion of innovative, IP-rich but asset-light SMEs from formal credit because their primary form of capital is intangible. The constraint has four reinforcing components:

1. **Valuation challenges.** Intangibles are characterised by exclusivity, embeddedness and uncertain reproduction costs, complicating banker pricing (Basu, 2025; Heller et al., 2024; Yu et al., 2025).
2. **Weak collateral liquidity.** Absent secondary markets for IP rights reduce financier confidence that collateral can be liquidated at fair value in default.
3. **Weak institutional support and corporate governance.** Insufficient risk-management frameworks tailored to IP financing expose lenders to moral hazard (Li, 2025; Li et al., 2025a).
4. **Weak judicial protection.** Without credible enforcement architecture, lenders cannot lawfully realise IP collateral in default (Gill & Heller, 2024; Li & Pei, 2024).

The combined effect is that financiers in developing economies default to immovable-property collateral requirements, excluding IP-rich asset-light SMEs from the formal credit market. This review directly addresses that gap.

1.3 Research Questions

- **RQ1.** What are the dominant critical success factors that enable sustainable IP financing markets in leading global economies?
- **RQ2.** What institutional, legal and valuation mechanisms distinguish best-practice IP financing ecosystems from those in developing economies?
- **RQ3.** What risk-management and corporate-governance conditions mediate the relationship between judicial IP protection and the volume of IP-backed lending?
- **RQ4.** What lessons can developing financial systems, particularly Zimbabwe, derive from leading IP financing markets?

1.4 Contributions

This review contributes in four ways. Firstly, it consolidates fragmented empirical evidence using a transparent, replicable PRISMA-ScR protocol. Secondly, it broadens the literature beyond Asia to cover the United States, the European Union and selected emerging economies. Thirdly, it integrates the resource-based view with judicial-protection theory into a coherent resource-enforceability model of banker acceptance of IP as collateral. Lastly, it translates synthesised evidence into actionable recommendations tailored to Zimbabwe's financial system and Education 5.0 innovation framework.

2. Conceptual Framework and Literature Review

2.1 Conceptual Boundaries

IP financing denotes any debt, equity-linked or securitisation arrangement in which IP rights are pledged, assigned or securitised as collateral (Basu, 2025; Heller et al., 2024; WIPO, 2023). The review focuses on three commercial structures: (a) patent pledging; (b) IP-backed securitisation; and (c) IP-backed minibonds and corporate bonds. Heller et al. (2024) classify determinants of IP use as collateral along two pillars: institutional determinants (contract law, IP registries, banking regulations) and economic determinants (characteristics of the IP resource and the cost-benefit trade-off of pledging).

2.2 Theoretical Framework

2.2.1 The Resource-Based View (RBV) of the Firm

The RBV posits that sustained competitive advantage arises from the possession of resources that are valuable, rare, inimitable and non-substitutable. Hudson and Morgan (2025) argue that properly protected IP exhibits inimitability and rarity and therefore generates strategic value. The RBV is necessary but insufficient to explain bankability. It accounts for the resource-side characteristics of IP but not the enforceability of the lender's claim.

2.2.2 Judicial Protection Theory

Judicial protection theory concerns the courts and tribunals to which financiers can resort for redress in borrower default (Han

et al., 2026; Li & Pei, 2024). Gill and Heller (2024) demonstrate that harmonised IP enforcement regimes in the European Union reduce the cost of debt for IP-rich firms. Wu and Liu (2025) trace the productivity gains of dedicated IP tribunals to improvements in total factor productivity, particularly in the Chinese pharmaceutical sector. Tong and Wang (2026) document that dedicated IP courts in China have catalysed the growth of multinational financial supply chains.

2.2.3 The Integrated Resource–Enforceability Model

Integrating the RBV (Barney, 1991; Hudson & Morgan, 2024) with judicial protection theory (Gill & Heller, 2024; Han et al., 2026; Tong & Wang, 2026; Wu & Liu, 2025), the review proposes the resource–enforceability model: the bankability of IP is the joint product of (a) the resource-based characteristics of the IP and (b) the enforceability of the lender’s claim through specialised or harmonised judicial institutions. The model accommodates the duality documented by Abdin et al., (2024)

2.3 Global IP Financing Markets

2.3.1 People’s Republic of China

China is the world’s dominant IP financing market. In 2023 alone, the value of trademarks and patents pledged reached CNY 850 billion, benefiting 37,000 businesses; 119 IP-backed securitisation products totalled CNY 26.8 billion; and the IP insurance market covered more than CNY 130 billion. Best practice evidence from China centres on five pillars: (i) dedicated IP courts since 2014, with quasi-natural-experiment evidence on multinational financial supply chains (Tong & Wang, 2026; Wu & Liu, (2025); (ii) judicial protection raising SME innovation efficiency in digital-finance ecosystems; (iii) the patent pledge pilot, a quasi-natural experiment showing reductions in financing constraints and increases in risk-taking; (iv) government subsidy and credit-guarantee channels that channel public funds into private IP-backed credit; and (v) quasi-natural evidence that patent-collateral policy expands bank loans to innovative startups by improving exploratory innovation.

Yu et al. (2025) demonstrate that the technical and legal quality of the patent governs financier acceptance, with higher-quality patents attracting larger loan amounts, longer maturities and lower interest rates. Dai et al. (2021) corroborate that corporate patenting enhances credit access for urban-headquartered firms.

2.3.2 United States of America

The United States is the oldest IP-collateral market globally. The cornerstone is Article 9 of the Uniform Commercial Code, adopted by all 50 states. UCC Article 9 treats IP rights as “general intangibles” and provides for perfection of security interests by filing a UCC-1 financing statement (Brennan, 2000; Boyce Gibson, 2015; Odinet, 2017; Xie, 2012). Brennan (2000) argues that while Article 9 is the most likely framework for IP-collateral transactions, the interaction between federal and state law creates complexity that the Article 9 regime cannot fully resolve. Federal pre-emption doctrine (the *Arkansas Radio* lineage) limits state perfection rules against federal registration in the USPTO, creating ambiguity about whether perfection should occur at the USPTO or under state UCC filing (Brennan, 2000; Boyce Gibson, 2015). Xie (2012) documents that the US system remains the most mature globally and serves as a comparative benchmark for Chinese reform efforts. Heller et al. (2024) classify the United States, along with Germany, as exemplifying an efficient institutional environment for IP collateralisation.

2.3.3 European Union and Continental Europe

Best practices in the European Union vary by jurisdiction but share harmonised enforcement. In the United Kingdom, IP rights are treated as intangible wealth and may be pledged through legal mortgages, fixed charges, and floating charges under the Companies Act 2006 and the Law of Property Act 1925; the pledgee may sell the patents or appoint an administrator on default (Nikitenko & Mesyats, 2017; Talisa & Badriyah, 2023). In **France**, IP rights may be pledged under civil-law pledge mechanisms. In **Germany**, registered IP (patents, trademarks) takes precedence over unregistered IP (copyrights); securitisation takes two forms—a *Pfand* (pledge) and a *Sicherungsabtretung* (trust security / transfer of title for security purposes). In **Poland**, Żelechowski (2009) analyses the doctrinal framework for patent and trademark securitisation with reference to the UNCITRAL Legislative Guide

on Secured Transactions. At the **European Union** level, formalities for creating a pledge over formal IP rights are harmonised: public registers operate a priority system granting first-applicant priority; the IP itself remains vested in the borrower; and formalities are comparable to those traditionally applied to immovable property. Gill and Heller (2024) demonstrate empirically that firms operating under harmonised IP enforcement regimes access debt financing at materially lower interest rates than unprotected firms. The pan-European normative anchor is the UNCITRAL Legislative Guide on Secured Transactions and its *Supplement on Security Rights in Intellectual Property*, which identifies four required elements: (a) integration within a comprehensive movable-assets regime; (b) recognition that future IP can become security; (c) priority rules for acquisition financiers; and (d) conflict-of-laws rules.

2.3.4 Russia and Other Emerging Markets

In Russia, the practice of IP pledging is at an early stage, with the binding constraint being valuation difficulty (Nikitenko et al., 2017; Nikitenko & Mesyats, 2017). In Indonesia, Talisa and Badriyah (2023) document that IP rights can serve as objects of fiduciary guarantee for creative-economy entrepreneurs.

2.3.5 Sub-Saharan Africa and Other Developing Economies

In **South Africa**, Amusa (2024) documents that the statutory and doctrinal framework for IP-as-security exists but valuation remains the binding constraint. In **Namibia**, Gebhardt and Plessis (2023) identify institutional barriers to IP commercialisation under the Swakopmund Protocol. In **Zimbabwe**, Chimombe (2020) documents barriers to IP financing arising from valuation opacity, weak secondary markets and underdeveloped judicial enforcement. In **Egypt**, Saadi et al. (2024) establish, using logistic regression on 3,025 firms from the World Bank Enterprise Survey, that access to bank credit raises the probability of firm innovation by 67%. In **Nigeria**, Oke (2019) outlines the legal foundations for IP-backed finance under the Secured Transactions in Movable Assets Act 2017. In **Kenya**, Nakhungu (2016) examines copyright collateralisation and concludes that Kenyan law is not adequate for systematic adoption. In **Tanzania**, Kimela (2025) proposes a structured IP-securitisation model requiring harmonisation across IP law, financial regulation, corporate law, insolvency rules and capital-market standards. In **India and other developing economies**, Verma (2006) argues that IP

is treated as part of the corporate portfolio in developed economies but that the practice is less prevalent in developing countries owing to financial constraints and weak IP portfolios.

In Eastern Europe and Central Asia, Abdin et al., (2024) surveying 21,860 firms across 27 transition economies, find that strong IP protection can be detrimental to process innovation in industries with limited capabilities, while remaining strategically beneficial for R&D-intensive activity-implying that wholesale transplantation of best practices is hazardous and policy calibration is essential.

2.4 Legal Regimes Governing IP Securitisation - Comparative Synthesis

Table 1: Legal Regimes Governing IP Securitisation - Comparative Synthesis

Jurisdiction	Statutory anchor(s)	Available mechanism	Documented evidence
United States	UCC Article 9 (state); federal IP statutes	UCC-1 perfection by security agreement; centralised USPTO filing proposal	Federal-state pre-emption ambiguity (Brennan, 2000; Boyce Gibson, 2015; Odinet, 2017; Xie, 2012)
United Kingdom	Companies Act 2006; Law of Property Act 1925	Legal mortgage; fixed/floating charge	Pledgee may sell patents or appoint administrator (Nikitenko & Mesyats, 2017; Talisa & Badriyah, 2023)
France	Code de la propriété intellectuelle; Civil Code	Civil-law pledge over intangibles	Pledging under general civil-law framework
Germany	Patentgesetz; Markengesetz; Civil Code	Pledge (<i>Pfand</i>) and trust security (<i>Sicherungsabtretung</i>)	Registered IP takes precedence over unregistered

Poland	Industrial Property Law; UNCITRAL-aligned amendments	Pledge; securitisation	Doctrinal framework aligned with UNCITRAL
Russia	Civil Code pledge provisions	Pledge; valuation binding constraint	Emergent practice (Nikitenko & Mesyats, 2017; Nikitenko et al., 2017)
China	Civil Code pledge; Patent Pledge Pilot (regional); IP Court system	Patent pledge; IP-backed securitisation; IP insurance	Largest global market (Tong & Wang, 2026; Li, Wang & You, 2024; WIPO, 2025)
South Africa	Secured Transactions in Movable Assets Act; Companies Act	IP-as-security; fiduciary pledges	Doctrinal framework exists; valuation under-developed
Nigeria	Secured Transactions in Movable Assets Act 2017	General movable-collateral regime	Reform prescribed
Kenya	Movable Property Security Rights Act; Copyright Act	Pledge of copyrights	Doctrinal adoption lagging
Tanzania	Movable Property Security Rights Act	Pledge; securitisation model	Reform proposed
Zimbabwe	Movable Property Security Interests Act; Patents Act	Pledge of IP under MOVPRO	Barriers dominate practice

The pattern that emerges is that jurisdictions with IP-specific registration, specialised courts and UNCITRAL-aligned guarantees

develop measurably deeper IP-backed credit markets than jurisdictions whose IP-collateral practice is grafted onto general movable-collateral statutes without IP-specific implementation.

2.5 Hypothesised Mechanism

Synthesising Sections 2.3 and 2.4, the review hypothesises that sustainable IP financing requires four conditions in combination: (i) specialised or harmonised judicial enforcement architecture; (ii) transparent, integrated IP-collateral registries; (iii) robust valuation infrastructure, typically government-supported in early stages; and (iv) corporate governance and disclosure-quality requirements that allow bankers to price IP risk. Where any condition is absent, IP-backed lending defaults to face the same exclusion as any unsecured innovation-driven firm; the central empirical pattern motivating this review.

3. Methodology

3.1 Review Protocol

The review followed the PRISMA-ScR checklist. No primary data were collected; ethical approval was therefore not required.

3.2 Search Strategy and Yields

Three bibliographic databases were searched between January 2024 and February 2026: Google Scholar, ScienceDirect and Taylor & Francis. Boolean operators were applied using the composite search string:

“IP financing” OR “intellectual property financing” OR “intellectual property collateralisation” OR “intellectual property pledging”

Table 2: Publications Databases

Database	URL	Records screened
Taylor & Francis	https://www.tandfonline.com/	4
ScienceDirect	https://www.sciencedirect.com/search	18

Google Scholar	https://scholar.google.com/	198
Total		220

The publications that were used in this systematic literature review were derived from 3 databases: Google Scholar, which generated 198 publications; the Science Direct database, which yielded 18 relevant publications; and Taylor and Francis, which generated four relevant publications. The above statistics are confirmed by the screenshots shown in Figures 1 to 3.

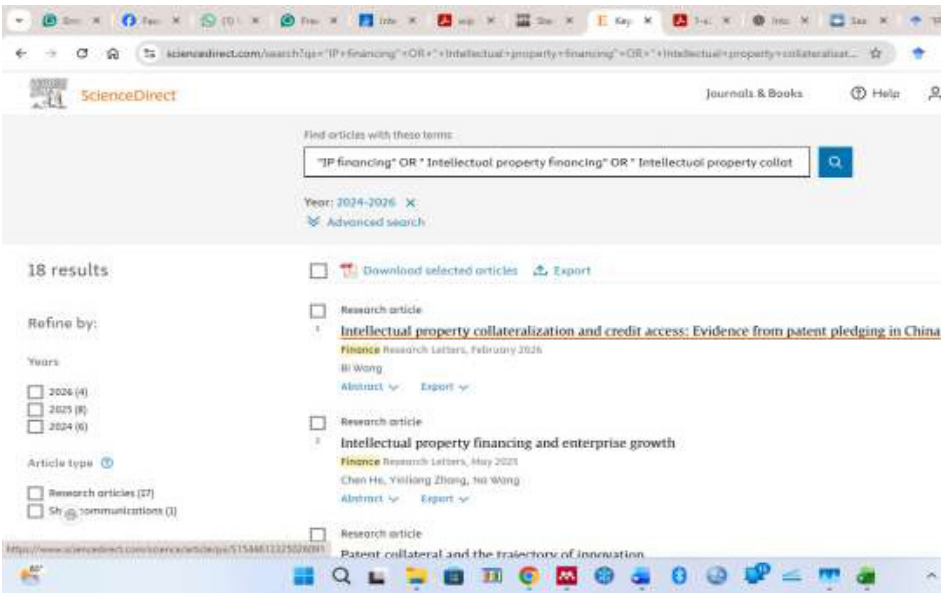


Figure 1: Search Results on Science Direct

Figure 1 shows that a search of the Science Direct database yielded 18 relevant publications.

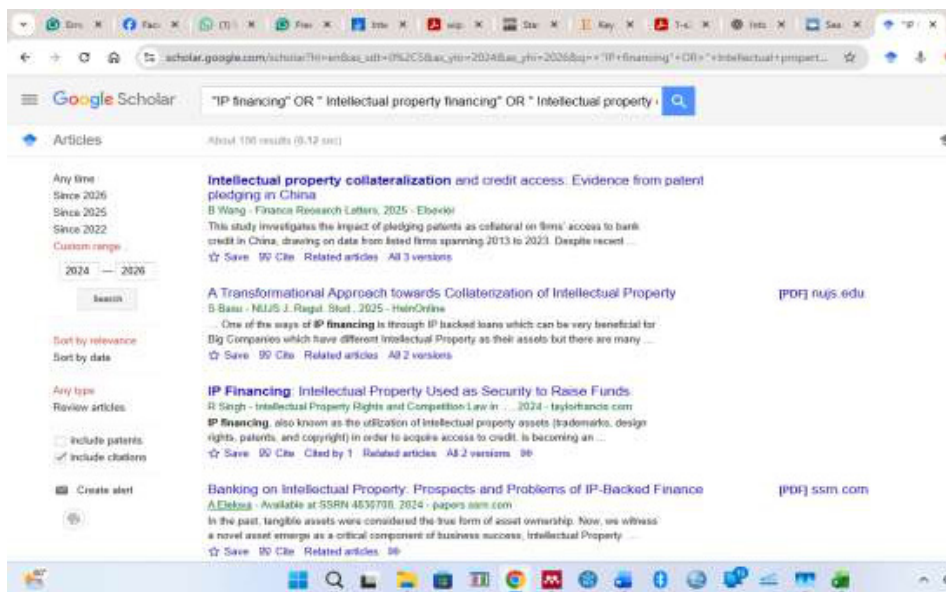


Figure 2: Search Results on Google Scholar

Figure 2 shows that a search of the Google Scholar database yielded 198 relevant publications.

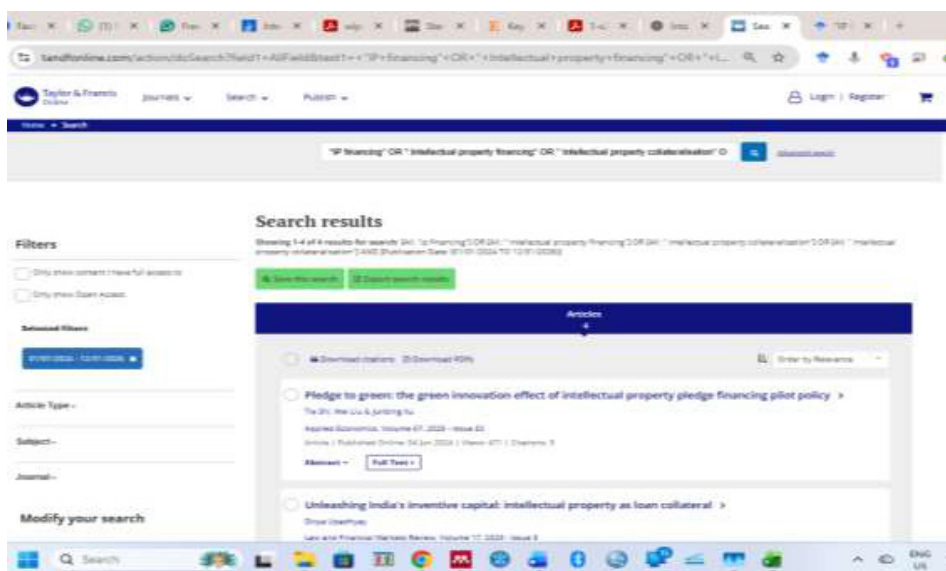


Figure 3: Search Results on Taylor and Francis

Figure 3 shows that a search of the Taylor and Francis database yielded 4 relevant publications.

Search for articles in the identified database was undertaken using the Boolean Operators ('AND', 'OR and 'NOT'). These operators were applied as follows: "IP financing" OR " Intellectual property financing" OR " Intellectual property collateralisation" OR " Intellectual property collateralisation." Having conducted a preliminary study, it is imperative to clarify the inclusion and exclusion criteria used in selecting the articles.

Following duplicate removal and full-text screening, 21 articles were retained, supplemented by two WIPO institutional reports.

3.3 Inclusion and Exclusion Criteria

Table 3: Inclusion and Exclusion

Inclusion	Exclusion
English-language articles	Non-English articles
Published January 2024 - February 2026	Articles outside the time window
Open-access, free-access articles	Pay-to-read articles without usable abstracts
Abstracts of pay-to-read articles where substantively relevant	Purely conceptual articles without empirical content
Studies on leading IP financing markets	Articles unrelated to IP financing
Notable developing-country studies (e.g., Egypt, SADC)	—

Table 3 presents the inclusion and exclusion criteria used to select articles for this systematic literature review. The first criterion was that the articles were to be in English and published between January 2024 and February 2026. Open-access or free-to-access articles that fell within this criterion, in line with Boolean operators, were also selected. Other relevant articles categorised as paid-to-read but with included abstracts were accessed via their abstracts for further analysis. The other inclusion criterion was that articles

had to focus on leading IP financing markets in China, the United States of America, or Europe, except for notable studies conducted in Africa, such as a study in Egypt (Saadi et al., 2025).

Figure 4 presents the article selection flowchart, which maps the stages used to identify, select, and include articles for the systematic literature review.

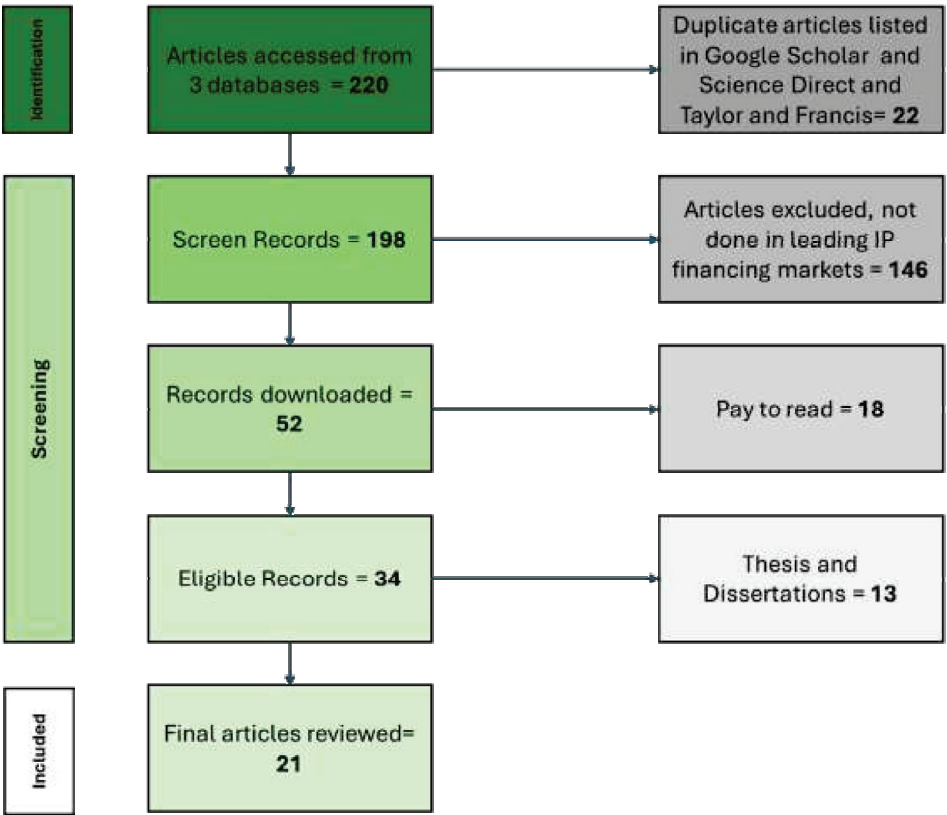


Figure 4: Article selection flow chart

In this systematic review of the literature, numerous studies from China are compared with those from other regions, as shown in Figure 1. This trend is attributed to the phenomenal rise in innovation-driven startups that increasingly rely on IP financing, which is the most suitable form of financing compared with pledging collateral in the form of movable and immovable tangible assets.

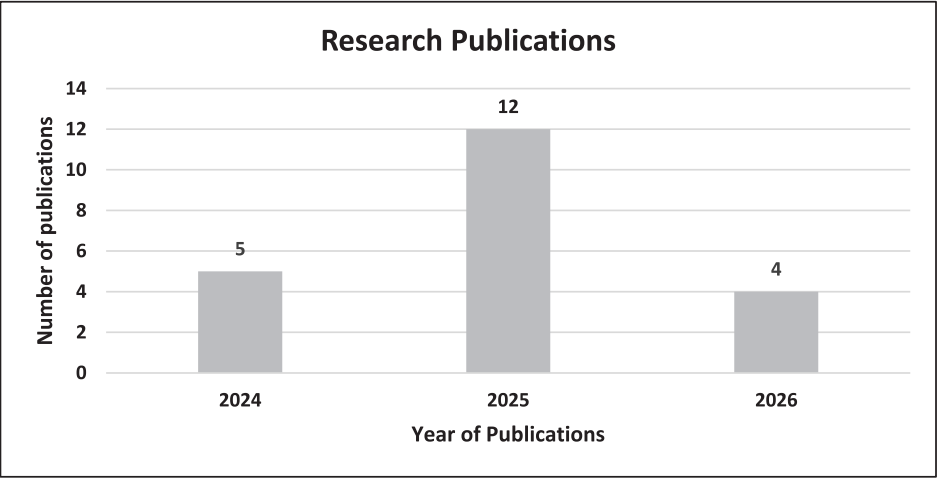


Figure 5: Research publications by year

The research showed a bias toward recent publications from 2024 to 2026. This was motivated by the need to capture contemporary debates on best practices in IP financing. As per Figure 5, most research papers that were reviewed for this systematic analysis were published in the year 2025. The review also incorporated four studies that were published in 2026. These research papers demonstrate the most significant developments in IP financing as it is being operationalised in the world’s leading IP financing market. The studies that were reviewed in this analysis were predominantly quantitative.

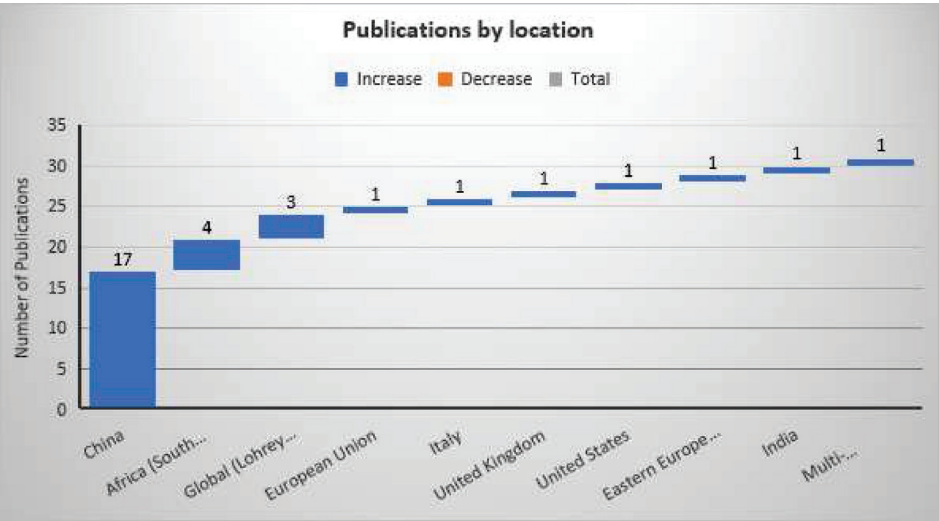


Figure 6: Research publications by location

According to Figure 6, the most prominent research on IP financing was conducted in China. WIPO (2025) reports that China is a global leader in IP financing, as it offers a variety of comprehensive credit guarantees, valuation platforms, common subsidies, and regulatory incentives that promote the use of trademarks and patterns as collateral.

3.4 Selection Process

Screening was conducted across four stages in line with PRISMA-ScR: identification, screening, eligibility, inclusion.

3.5 Data Charting and Synthesis

A standardised charting form extracted author(s), year, journal, geographic context, research design, theoretical lens, and primary findings. Narrative synthesis was conducted, organised thematically around the four research questions. Quality was inferred from peer-review status, methodological consistency and replication of findings across jurisdictions; no formal JBI critical appraisal was performed.

3.6 Methodological Limitations

The review is constrained by three limitations: (a) only English-language sources were included; (b) the search was confined to three databases, missing potentially relevant work indexed in Scopus, Web of Science, or African Journals Online; and (c) the 2024–2026-time window privileges recent evidence and may underweight seminal earlier work.

4. Results

4.1 Bibliometric Profile

Of the 21 included studies, publication year is 2024 (n=1), 2025 (n=17) and 2026 (n=4). Geographic distribution shows a plurality of evidence from China, with single studies from the European Union, Eastern Europe and Central Asia, Italy, Egypt and a global sample.

4.2 RQ1 - Dominant Critical Success Factors in Leading Markets

Across the corpus, judicial protection and enforceability of IP-

backed collateral emerged as the most consistently documented critical success factor. In China, Tong and Wang (2026) show that dedicated IP courts have catalysed the growth of multinational financial supply chains. Han et al. (2026) find that judicial protection significantly and positively affects SME innovation efficiency within digital finance. Wu and Liu (2025) trace productivity gains of dedicated IP tribunals to total factor productivity improvements in pharmaceuticals. In the European Union, Gill and Heller (2024) estimate that firms operating under harmonised IP enforcement regimes access debt financing at materially lower interest rates than unprotected firms. In the United States, Heller et al. (2026) classify the institutional environment as efficient for IP collateralisation.

4.3 RQ2 - Institutional, Legal and Valuation Mechanisms

(a) Government subsidy and credit-guarantee architecture.

Using 20,471 firm-year observations (2000-2021), Zhao et al. (2025) demonstrate that IP protection policy stimulates innovation principally by reducing financing constraints and channelling government subsidies to innovative firms. Li, Wang and You (2024) corroborate this through a quasi-natural experiment on China's patent-pledge pilot.

(b) Patent quality and collateral eligibility. Yu et al. (2021) establish that the technical and legal quality of patents is positively associated with financier acceptance; high-quality patents attract larger loan amounts, longer maturities and lower interest rates. Dai et al. (2021) corroborate that corporate patenting enhances credit access.

(c) Statutory architecture. Across jurisdictions, the depth of IP-backed credit markets is positively associated with IP-specific statutory architecture. In the United States, UCC Article 9 establishes the baseline (Brennan, 2000; Boyce Gibson, 2015). In the European Union, harmonised enforcement and UNCITRAL-aligned national statutes enhance cross-border efficiency. In Poland, recent legislative changes have improved securitisation of patents and trademarks. In China, the patent pledge pilot has served as de facto statutory experimentation under the Civil Code. In Russia and other emerging markets, the binding constraint is the absence of IP-specific implementation of general movable-collateral statutes (Nikitenko et al., 2017; Nikitenko & Mesyats, 2017).

4.4 RQ3 - Risk Management and Corporate Governance

Li and Pei (2024) demonstrate that judicial IP protection reduces manipulative behaviour in corporate R&D expense reporting, indirectly supporting financier confidence in disclosed intangible values. Wang and Wang (2025) document that IP protection is associated with reduced corporate data-breach risk. Li (2024) shows that heavy reliance on IP is associated with lower financing efficiency where corporate governance is weak, but that mature governance mitigates the effect. Li et al. (2025a), using 2014-2022 panel data on Chinese non-listed enterprises, demonstrate that IP protection improves capital allocation efficiency through innovation incentives, reduced financial constraints and improved information transparency.

4.5 RQ4 - Evidence Relevant to Developing and Transition Economies

Three evidentiary strands speak to Zimbabwe. Firstly, Abdin et al. (2024) document the duality - strong IP protection can be detrimental to process innovation in resource-constrained settings but strategically beneficial for R&D-intensive activity. Secondly, the Egyptian evidence establishes that access to bank credit raises the probability of firm innovation by 67%. Thirdly, the SADC evidence (Amusa, 2024; Chimombe, 2020; Gebhardt & Plessis, 2023) shows that the institutional void is not primarily legislative but enforcement and valuation.

4.6 Aggregate Quality Distribution

A narrative quality appraisal of each included study yields: 12 High-confidence studies, six Medium-High, two Medium, and one conceptual study. The dominant findings therefore rest on robust identification of effects.

5. Discussion

5.1 Theoretical Synthesis - The Resource-Enforceability Model

The review's principal theoretical contribution is the articulation of the resource-enforceability model. Bankability of IP is the joint product of resource-based characteristics and enforceability of the lender's claim through specialised or harmonised judicial

institutions. The model accommodates the duality documented by Abdin et al. (2024) and offers an integrative cross-jurisdictional framework.

5.2 Comparative Jurisdictional Analysis

Three patterns emerge. Firstly, jurisdictions with IP-specific statutory architecture (the United States, the United Kingdom, France, Germany and the European Union under harmonised enforcement) develop measurably deeper IP-backed credit markets than jurisdictions relying on general movable-collateral statutes. Secondly, jurisdictions emerging from general movable-collateral statutes require not just legislative enactment but supportive infrastructure - valuation standards, registries, judicial training and risk-sharing instruments. Thirdly, government credit-guarantee engineering (the Chinese experience) lowers the unit cost of IP lending by shifting risk from private to public agents (Li, Wang & You, 2024; Zhao et al., 2025).

5.3 Practical Implications

1. Specialised IP courts are foundational - Chinese, EU and US evidence converges on this (Gill & Heller, 2024; Han et al., 2026; Tong & Wang, 2026; Wu & Liu, 2025).
2. Statutory reform along UNCITRAL principles - jurisdictions should follow the four elements specified in the UNCITRAL Legislative Guide on Secured Transactions and its Supplement on Security Rights in Intellectual Property.
3. Online IP registries and transparent valuation protocols reduce information asymmetry.
4. Central-bank engagement through credit guarantees and recapitalised resolution vehicles lowers the unit cost of IP lending (WIPO, 2025; Zhao et al., 2025).

5.4 Limitations of the Evidence Base

The dominance of Chinese studies limits external validity. The studies are predominantly cross-sectional or short-panel, limiting causal inference (the quasi-natural experiments by Li, Wang & You, 2024 and Luo et al., 2024 are notable exceptions). The literature reports aggregate-level relationships rather than disaggregating effects by firm size, sector and founder characteristics.

5.5 Limitations of the Review

The review is bounded by the constraints in Section 3.6. The absence of formal critical appraisal means that the relative weight given to individual studies reflects frequency consistency and methodological alignment rather than quality-weighted synthesis.

6. Conclusions and Recommendations

6.1 Logical Consistency with Problem Statement, Literature and Findings

The conclusions follow logically from the four evidentiary pillars:

Table 4: Evidentiary pillars

Pillar	Statement	Consequence for the conclusions
Problem statement (1.2)	Innovative, IP-rich but asset-light SMEs in developing economies are excluded from formal credit.	Conclusions must produce recommendations that address this exclusion.
Literature (2)	Best-practice evidence across China, the US, the EU and emerging economies converges on judicial protection as the dominant critical success factor.	Conclusions must translate these enablers into actionable reforms.
Findings (4)	Doctrinal evidence is documented at each of the four research questions.	Conclusions must remain faithful to the empirical findings.
Recommendations (6.2)	Recommendations must be specific enough to be operationalised under Education 5.0.	Conclusions must close the loop between diagnosis and prescription.

6.2 Recommendations for Developing Financial Systems

Policy and statutory.

1. **Establish specialised IP courts** within the national judiciary, dedicated to the enforcement of IP rights and the resolution of IP-collateral disputes (Gill & Heller, 2024; Han et al., 2026; Tong & Wang, 2026; Wu & Liu, 2025).
2. **Reform IP-collateral statutes along UNCITRAL principles**, explicitly recognising (i) IP as collateral within a comprehensive movable-assets regime; (ii) future IP as eligible security; (iii) priority rules for acquisition financiers; and (iv) conflict-of-laws rules.
3. **Establish online IP registries** that interface with national collateral registries, supporting perfection under laws such as the Movable Property Security Interests Act (2022) or analogous statutes.
4. **Design dedicated loan instruments, credit guarantees and risk-sharing mechanisms** through the central bank, calibrated to the lines of the Chinese patent-pledge pilot (Li, Wang & You, 2024; Zhao et al., 2025).
5. **Capitalise the Zimbabwe Asset Management Company** to absorb defaults arising from IP-related loans, signalling credible lender protection and unlocking private-sector participation (Chimombe, 2020; WIPO, 2025).

Educational and institutional

6. Universities in Zimbabwe for instance, leveraging Innovation Hubs under the State's Education 5.0 framework - should provide technical assistance in IP portfolio management, commercialisation strategy and patent drafting (Gebhardt & Plessis, 2023; Lohrey & Willoughby, 2025).
7. Joint programmes with WIPO Academy and African IP institutions should deliver IP-valuation certification to lower lender entry barriers (Kimela, 2025; Oke, 2025; WIPO, 2023).

6.3 Implications for Theory

The review advances a resource-enforceability model of IP financing, accommodating the contradictory effects of IP protection observed by Abdin et al. (2024) and offering a unifying framework for future empirical testing.

6.4 Future Research

Four priorities: (i) panel-data studies in developing economies disaggregating effects by firm size, sector and gender; (ii) comparative case studies of jurisdictions that have successfully or unsuccessfully transplanted Chinese-style IP court models or UNCITRAL-aligned statutory reforms; (iii) experimental and quasi-experimental designs estimating the causal effect of dedicated IP court establishment on SME lending volumes, interest-rate spreads and default recovery rates; and (iv) micro-evidence on the transmission of judicial protection to bankability in low-income economies.

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Appendix A. Primary Studies Included in the Systematic Review

Study	Location	Methodology	Affiliation / Journal	Key finding
Abdin et al.	E. Europe & C. Asia (n=21,860)	Quantitative	Technological Forecasting & Social Change	Strong IP protection may hinder process innovation in capability-constrained settings but remains beneficial for R&D
Amusa	South Africa	Doctrinal/ qualitative	Journal of Open Access to Law	Statutory framework exists; valuation and enforcement binding constraints
Brennan	United States	Doctrinal	Santa Clara Computer & High Tech Law Journal	UCC Article 9 framework; federal-state pre-emption complexity
Boyce Gibson	United States	Doctrinal	John Marshall Review of IP Law	UCC Article 9 / federal IP law intersection; central filing proposed
Dai et al.	China	Quantitative	Journal of Corporate Finance	Corporate patenting enhances credit access for urban firms
Dong & Li	China	Quasi-natural experiment	Finance Research Letters	IP protection catalyses digital transformation through R&D investment
Du et al.	China	Quantitative	Operations Research Letters	IP protection enables supply-chain innovation and investment
Gebhardt & Plessis	SADC	Qualitative	Journal of Namibian Studies	Institutional barriers under the Swakopmund Protocol
Gill & Heller	European Union	Quantitative	Journal of Banking & Finance	Harmonised IP enforcement yields lower borrowing costs

Han et al.	China	Quantitative	Finance Research Letters	Judicial IP protection positively affects SME innovation efficiency
Heller et al.	Cross-jurisdiction	Conceptual taxonomy	Journal of Banking & Finance	Taxonomy of institutional and economic determinants
Hudson & Morgan	Cross-jurisdiction	Quantitative	Journal of Business Research	RBV-grounded strategic role of IP
Kimela	Tanzania	Reform proposal	Routledge handbook	Securitisation feasible under harmonised regulatory architecture
Lee	Global	Conceptual	J. of IP Law & Practice	UNCITRAL four-element legislative framework
Li	China	Quantitative	Finance Research Letters	IP dependence lowers financing efficiency absent strong governance
Li, Wang & You	China	Quasi-natural experiment	Finance Research Letters	Patent-pledge pilot reduces financing constraints; promotes risk-taking
Li & Pei	China	Quantitative	Finance Research Letters	Judicial protection reduces R&D-expense manipulation
Li et al. (2025a)	China (panel 2014-2022)	Quantitative	International Review of Economics & Finance	IP protection improves capital allocation efficiency
Lohrey & Willoughby	Global	Quantitative	World Patent Information	SMEs using IP finance exhibit higher innovative performance
Luo et al.	China	Quasi-natural experiment	Pacific Basin Finance Journal	Patent-collateral policy expands startup borrowing
Meyer	Cross-jurisdiction	Conceptual	Nuclear Engineering and Technology	Geopolitical analysis of IP in strategic-technology sectors
Nakhungu	Kenya	Doctrinal/qualitative	Doctoral dissertation	Doctrinal adoption of copyright collateralisation lagging

Nikitenko & Mesyats	Russia/EU comparison	Doctrinal	Int. J. Mech. Eng. & Tech.	Industrial-property objects as innovation instruments
Nikitenko et al.	Russia	Doctrinal	J. Legal, Ethical & Reg. Issues	Early stage of IP pledging practice
Odinet	United States	Doctrinal	Washington & Lee Law Review	UCC Article 9 framework for IP-as-collateral
Oke	Nigeria	Reform proposal	Springer chapter	Statutory reforms under STMA 2017
Pisicoli et al.	Italy	Quasi-natural experiment	Journal of Policy Modelling	Intangibles harder to finance than tangibles even in mature markets
Saadi et al.	Egypt (n=3,025)	Logistic regression	Sustainable Futures	Bank credit raises probability of innovation by 67%
Talisa & Badriyah	Indonesia/comparative	Doctrinal/comparative	Deepublish	Comparative IP fiduciary-guarantee regimes
Tong & Wang	China (2012-2023)	Quasi-natural experiment	Finance Research Letters	IP courts catalyse innovation and supply-chain financing
Verma	Developing economies	Conceptual	J. Intellectual Property Rights	Developing economies suffer thinner IP portfolios and weaker financing infrastructure
Wang	China (2013-2023)	Quantitative	Finance Research Letters	IP financing improves credit access and repayment terms
Wang & Wang	China	Quantitative	International Review of Financial Analysis	IP protection reduces data-breach risks
WIPO	Global	Institutional report	WIPO	Best-practice framework document
WIPO	Global	Institutional report	WIPO	Global scale statistics and IP-finance trends
Wu & Liu	China	Path analysis	Finance Research Letters	IP-court enforcement raises total factor productivity
Xie	United States	Doctrinal/comparative	Beijing Law Review	US IP-collateral system as benchmark for Chinese reform

Yu et al.	China	Quantitative	Pacific Basin Finance Journal	Patent quality governs financier acceptance, terms and pricing
Żelechowski	Poland/ UNCITRAL	Doctrinal/ comparative	IIC	UNCITRAL-aligned analysis of Polish IP-securitisation law
Zhao et al.	China (n=20,471)	Quasi-natural experiment	International Review of Financial Analysis	IP-protection policy stimulates innovation through R&D and subsidies
Zhu & Xia	China	Quantitative	International Review of Economics & Finance	IP protection enables collaborative innovation through internal control

Appendix B. Narrative Quality Appraisal of Included Studies

Study	Design	Sample	Strengths	Limitations	Confidence
Abdin et al.	Panel regression	n=21,860	Multi-country controls	Macro granularity	High
Amusa	Doctrinal	Single-jurisdiction	Clear exposition	No empirical test	Medium
Brennan	Doctrinal	United States	Strong doctrinal synthesis	Single jurisdiction	Medium-High
Boyce Gibson	Doctrinal	United States	Doctrinal depth	Doctrinal only	Medium
Dai et al.	Cross-sectional	Chinese listed firms	Strong pledge design	Causal limits	Medium-High
Dong & Li	Quasi-natural	Chinese manufacturers	Causal identification	External validity	High
Du et al.	Cross-sectional	Chinese firms	Channel test	Causal limits	Medium
Gebhardt & Plessis	Qualitative	SADC region	Direct relevance	Conceptual	Medium
Gill & Heller	Cross-sectional	EU listed firms	Cost-of-debt test	Heterogeneity	High
Han et al.	Quasi-natural	Chinese tech SMEs	Digital-finance interaction	Lag diffusion	High
Heller et al.	Conceptual taxonomy	Cross-jurisdiction	Robust analytical framework	Not empirical	Medium
Hudson & Morgan	Cross-sectional	Cross-jurisdiction	RBV-grounded design	Proxy variables	Medium-High
Kimela	Reform proposal	Tanzania	Clear design	Not empirical	Medium
Lee	Conceptual	UNCITRAL reframing	Normative anchor	Conceptual	Medium
Li	Panel	Chinese listed firms	Governance moderator	Identification indirect	High
Li, Wang & You	Quasi-natural	China	Strong identification	Treatment uniformity	High
Li & Pei	Panel	Chinese listed firms	Novel manipulation measure	Measurement error	High
Li et al. (2025a)	Panel 2014-2022	Chinese non-listed enterprises	Long panel	Non-listed sourcing	High
Lohrey & Willoughby	Global review	Global SMEs	Cross-jurisdiction	Aggregate correlations	Medium
Luo et al.	Quasi-natural	Chinese listed firms	Strong identification	Industry-mix dependence	High
Meyer	Conceptual	Cross-jurisdiction	Strategic framing	Non-quantitative	Medium
Nakhungu	Doctrinal	Kenya	Comparative reference	Doctrinal lag	Medium
Nikitenko & Mesyats	Doctrinal	Russia / EU comparative	Cross-jurisdiction	Doctrinal only	Medium-High

Nikitenko et al.	Doctrinal	Russia	Doctrinal depth	Doctrinal only	Medium
Odinot	Doctrinal	United States	UCC framework	Single jurisdiction	Medium-High
Oke	Reform proposal	Nigeria	Prescriptions	Not empirical	Medium
Pisicoli et al.	Quasi-natural	Italian firms since 2012	Strong design	Single-country	High
Saadi et al.	Logistic regression	WB Survey, n=3,025	MENA external validity	Self-reported innovation	Medium
Talisa & Badriyah	Doctrinal/comparative	Indonesia/EU	Comparative depth	Doctrinal	Medium
Tong & Wang	Quasi-natural	2012-2023, China	Long pre/post window	Cross-province generalisation	High
Verma	Conceptual	Developing economies	Binding constraints	Conceptual	Medium
Wang	Panel	2013-2023 listed	Repayment-terms differential	Listed-firm bias	High
Wang & Wang	Panel	Chinese listed firms	Novel outcome	Reverse causality	Medium-High
Wu & Liu	Path analysis	Chinese listed firms	Causal-path specification	Path-coefficient interpretation	Medium-High
Xie	Doctrinal/comparative	United States	Reform benchmark	Doctrinal	Medium
Yu et al.	Cross-sectional/panel	Chinese listed firms	Patent-quality granularity	Listed-firm selection	High
Żelechowski	Doctrinal/comparative	Poland / UNCITRAL	Rigorous doctrinal analysis	Doctrinal	Medium-High
Zhao et al.	Quasi-natural	n=20,471, 2000-2021	Long panel	Treatment-intensity heterogeneity	High
Zhu & Xia	Panel	Chinese listed firms	Collaboration channel	Pair-data requirement	Medium-High



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