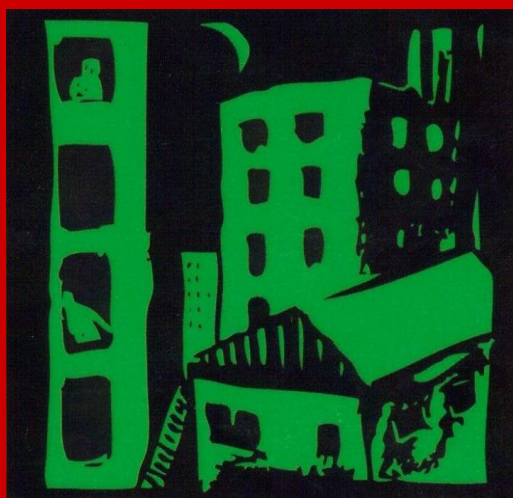
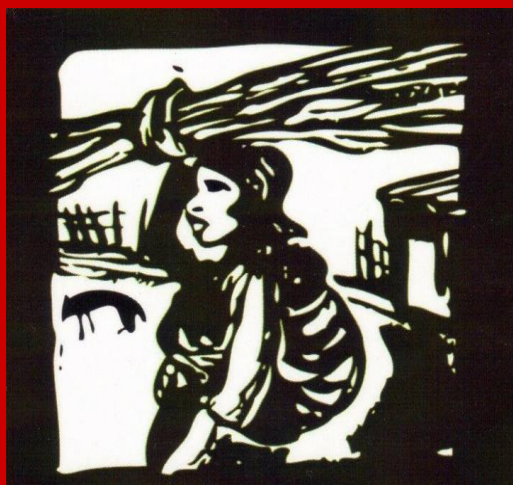


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Generative AI and South Africa's intellectual property law: Exploring a balance between protectionism and innovation

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ABSTRACT

The development and increased use of artificial intelligence (AI), particularly generative AI, raises pressing legal issues. AI impacts every aspect of the law, including intellectual property law. Human beings are no longer the masters of innovation: the question that arises, then, is whether AI-generated inventions should be legally recognised and protected. This article aims to contribute to the debate surrounding the complexities of protecting and regulating AI-generated inventions and the possible departure from human inventorship in the light of current technological advancement. It is argued that a rethinking and modification of some of the intellectual property rules, particularly in the context of patents,

is required in order to ensure a balance of protectionism and innovation. The article stresses the need for a proactive approach and inclusive legal framework that accommodates the rise of generative AI while ensuring fair and appropriate protection for human inventions.

Keywords: generative artificial intelligence; technological innovation; protectionism; intellectual property rules; patents

1 INTRODUCTION

Intellectual property rights arising from, inter alia, patents, copyrights and designs play an increasingly important role in promoting innovation and creativity through economic incentives and exclusive commercial rights granted to the creator.¹ Innovation refers to “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations ...”² It generally involves a “new or improved product or process (or combination thereof) that differs significantly” from the previous ones made available for use.³ Innovation relates to the development and commercial success of the invention.⁴ The innovation in science and technology is regarded as indispensable for economic growth.⁵ South Africa places strong emphasis on innovation, improved productivity and the importance of pursuing a knowledge economy.⁶ Indeed, the main objective of its Intellectual Property Policy is “to *nurture and promote a culture of innovation*, by enabling creators and inventors to reach their full potential and contribute towards improving the competitiveness of our industries”.⁷

¹ Neves PD, Afonso O, Silva D & Sochirca E “The link between intellectual property rights, innovation and growth: A meta-analysis” (2021) 97 *Economic Modelling* 196 at 196–197. See generally Van der Merwe A, Geyer S & Kelbrick R (eds) *Law of intellectual property in South Africa* 2nd ed Cape Town: LexisNexis (2016) at xxiii.

² Organisation for Economic Co-operation and Development (OECD) *Innovation in firms: A microeconomic perspective* (2009) OECD at 11 available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2009/11/innovation-in-firms_g1g191df/9789264056213-en.pdf (accessed 16 August 2023).

³ OECD & Eurostat *Oslo Manual 2018: Guideline for collecting, reporting and using data on innovation, the measurement of scientific, technological and innovation activities* 4th ed Paris: OECD Publishing (2018) at 20.

⁴ Ncube C *Science, technology & innovation and intellectual property: Leveraging openness for sustainable development in Africa* 1st ed Cape Town: Juta (2021) at 94.

⁵ See Van der Merwe, Geyer & Kelbrick (2016) at xxv.

⁶ See the Intellectual Property Policy of the Republic of South Africa (GN 518, GG 41870, 31 August 2018) (“Intellectual Property Policy”) at 2.

⁷ Intellectual Property Policy of the Republic of South Africa (2018) at 4. Emphasis added.

Intellectual property is a key driver of innovation and fosters economic growth.⁸ A link exists between innovation and the general standard of living, as innovation can result in the creation of jobs. De Beer, Armstrong, Oguamanam and Schonwetter rightly aver that human development, including economic growth and the ability of humans to live longer, healthier and more fulfilling lives, depends on innovation and creativity.⁹

This article explores the synergy between artificial intelligence (AI) and intellectual property (IP) law, in particular patent law, and the question of how a balance between protectionism and innovation could be achieved in the context of generative AI. The central question here is whether AI-generated inventions should be legally recognised and protected (as such, all other forms of IP are outside the scope of this article, even though the arguments made may be relevant and applicable).

The article is divided into four sections. The next section discusses the intersection between generative AI, IP and innovation. It also gives brief insight into the patent system, in particular the laws and theories behind the protection of inventions. The third section considers whether it is possible to create a harmonious relationship between IP protection, innovation and protectionism. Section four provides insights on the way forward, and is followed by a conclusion.

2 THE INTERSECTION OF GENERATIVE AI, IP AND INNOVATION

While there is no single or widely accepted definition of AI,¹⁰ for practical purposes it may be described as an area of endeavour involving “powerful algorithms, machines or computer systems that have over time developed human-like capabilities through techniques such as machine learning, neural networks, logic programming and fuzzy logic”.¹¹ Similarly, Ning regards AI as comprising systems that are capable of replicating human-like self-reasoning, superpowered thinking, and data analysis.¹² As such, AI models simulate human intelligence and capabilities to the extent that they can skilfully perform human tasks including intellectual tasks. Some of the popular models include ChatGPT, Whisper, DALL-E 2 and Alexa.¹³

⁸ WIPO *Innovation Driving Human Progress: WIPO and the Sustainable Development Goals* Geneva: WIPO Publication Reference No. 1061E/2021 (2021) at 3.

⁹ De Beer J, Oguamanam C & Schonwetter T “Innovation, intellectual property and development narratives in Africa” in De Beer J, Armstrong C, Oguamanam C & Schonwetter T (eds) *Innovation & intellectual property: Collaborative dynamics in Africa* (2014) 1.

¹⁰ Abbott R “Intellectual property and artificial intelligence: An introduction” in Abbott R (ed) *Research handbook on intellectual property and artificial intelligence* (2022) 6. See also Dornis TW “Artificial intelligence and innovation: The end of the patent law as we know it” (2020) 23 *Yale Journal* 97 at 100; Oriakhogba D “Inventorship and ownership of patent: What if DABUS came to Africa? Visiting AI inventorship and ownership of patent from the Nigerian perspective” (2021) 42(2) *Business Law Review* 91.

¹¹ Ncube C, Oriakhogba D, Rutenberg I & Schonwetter T *Artificial intelligence and the law in Africa* Cape Town: LexisNexis (2023) at 1.

¹² Ning H “Is it fair? Is it competitive? Is it human? Artificial intelligence and the extent to which we can patent AI-assisted inventions” (2023) 49(2) *Journal of Legislation* 429.

¹³ See generally Ncube, Oriakhogba, et al. (2023) 1.

On the basis of its capabilities, AI may be categorised as weak (or narrow) or strong. Narrow AI “is able to perform a dedicated task” since it is trained only for a specific task.¹⁴ Most AI that currently exists is narrow or weak.¹⁵ By contrast, the exemplar of strong AI is generative AI. The latter is a subform of AI that focuses on generating new content by means of algorithms and models that have been trained on existing data using machine-learning techniques.¹⁶ Generative AI, in short, involves the creation of new and unique data or content.¹⁷

An example in the context of patents is Stephen Thaler’s Creativity Machine, the so-called Device for the Autonomous Bootstrapping of Unified Sentience (DABUS), which is said to have produced inventions¹⁸ and to be capable of performing any intellectual task with efficiency like a human being.¹⁹ Arguably, then, AI-generated inventions are no longer a far-fetched idea but becoming a new reality.²⁰ A sharp rise in AI innovation is to be expected as more businesses adopt strategies to remain competitive in the marketplace.²¹ Indeed, the world is entering a new era where machines are beginning to play a role in the inventive process and where human beings, in turn, might no longer be the masters of innovation.²²

Generative AI has a significant role to play in contributing to innovation. A global debate has thus arisen as to whether or not AI-generated inventions should be protected, and if so, how IP arising from AI ought to be protected. It is important to stress that where AI is used as a tool to create an invention (that is, where the invention is merely AI-assisted), inventorship vests in a human being as long as there is proof of a significant human contribution.²³ The problem arises with inventions that are generated entirely by an AI system and without human involvement. This raises the question of whether the existing legal framework is sufficient to cater for AI-generated inventions. In

¹⁴ Divya A, Prema R, Sangeetha M & Anwar Basha G *Principles of artificial intelligence* India: SK Research Group of Companies (2022) at 3.

¹⁵ Divya, Prema, et al. (2022) at 3.

¹⁶ Alto V *Modern generative AI with ChaptGPT and Open AI models* United Kingdom: Packt Publishing (2023) at 4.

¹⁷ Alto (2023) at 3.

¹⁸ South Africa DABUS Patent Application 2021/03242; United Kingdom *Thaler v Comptroller-General of Patents, Designs and Trademarks* [2023] UKSC 49, European Patent Office, Board of Appeal Case No. J 0008/20 (Designation of inventor/DABUS) (21 December 2021); *United States Court of Appeals for the Federal Circuit in Stephen Thaler v Katherine K Vidal* Case No. 22-2347) Fed Cir. 2022; Federal Court of Australia *Commissioner of Patents v Thaler* [2022] FCAFC 62.

¹⁹ Divya, Prema, et al. (2022) at 3–4.

²⁰ Dornis (2020) at 101 & 114; Koay T & Li N “Artificial intelligence and inventorship: An Australian perspective” (2020) 15(5) *Journal of Intellectual Property Law and Practice* 399 at 400.

²¹ AI is becoming near-ubiquitous: see Hashiguchi M “The global artificial intelligence revolution challenges patent eligibility laws” (2017) 13(1) *Journal of Business and Technology Law* 1 at 8.

²² Merritt CG “A compulsory solution to the machine problem: Recognising artificial intelligence as inventors in patent law” (2023) 25(1) *Vanderbilt Journal of Entertainment & Technology Law* 212.

²³ See generally Ning (2023) at 443. See also Dornis (2020) at 103–104.

answering this question, two interrelated issues come to the fore: the nature of the inventor, and the nature of the invention that should qualify for legal protection.

A case in point is Stephen Thaler's application in several jurisdictions to have DABUS, an AI, registered as an inventor.²⁴ According to Thaler, the invention titled "Food container and devices and methods for attracting enhanced attention" was autonomously generated by an AI, DABUS. The main question that patent offices and courts have grappled with in the different jurisdictions where protection was sought was whether AI systems can be regarded as inventors under the existing patent laws that were considered.²⁵ The answer has generally been a resounding no. However, in South Africa, the Companies and Intellectual Property Commission (CIPC), which received a similar application, granted DABUS a patent.²⁶ An equally important question – the focus of this article – is whether AI-generated inventions may be protected.

2.1 The patent system: An overview

A patent is a form of IP and is simply a certificate which is granted for an invention.²⁷ An "invention" is a new product or a process that results from inventive activity, and it generally makes some form of technological progress towards solving a specific technical problem.²⁸ The patent system provides legal protection to inventions such as processes or methods by granting exclusive rights to the owner.²⁹ This monopoly encourages innovation since owners can recoup their investment and see profits by commercialising their inventions.³⁰ Cornish and Llewelyn rightly opine that patents are intended to incentivise the making of inventions and the subsequent innovative work that puts the inventions to practical use.³¹ The incentive given to creators means that information that might have otherwise been withheld is shared for the benefit of the

²⁴ The first patent in the world granted to an invention created by an AI was in South Africa. The CIPC registered DABUS as an inventor under patent number 2021/03242. See also Australian DABUS Patent Application No. 2019363177, which was overturned.

²⁵ See *Thaler v Comptroller-General of Patents, Designs and Trademarks* [2023] UKSC 49; *Commissioner of Patents v Thaler* [2022] FCAFC 62, *Thaler v Vidal* [2022] US Court of Appeals for the Federal Circuit No. 21-2347.

²⁶ South Africa DABUS Patent Application 2021/03242.

²⁷ Section 2(xiii) of the Patents Act 57 of 1978 (GN 956, GG 6012, 17 May 1978) available at https://www.gov.za/sites/default/files/gcis_document/201504/act-57-1978.pdf (accessed 24 February 2025).

²⁸ See article 27(1) of the TRIPS Agreement. See also Visser C & Van der Merwe A (eds) *Law of intellectual property in South Africa* 3rd ed Cape Town: LexisNexis (2024) 321.

²⁹ The monopoly granted to the creator prevents third parties from exploiting the invention. See Dean O & Dyer A *Introduction to intellectual property law* Cape Town: Oxford University Press (2022) at 241. See also Ning (2023) at 421.

³⁰ Hashiguchi (2017) at 4; Koay & Li (2020) at 402.

³¹ Cornish W & Llewelyn D *Intellectual property: Patents, copyright, trademarks and allied rights* 8th ed United Kingdom: Sweet and Maxwell (2003) at 131.

public.³² The financial incentive argument is one of the justifications for the protection of intellectual property and it is based primarily on rewarding the inventor to encourage the disclosure of inventions as well as to prevent others from exploiting the invention for a period of 20 years.³³ This promotes investment in technology and facilitates innovation, all of which are important for economic growth.³⁴

The patent system provides statutory limitations and checks to ensure that there is a balance between the rights of the creator *vis-à-vis* the rights of the user. Human inventorship is an example of one of the implicit checks that underpin the patent system. The reason is that the patent system is built on human creation, since it is founded on the idea that only human beings qualify as inventors.³⁵ An invention is, therefore, inseparably intertwined with the requirement of a human mind, as patent law envisages only human inventors. This raises the question of whether, in this technologically driven era, human beings should remain the only inventors – and, if not, the extent to which the patent system should accommodate AI inventions.

In the case of South Africa, its Patents Act 57 of 1978 and regulations do not include a definition of “inventor”.³⁶ The Act, however, refers to applicants with the pronouns “he” and “she”, rather than “it”.³⁷ It may be inferred then that the Act recognises only human beings as inventors. Put differently, the current legislative framework is premised on the notion that it is people, and not machines, that are able to “conceive” inventions; hence, the concept of “invention” applies exclusively to natural persons. In view of this, it is undeniably a statutory requirement that only human beings are eligible to be “inventors”. This has generally become an international requirement, as exemplified in various jurisdictions including the United States of America (USA).³⁸

Nevertheless, it is important to note that most patent laws, including South Africa’s Patents Act 57 of 1978, were enacted before the emergence of generative AI; by corollary, these laws do not explicitly make provisions for AI inventions since an invention is generally understood as something created by a human being.³⁹ As such, AI-generated inventions clash with the traditional notions of patent law.

³² The disclosure requirement is pertinent to patent systems’ effectiveness as it results in the inventions entering the public domain. See Dean & Dyer (2022) at 241. See also Merritt (2023) at 219.

³³ See Van der Merwe, Geyer & Kelbrick (2016) at xxiv.

³⁴ Koay & Li (2020) at 402.

³⁵ Dornis (2020) at 102 & 115.

³⁶ See section 2 of the Patents Act 57 of 1978.

³⁷ See section 27 of the Patents Act 57 of 1978. See also Oriakhogba DO “DABUS gains territory in South Africa and Australia: Revisiting the AI-inventorship question” (2021) 9(1) *South African Intellectual Property Law Journal* (2021) 87 at 96.

³⁸ Section 100(f) of the US Patent Act defines an inventor as an “individual”, which means a natural person. See also *In re Application of Application No. 16/524*, 350 July 2019; article 81 of the European Patent Convention.

³⁹ While AI is generally viewed as fundamentally unnatural and far from what is characteristically human, some view it as an “inevitable concomitant of human progression”: Ning (2023) at 422.

The clash also arises when it comes to the criteria for patentability under the existing patent framework.⁴⁰ The traditional patentability requirements are that an invention must be new; non-obvious to a person skilled in the art (also known as inventive step which means the invention does not form part of the prior art); and useful, in that it can be used or applied in industry, agriculture and trade.⁴¹ But two patentability requirements are problematic when it comes to AI-generated inventions, namely novelty and the inventive step. Section 25 of the Patents Act provides that “an invention shall be deemed to be new if it does not form part of the state of art immediately before the priority date of any claim to that invention”.⁴² This novelty requirement means that, to qualify for registration, the invention should not form part of the prior art.⁴³ However, it will prove to be difficult to satisfy this requirement in the context of AI-generated inventions because the machine relies on information built into its system.⁴⁴

The inventive-step assessment is also problematic⁴⁵ in that the test for inventiveness is measured against “a person skilled in the art” and nothing else.⁴⁶ Based on this standard, it is arguably questionable if an AI invention could ever satisfy the current non-obviousness test in view of the fact that AI operates by drawing conclusions from large amounts of data.⁴⁷ Abbott opines that it may be difficult to determine cognitively what would be found to be obvious to an AI since the “mental process” involved when inventing, by humans, is absent.⁴⁸ Consequently, there may be a need to change the inventive-step test to rather focus on the ability of the AI to reproduce the invention described and claimed in the patent application.

In summary, the first hurdle in the existing rules relates to human inventorship; the second hurdle is meeting the patentability requirements. Over the years, the patent system has retained this high standard that revolves around the human element. While the standard may have survived the advent of computers, generative AI poses the risk of disrupting the status quo, as a shift in the legal landscape appears to be inevitable.

⁴⁰ Ning (2023) at 422; Merritt (2023) at 225–226; Hashiguchi (2017) at 29; Koay & Li (2020) at 404.

⁴¹ Section 25 of the Patents Act 57 of 1978.

⁴² Section 25(5) of the Patents Act 57 of 1978.

⁴³ See generally Visser & Van der Merwe (2024) at 330; Van der Merwe, Geyer & Kelbrick (2016) at 416.

⁴⁴ Merritt (2023) at 225–226.

⁴⁵ Kim D “AI-generated inventions: Time to get the record straight” (2020) 69(5) *GRUR International – Journal of European and International IP Law* 443 at 446–448. See also Oriakhogba (2021) at 93.

⁴⁶ Section 25(10) of the Patents Act 57 of 1978. See also Visser & Van der Merwe (2024) at 333–334; Crouch D “Legal fictions and the corporation as an inventive artificial intelligence” in Abbott (2022) 355 at 367; Abbott R “The artificial inventor project” (December 2019) *WIPO Magazine* available at <https://www.wipo.int/en/web/wipo-magazine/articles/the-artificial-inventor-project-41111> (accessed 17 January 2024).

⁴⁷ Merritt (2023) at 225–226 argues that there is a real possibility that continued development of AI will result in everything becoming obvious.

⁴⁸ Abbott (2019).

2.2 The international and regional patent framework

The Agreement on Trade-Related Aspects of Intellectual Property Rights of 1995 (TRIPS), signed in Marrakesh, Morocco, on 15 April 1994, is an international agreement that sets the minimum standards on IP for member states of the World Trade Organization (WTO).⁴⁹ Most African countries, including South Africa, are signatories to the TRIPS Agreement and obliged to comply with its provisions.⁵⁰ Article 8 of the TRIPS Agreement provides that:

*[t]he protection and enforcement of IP rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.*⁵¹

The main objectives of the TRIPS Agreement are to promote technological innovation and ensure the transfer of technology for the benefit of the public. The TRIPS Agreement thus frames the IP system in terms of innovation, technology and public welfare.⁵² The promotion of innovation is of equal importance as the transfer and dissemination of technology. Notably, the TRIPS Agreement does not cater explicitly for AI-generated inventions since this is a new technology. Similarly, national laws across the globe do not expressly make provision for inventions autonomously produced by a machine. The TRIPS Agreement is also silent on the nature of inventors, which means that WTO member states have policy space in which to decide on the nature and form of the protection, if any, that should be given to AI-generated inventions.⁵³

The second international treaty is the Paris Convention for the Protection of Industrial Property ("Paris Convention") which was concluded on 20 March 1883. It was the first international agreement adopted under the World Intellectual Property Organization (WIPO), a specialised agency of the United Nations which aims to ensure that intellectual creations are protected. The Paris Convention makes provision for patents.⁵⁴ Article 4^{ter} requires the mentioning of the inventor in the application for a patent. It is silent, however, on who qualifies as an inventor. The patentability requirements are also not clearly spelt out under article 4^{quater}. The latter states that the grant of a patent shall not be refused or invalidated on the ground that the sale of the patented product is subject to restrictions resulting from domestic law. Again,

⁴⁹ Article 1 of the TRIPS Agreement signed Marrakesh in Morocco on 15 April 1994. See Annex 1C of the Marrakesh Agreement establishing the World Trade Organization.

⁵⁰ South Africa became a member state of the World Trade Organization on 1 January 1995. See World Trade Organization "South Africa and the WTO" available at https://www.wto.org/english/thewto_e/countries_e/south_africa_e.htm#:~:text=South%20Africa%20has%20been%20a,GATT%20since%2013%20June%201948 (accessed 13 September 2023).

⁵¹ Article 7 of the TRIPS Agreement.

⁵² World Trade Organization "TRIPS – Trade-related aspects of intellectual property rights" available at https://www.wto.org/english/tratop_e/trips_e/trips_e.htm (accessed 4 September 2023).

⁵³ Mitra-Kahn B "Economic reasons to recognise AI inventors" in Abbott (2022) 375 at 388.

⁵⁴ See articles 4 and 6 of the Paris Convention of 1883.

member states have to decide on the criteria for patentability under the Paris Convention.

It is worth mentioning the Patent Cooperation Treaty (PCT), which was concluded in Washington on 19 June 1970. It governs international patent applications and submissions,⁵⁵ and was entered into force on 1 April 2002. The PCT facilitates the single filing of a patent application in multiple countries. It leaves it to signatories to decide on inventorship requirements,⁵⁶ which means that signatories to the PCT are able to decide individually what information is required in regard to inventors and what form it should take. Where there are inventorship requirements in some of the chosen jurisdictions, the applicant must fulfil those. The listing of an inventor is optional in countries where such a requirement is not specified.⁵⁷

At the African-regional level, an instrument of relevance is the Protocol to the Agreement establishing the African Continental Free Trade Area on Intellectual Property Rights, adopted in February 2023 in Accra, Ghana.⁵⁸ Article 12 requires state parties to grant patents for inventions, including products or processes in all areas of technology, which are new, involve an inventive step, and are industrially applicable. Its use of the word “shall” implies that state parties are obliged to grant patents as long as the well-established patentability requirements have been satisfied. Furthermore, patent laws should not hinder access to, inter alia, medicines, vaccines, diagnostics, therapeutics, or other health-care inputs, ingredients and processes.⁵⁹ Notably, article 17 deals with emerging technologies. It provides as follows:

*State Parties may: a. adopt measures to protect emerging technologies through existing categories of intellectual property rights or sui generis systems to facilitate trade under the AfCFTA; b. adopt measures to promote access and use of new and emerging technologies; c. to support and encourage the use of emerging technologies to facilitate industrialisation and the development of value chains; and d. promote environmentally friendly use of emerging technologies.*⁶⁰

State parties are permitted to protect emerging technologies using the existing IP systems or by adopting *sui generis* systems. It can be inferred from the wording in the provision above that the IP Protocol is in favour of protecting emerging technologies. By implication, states may use their patent laws to protect emerging technologies such as

⁵⁵ Under article 3, it sets out the requirements for international applications.

⁵⁶ Mitra-Kahn (2022) at 388.

⁵⁷ Regulation 4(1)(a)(iv) and 4(1)(c)(i) of the WIPO Regulation under the Patent Cooperation Treaty of 2004.

⁵⁸ African Union Seventh Extra-Ordinary Session of the Specialised Technical Committee on Justice and Legal Affairs (Experts Meeting) (16–21 January 2023) STC/Legal/Exp available at https://www.isds.bilaterals.org/IMG/pdf/en_-_draft_protocol_of_the_afcfta_on_intellectual_property_rights.pdfm (accessed 24 February 2024).

⁵⁹ Article 12(3)(a) of the IP Protocol.

⁶⁰ Article 17(1) of the IP Protocol. Emphasis added.

AI-generated inventions in order to facilitate trade, industrialisation and the development of value chains.

This desire to protect emerging technologies is laudable and a positive development, as it has the potential to contribute to economic growth. South Africa has observer status at the African Regional Intellectual Property Organisation (ARIPO) meetings, which is consistent with article VI of the Lusaka Agreement on the Creation of the African Regional Intellectual Property Organisation of 2016, given that mandates ARIPO to cooperate with non-member states. It is, therefore, important to examine the legal position regarding AI-generated inventions under the ARIPO patent regime. The position under the African Intellectual Property Organisation (OAPI) is not included in this discussion since South Africa is neither a member nor a country with observer status.

The Harare Protocol on Patents and Industrial Designs of 2023, adopted in Harare, Zimbabwe, governs patents in ARIPO member states. Article 3(10) states that “ARIPO patents shall be granted for any inventions, in all fields of technology”. This is on condition that the inventions are new, involve an inventive step, and have industrial application. Although the Harare Protocol does not refer to AI, the words “any inventions in all fields of technology” show that the provision is all-encompassing. Arguably, ARIPO member states may grant patents to AI-generated inventions if the latter satisfy the patentability requirements.

3 INNOVATION AND PROTECTIONISM

3.1 Human innovation versus artificial innovation

There are four types of innovation.⁶¹ Product innovation relates to products or services which are new in terms of their characteristics or intended uses. Process innovation entails the implementation of a new or significantly improved production or delivery method. Marketing innovation is concerned with new marketing methods that involve include significant improvement in product design, packaging, promotion or pricing. Lastly, organisational innovation deals with the adoption of new organisational methods in companies’ business practices. Innovation may also be classified as technological or non-technological,⁶² as well as formal or informal. The latter is relevant in the context of African countries, as they tend to have large informal sectors.

Crucially, the new product, service, process, method or practice requires implementation through market availability, so, for it to qualify as an innovation, it cannot merely be abstract.⁶³ In other words, innovation requires the commercialisation of new ideas.⁶⁴ As such, not all inventions result in innovation, as some inventions are

⁶¹ OECD (2009) at 11–12.

⁶² OECD (2009) at 15.

⁶³ De Beer, Oguamanam & Schonwetter (2014) at 10.

⁶⁴ WIPO “IP & business: Intellectual property, innovation and new product development” (30 July 2005) *WIPO Magazine* available at https://www.wipo.int/wipo_magazine/en/2005/04/article_0002.html (accessed 11 September 2023).

not commercialised – meaning that the new idea never gets to see “the light of commercial success”.⁶⁵ Hence, although there is a close interplay between innovation and invention, the two terms are not synonymous. As explained earlier, innovation involves the process of implementing the new product or method (the invention) and turning it into a real-world solution; put differently, it involves (again) the commercialisation of the invention.⁶⁶ Thus, the implementation requirement distinguishes an innovation from an invention.⁶⁷ Inventions are promoted and protected under the patent system, and are a core component of innovation.

While research has generally shown that the current IP modalities contribute to innovation and creativity in Africa, most patent office are unfit for purpose. On the one hand, they lack the capacity to examine patents and continue to rely on foreign examination despite statutory provisions that require local inspection of patent applications.⁶⁸ On the other hand, there is a near-total lack of electronic storage and dissemination of patents filings for use by innovators and other stakeholders. This results in patent offices merely collecting fees instead of facilitating the disclosure of useful information to society that would foster innovation. As Mgbeoji argues, the weaknesses of African patent offices have the potential to hamper technology transfer and domestic industrialisation.⁶⁹

Thus, the facilitative role of Africa's current IP modalities undoubtedly needs to be strengthened.⁷⁰ Capacity-building, improvement of technology in patent offices, and the adoption of sound, inclusive and development-oriented IP policies would make a positive impact on innovation on the continent. However, the position in South Africa is more advanced, as its patent office introduced an automated system that enables it to store and disseminate patents electronically for the benefit of society.⁷¹

The question that arises is whether AI-generated inventions allow for full disclosure of the particulars of the invention, thereby promoting innovation inasmuch as other people are able to use the information in ways that lead to technological progress.⁷² Simply put, are patent laws suited to protecting AI-generated inventions where there is no human input? Moreover, what is the effect on the *quid pro quo* principle for granting monopoly rights over an invention in instances where full disclosure of the patented invention is not possible?

Proponents of AI-generated inventions argue that it is important to recognise and protect such inventions and that failure to do so would severely limit technological and

⁶⁵ WIPO (30 July 2005).

⁶⁶ Ncube (2021) at 94.

⁶⁷ Ncube (2021) at 96.

⁶⁸ Mgbeoji I “African patent offices not fit for purpose” in De Beer, et al. (2014) at 238.

⁶⁹ Mgbeoji (2014) at 240–242.

⁷⁰ De Beer, Oguamanam & Schonwetter (2014) at 5.

⁷¹ CIPC “New automated processes” available at <https://www.cipc.co.za/?p=12019> (accessed 25 November 2024).

⁷² Visser & Van der Merwe (2024) at 317.

scientific advances.⁷³ This is on the understanding that AI is a “human-made” entity or tool that needs human direction only for a short period;⁷⁴ once the AI becomes emancipated or strong AI, it develops its own inventive skills and can produce its own inventions.⁷⁵ This is generally known as generative AI, and it is a technology that uses algorithms to produce new content. Merritt states that this type of AI is not limited by the dataset used to create it and is able to create new processes to solve new problems.⁷⁶ As indicated earlier, the AI that currently exists is narrow or weak.⁷⁷ Strong or generative AI is, however, no longer far-fetched as machines are beginning to play an essential role in the inventive process.⁷⁸ Therefore, the recognition and proper protection of such inventions is necessary.

Moreover, patent protection for AI-generated inventions would act as an incentive for disclosing new information, thus, promoting innovation.⁷⁹ Abbott supports this position and argues that “patent protection should be available for AI-generated [inventions] because it will incentivise innovation”.⁸⁰ It is important to note that AI itself does not need to be incentivised; instead, patent protection would encourage the people who develop, own and use AI. Allowing patents to be granted for AI-generated inventions would foster the development of AI technologies, which, in turn, would result in more innovation for society.⁸¹

However, opponents of AI-generated inventions hold a different view and reject the protection of inventions that are created solely by pressing the “go” button on an AI.⁸² The key question here is: What does this mean for a human inventor? The rise of AI and its ability to create or innovate seemingly in the blink of an eye has serious implications for the livelihoods of inventors and the quality of what is produced. Athota avers that AI by its nature “cannot produce output without input from the human mind feeding information into the machine”.⁸³ Kim holds the same view, arguing that it is erroneous to believe that there can be an invention produced by an AI, as there is a difference

⁷³ There is a need for a patent system that allows AI to evolve in ways that make the lives of people better: Dornis (2020) at 158–159. See also Ning (2023) at 448; Abbott R “Introduction: Artificial intelligence and the law” in Abbott R *The reasonable robot: Artificial Intelligence and the law* (2020) 11.

⁷⁴ See Dornis (2020) at 106; Merritt (2023) at 214.

⁷⁵ Alto (2023) at 4–5.

⁷⁶ Merritt (2023) at 215 uses the term “general AI” and explains that it has a broad reach and functions like the human mind.

⁷⁷ See the discussion under part 2.

⁷⁸ Merritt (2023) at 212.

⁷⁹ Engel A “Can a patent be generated for AI-generated invention?” (2020) 69 *GRUR International – Journal of European and International IP Law* 1123.

⁸⁰ Abbott (2020) at 10.

⁸¹ Abbott (December 2019).

⁸² Ning (2023) at 429.

⁸³ Athota VS *Mind over matter and artificial intelligence: Building employee mental fitness for organisational success* Australia: Palgrave Macmillan (2021) at 3.

between “autonomous” and “autonomy”.⁸⁴ The human mind is, thus, historically seen as the main source of input of the information which the algorithms use or respond to.

In this regard, various jurisdictions have a similar legal position that an inventor must be a natural person. For example, the USA and Australia have held that the existing patent law does not recognise AI-generated inventions and that inventors must be human.⁸⁵ However, the decision of the German Federal Court of Justice in the DABUS case seems to suggest that German patent law will protect AI-generated inventions provided that a human person is named as its inventor in the application.⁸⁶ The condition which must be met, apart from the patentability requirements, is that the applicant must name at least one “natural” inventor.⁸⁷ This is irrespective of whether the AI made the main contribution. This means that the designation of a natural person is necessary if an AI system was used as a means to develop the claimed invention or technical teaching.

It can be inferred then that the German position points to the possibility of protecting inventions generated by AI with minimal human input. This type of AI would fall into the category of strong or general AI. Although the applicant has to provide the name of the inventor in the patent application, the court stated, that the patent office is, in principle, not responsible for checking the content of the designation of the inventor and that an incorrect assessment has no direct effect on the application procedure.⁸⁸ Arguably, an invention generated by AI will be patented if it meets the patentability requirements.

As regards South Africa, it awarded inventorship to DABUS, making this the world's first patent granted to an AI as an inventor.⁸⁹ The (in)correctness of South Africa's CIPC's approach to the DABUS application stemmed from the fact that:

*questions relating to whether the invention is designated as excluded subject matter under s 25(2) and (3), and whether the inventor and applicant are qualified under s 27(1) are usually ignored at the formal examination stage ... thus, making them matters for the Commissioner of Patents to consider as grounds for the revocation of a patent where such claims in respect of the patent are made under s 60 of the SAPA.*⁹⁰

⁸⁴ Kim D (2020) at 446–447.

⁸⁵ See *Stephen Thaler v Shira Perlmutter, Register of Copyrights and Director of the United States Copyright Office, et al.* Civil Act No. 22–1564(BAH). The US Federal Circuit did not address the question of whether AI-assisted inventions are also excluded from protection. See *Thaler v Vidal* F 4th 1207 (Federal Circuit court 2022). See *Decision of the Full Federal Court of Australia* Case No. (2022) FCAFC 62. See also Oriakhogba (2021) at 96.

⁸⁶ See Federal Court of Justice *President of the German Patent and Trade Mark Office v Thaler* (11 June 2024) paras 44–46.

⁸⁷ See Federal Court of Justice (11 June 2024) para 44.

⁸⁸ Paragraph 46.

⁸⁹ See Patents No. 2021/03242.

⁹⁰ Oriakhogba (2021) at 93.

In addition, South Africa's depository patent system lacks substantive examination of the invention.⁹¹ The application for an invention only involves a formal examination, a process which includes checking the application forms used and seeing if the financial and administrative requirements have been met.⁹² It also includes checking the nature of the inventor and the applicant, as well as whether the invention is excluded under section 25(2) of the Patents Act.⁹³ Substantive examination would focus on the patentability requirements based on the claims set out in the application; the examiner would also check the quality of the invention and the extent of disclosure against the prior art.⁹⁴ As Oriakhogba notes, however, the South Africa patent system is merely a depository, while the CIPC only conducts limited formal examinations⁹⁵ – a situation which has made it easy for inventors to get patents.

In contrast, the reason why DABUS failed to obtain a patent in other jurisdictions such as the United Kingdom and Australia was that no human inventor had been identified in the patent application. This point was raised in the formal examination stage.⁹⁶ The question of whether AI-generated inventions meet the patentability requirements was secondary to the inquiry and would have been addressed in the substantive examination.

The legal position regarding the protection of AI-generated invention thus remains controversial. It has been argued that allowing AI-generated inventions would stifle innovation and competition since it would lead to the creation of “patent thicket-generators” due to licensing requirements.⁹⁷ A “patent thicket” is a dense web of overlapping patents that protect different components of a technological product.⁹⁸ It comes into being when the overlapping patents belong to different firms, and makes it difficult for a company to commercialise new technology. For example, thickets in the

⁹¹ South Africa has a depository system. See section 34 of the Patents Act 57 of 1978 and Regulations 40–41 of the Patents Regulations of 1978. See also Intellectual Property Policy at 17; Van der Merwe, Geyer & Kelbrick (2016) at 389.

⁹² Goodman J “Homography of inventorship: DABUS and valuing inventions” (2022) 20 *Duke Law and Technology Law* 1 at 16.

⁹³ Section 25(2) of the Patents Act 57 of 1978; Oriakhogba (2021) at 92.

⁹⁴ Section 25(5)–(12) of the Patents Act.

⁹⁵ Oriakhogba (2021) at 94.

⁹⁶ *Thaler v Comptroller-General of Patents, Designs and Trademarks* [2023] UKSC 49, European Patent Office, Board of Appeal Case No. J 0008/20 (Designation of inventor/DABUS) (21 December 2021); *United States Court of Appeals for the Federal Circuit in Stephen Thaler v Katherine K Vidal* Case No. 22–2347 (Fed Cir. 2022; Federal Court of Australia *Commissioner of Patents v Thaler* [2022] FCAFC 62.

⁹⁷ Taylor J “I’m sorry Dave I’m afraid I invented that: Australian court finds AI systems can be recognised under patent law” (31 July 2021) *The Guardian* available at <https://www.theguardian.com/technology/2021/jul/30/im-sorry-dave-im-afraid-i-invented-that-australian-court-finds-ai-systems-can-be-recognised-under-patent-law> (accessed 21 November 2024).

⁹⁸ UK Intellectual Property Office *A study of patent thickets* Newport: IPO (2013/26) at 7 available at <https://assets.publishing.service.gov.uk/media/5a7dc04ded915d2acb6edea7/ipresearch-thickets.pdf> (accessed 11 November 2024).

software industry would hinder innovation, given that computer programmers rely on the modularisation of code.⁹⁹

Merritt and others have expressed contrary views, however, arguing that there are many benefits to be derived from AI-generated inventions, given that generative AI can analyse large and complex data and yield innovations that might not otherwise come about.¹⁰⁰ As Haefner, et al. note, “AI can deliver higher quality, greater efficiency and better outcomes than human experts.”¹⁰¹ These added benefits may reduce the cost of processes involved in innovation, thereby helping companies to remain competitive.¹⁰² The fact that AI is moving into what used to be the domain of humans and taking on their “traditional” role in the context of innovation and creativity should not be an obstacle to its recognition or the role it could fulfil. In the near future, generative AI has the potential to contribute to innovation to the same extent as humans. Although the effects of AI innovation on sustainable development have been mixed,¹⁰³ it has the potential to contribute to achieving the Sustainable Development Goals (SDGs) if the risks that it (AI) poses are carefully managed.¹⁰⁴

AI promotes SDG 9, which provides for the building of resilient infrastructure, the promotion of inclusive and sustainable industrialisation, and the fostering of innovation.¹⁰⁵ Innovation, including AI innovation, can play an important role in supporting the realisation of other goals too, by reducing poverty in Africa, ending hunger, and improving everyone’s general health and well-being.¹⁰⁶ Digital technologies can also help in addressing climate change, optimising resource use, and improving farming techniques – the latter can lead to an increase in crop yields and the efficient use of energy. In this vein, Nahar identifies various ways in which AI could contribute to the SDGs, such stimulating economic growth; fostering the upskilling and reskilling of the workforce through personalised training and access to learning opportunities; and contributing to the improvement of water management.¹⁰⁷

As such, IP rights need to be leveraged or harnessed to promote AI innovation and creativity which, in turn, would aid development in Africa. The continent cannot afford to lag behind in deriving benefits from generative AI. Instead, it should exploit AI so as

⁹⁹ Ncube (2021) at 97.

¹⁰⁰ Merritt (2023) at 224.

¹⁰¹ Haefner N, Wincent J, Parida V & Gassmann O “Artificial intelligence and innovation management: A review, framework, and research agenda” (2021) 162 *Technological Forecasting & Social Change* 1 at 2.

¹⁰² Merritt (2023) at 224.

¹⁰³ See Ncube (2021) at 122.

¹⁰⁴ Nahar S “Modelling the effects of artificial intelligence (AI) based innovation On Sustainable Development Goals (SDGs): Applying a system dynamics perspective in a cross-country setting” (2024) 201 *Technological Forecasting & Social Change* 1 at 2. See also WIPO (2021) at 1–4.

¹⁰⁵ United Nations Department of Economic and Social Affairs Sustainable Development “The 17 Goals” <https://sdgs.un.org/goals> (accessed 12 September 2023).

¹⁰⁶ This includes SDGs 2, 3, 6, 7, 8, 11 and 13. See WIPO (2021) at 12.

¹⁰⁷ Nahar (2024) at 4–6.

to find solutions to pressing problems, such as in the area of pharmaceuticals. The need is to adapt to technological advancement while putting mechanisms in place to support it.

3.2 Protectionism

Protectionism refers to the policies aimed at protecting the domestic market or small and emerging companies. The term is generally used in the context of international trade when governments impose trade restrictions, such as tariffs and subsidies, to protect infant industries and preserve jobs.¹⁰⁸ Similarly, in the IP context, protectionism obtains when laws or policies are aimed at restricting or limiting the protection of inventions made by non-humans. The existing patent rules may serve as a deterrent to AI-generated inventions. The imposition of requirements that AI cannot realistically meet due to its inherent nature effectively excludes it from patent protection.¹⁰⁹ For example, the requirement that an invention must be non-obvious to a person skilled in art would pose a hurdle for AI-generated inventions.¹¹⁰

If there is little to no IP protection of AI-generated inventions, this would undermine technological innovation.¹¹¹ In such circumstances, IP becomes a threat to AI innovation because of the application of the current laws, which have the potential to impede creativity. The general attitude towards inventions in most jurisdictions, such as the USA,¹¹² demonstrates a certain level of protectionism or restriction regarding what is patentable. IP dynamics may thus indirectly undermine innovation,¹¹³ as businesses tend to be cautious and will avoid the manufacturing or development of products that could infringe someone's patent rights.

The current patent legislative framework exhibits protectionism towards human inventiveness or the creations of human beings, which are the foundation of the patent system.¹¹⁴ Human involvement has been retained as an essential component of the IP law system;¹¹⁵ as such, lack of human involvement may become a barrier to the protection of AI-generated inventions. In other words, the rule that IP protects only

¹⁰⁸ See article 20 of the General Agreement on Tariffs and Trade (GATT) of 1994.

¹⁰⁹ Hashiguchi (2017) at 29.

¹¹⁰ Section 25(10) of the Patents Act 57 of 1978.

¹¹¹ See De Beer, Sowa I & Holman K "Frameworks for analysing African innovation: Entrepreneurship, the informal economy and intellectual property" in De Beer J, Armstrong C, Oguamanam C & Schonwetter T (eds) *Innovation & intellectual property: Collaborative dynamics in Africa* (2014) at 32.

¹¹² See generally the decision in *Naruto v Slater* No 16-15469 (United States Court of Appeals Ninth Circuit, 2018) which is still relevant even though the case deals with copyright law.

¹¹³ See De Beer, Sowa & Holman (2014) at 32.

¹¹⁴ As mentioned earlier, the assumption is that only human beings are capable of inventing: see Dornis (2020) at 115.

¹¹⁵ The same issues are being raised with regard to copyright law: see *Stephen Thaler v Shira Perlmutter, Registrar of Copyrights and Director of the United States Copyright Office* Civil Action No. 22-1564(BAH).

human creations or ingenuity should not be treated as sacrosanct. Furthermore, the law should not be rigid: in a proper system, AI-generated inventions do not pose a threat to humans, and where there is human input, the naturally person usually enjoys protection.¹¹⁶

Abbott argues that failing to recognise AI as an inventor reduces transparency and allows human beings to take credit for inventions they did not create.¹¹⁷ Importantly, allowing a person to be listed as the inventor of an AI-generated invention puts all inventions on the same level and does not take cognisance of the work of human inventors who legitimately invent new products or processes.¹¹⁸ This is as unfair and prejudicial to human inventorship as it is to generative AI. The argument that AI cannot autonomously generate inventions can no longer be supported since in practice there are inventions that have been generated autonomously by machines.¹¹⁹ With technology evolving rapidly, there is a shift from weak AI systems to AI with problem-solving abilities.¹²⁰ These strong systems are able to understand, learn and apply knowledge across a range of tasks. The realisation of strong AI systems is hence becoming a reality.

3.2.1 *The black-box problem and the right to disclosure in the patent system*

The disclosure requirement is provided under the patent laws. Article 29(1) of the TRIPS Agreement obliges member states to have laws that require an applicant for a patent to disclose the invention in a “manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art”. It further provides that failure to meet the disclosure requirement will result in unspecific or speculative embodiments of the invention. The granting of a patent in such circumstances may harm innovation and unduly affect competition.

South Africa's Patents Act, in compliance with the TRIPS Agreement, also requires the specification to fully disclose the invention.¹²¹ This raises the question of whether generative AI can disclose its inventions in a sufficiently clear manner. This is known as the black-box problem, which refers to the lack of transparency, explainability, and interpretability of an AI's internal processes.¹²² The disclosure requirement is a

¹¹⁶ See Dornis (2020) at 111.

¹¹⁷ Abbott (2022) at 10 & 13. See also Gervais D “Is Intellectual property law ready for artificial intelligence?” (2020) 69(2) *GRUR International – Journal of European and International IP Law* 117.

¹¹⁸ Abbott (2020) at 10.

¹¹⁹ Abbott (2020) at 10.

¹²⁰ Bohnenberger T *AI & the industry* 1st ed Berlin: Neopubli GmbH Publishers (2023).

¹²¹ Among other things, the specification should describe, illustrate and exemplify the invention and the manner in which it works. See section 33(3)(b) of the Patents Act 57 of 1978.

¹²² Von Eschenbach WJ “Transparency and the black box problem: Why we do not trust AI” (2021) 34 *Philosophy & Technology* 1607 at 1608. See also ScaDS.AI “Cracking the code: The black box problem of AI” at <https://scads.ai/cracking-the-code-the-black-box-problem-of-ai/#:~:text=The%20black%20box%20problem%20refers,This%20poses%20a%20significant%20challenge> (accessed 29 January 2024). See generally Brozek B, et al. “The black box problem revisited: Real and imaginary challenges for automated legal decision making” (2023) *Artificial Intelligence and Law* 1.

fundamental attribute of patent law, and it enables a person skilled in the relevant area to reproduce the invention once the patent expires and the invention falls into the public domain.¹²³ The idea is for the invention to contribute positively to the welfare of society, which justifies the monopoly granted to the inventor.¹²⁴ A clear description of the extent and scope of the rights protected also assists third parties from infringing the patent.

The lack of interpretability of AI algorithms poses a challenge, particularly where the disclosure requirement cannot be satisfied. It means that other companies cannot further develop the technology or make use of it once the term of protection comes to an end. The IP system provides rights and exceptions and protects creators, while at the same time providing benefits to society; however, the black-box problem undermines the rationale for granting protection in the case of AI-generated inventions since the disclosure requirement may not be satisfied. This is particularly in cases where the black box AI and not Explainable AI (XAI) is concerned. As opposed to XAI which creates algorithms that give insights and explanations on how the AI invented the product,¹²⁵ black box AI does not explain how the output is produced. Kosinski correctly opines that:

*Generative AI models rely on complex neural networks to respond to natural language commands, solve novel problems and create original content, but it's difficult to interpret what happens inside those networks.*¹²⁶

In other words, the deep learning systems that power generative AI models are so complex that even their creators do not understand exactly what happens inside them. The black box AI becomes a hurdle as the applicant may be unable to fully disclose the invention in the patent application. Protectionism, or restricting the grant of rights to such inventions, would be justifiable in such circumstances. As such, a patent cannot be granted for an invention which is unspecific or speculative since the monopoly cannot be justified. Where the generative AI is transparent, or a so-called “explainable AI”,¹²⁷ the disclosure requirement must be met for the purposes of patent protection.

¹²³ The public should know precisely how to make and use the invention. See Elahi S & De Beer J (eds) *Knowledge & innovation in Africa: Scenarios for the future* Cape Town: Open AIR (2013) at 140; Van der Merwe, Geyer & Kelbrick (2016) at 359; Cuntz A, Fink C & Stamm H “Artificial intelligence and intellectual property: An economic perspective” Economic Research Working Paper No. 77/2024, WIPO 11-12 available at <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-econstat-wp-77-en-artificial-intelligence-and-intellectual-property-an-economic-perspective.pdf> (accessed 11 November 2024).

¹²⁴ The patent provides a *quid pro* which is aimed at providing an incentive for new technology. See Van der Merwe, Geyer & Kelbrick (2016) at 359.

¹²⁵ Ganesan A “Ethical use of AI in criminal justice system” in Gaur L (ed) *Responsible implementations of Generative AI for multidisciplinary use* (2025) 353-355.

¹²⁶ Kosinski T “What is black box artificial intelligence (AI)?” available at <https://www.ibm.com/think/topics/black-box-ai> (accessed 6 March 2025).

¹²⁷ XAI is a class of models that may be a solution to black box problem in AI. See Von Eschenbach (2021) at 1615.

4 ANALYSIS AND THE WAY FORWARD

The current laws demonstrate that South Africa generally lacks a legal framework for AI. This has a negative impact on the recognition and protection of AI-generated inventions and the promotion of AI innovation. The international and regional framework appears to be in favour of protecting technological inventions and in promoting innovation. The TRIPS Agreement requires the protection and enforcement of IP rights to contribute to the promotion of technological innovation. AfCFTA makes provision for emerging technologies. It promotes access to and use of newly emerging technologies. State parties are encouraged to adopt measures through the existing categories of IP rights or *sui generis* systems to protect emerging technologies. African countries, including South Africa, are urged to use emerging technologies to facilitate industrialisation and the development of value chains. This demonstrates that AfCFTA regards emerging technologies such as AI as drivers for development and industrialisation. ARIPO's Harare Protocol on Patents and Industrial Designs of 2023 states that ARIPO patents shall be granted for "any inventions", an open-ended provision which seems to accommodate AI.

It has been averred that under the current patent legal system, AI cannot be regarded as an inventor and AI-generated inventions cannot be protected.¹²⁸ For example, under its Patent Act, Germany is of the view that AI cannot be an inventor.¹²⁹ However, its Federal Court clarified that inventions generated by AI are protectable, subject to a natural person being named as an inventor. Despite these developments in Germany, the protection of AI-generated inventions remains debatable. Abbott concludes that "the law remains backward-looking when AI creates 'products of the mind'".¹³⁰ It is settled law that an AI cannot be a bearer of rights and cannot assign rights to a human being as the owner.¹³¹ While AI does not qualify as an inventor, this should not be interpreted to mean that inventions generated by AI autonomously should not be protected and thus fall into the public domain. The current patent system is evidently deficient since the laws were not designed with AI systems in mind.¹³²

Increased growth in AI-generated inventions and the transition to an AI-enabled economy is inevitable. The shifting legal landscape of AI requires a proper legal framework. Ning accordingly opines that:

[t]he superpower of a patent is only matched by the superpower of AI. If we are not careful, we might let one consume the other. The best way forward is to protect both, at no

¹²⁸ See case law dealing with the DABUS in various jurisdictions: *Thaler v Comptroller-General of Patents, Designs and Trademarks* [2023] UKSC 49; *Commissioner of Patents v Thaler* [2022] FCAFC 62, *Thaler v Vidal* [2022] US Court of Appeals for the Federal Circuit No. 21-2347. See also Oriakhogba (2021) at 90.

¹²⁹ See Federal Court of Justice (11 June 2024) para 21.

¹³⁰ Abbott (2020) at 10.

¹³¹ Oriakhogba (2021) at 87.

¹³² Dornis (2020) at 97. See also Abbott (2020) at 10.

*cost to the ... potential and possibility that AI has to offer. It is a delicate but necessary balance.*¹³³

AI is bound to reshape patent law. A properly planned and supported transition through a legislative and governance framework is required. It would be unprogressive for AI-generated inventions, the so called “invention without an inventor”, to be left outside of the protection afforded under the patent system. The increasing role of AI is indicative of the direction which the law needs to take. There is no doubt that the law tends to react slowly and cautiously to new technology.¹³⁴ The need for appropriate policy to address IP, AI and innovation cannot be overstated. South Africa’s IP Policy forms an integral part of the country’s broader development strategy.¹³⁵ The existing policy framework may generally inform the approach to generative AI, but most importantly there is a need to adopt an AI policy. Implementation of the AI policy will be crucial since a good policy is effective only to the extent to which it is implemented. Therefore, it should not be just rhetoric, with documents being left to gather dust.

The development of innovative technologies is important to achieving many of the SDGs, as it offers new ways of addressing poverty, hunger, premature mortality, and issues of climate change.¹³⁶ The protection of AI-generated inventions is pertinent to innovation and, in turn, to the attainment of SDGs. As Azoulay, the director of the United Nations Educational Scientific and Cultural Organisation (UNESCO), states:

*AI is humanity’s new frontier ... The guiding principle of AI is not to ... replace human intelligence ... The AI revolution opens up exciting new prospects, but the anthropological and societal upheaval it brings in its wake warrant careful consideration.*¹³⁷

Numerous benefits may be derived from generative AI, since it can play a pivotal role in various fields and industries ranging from the manufacturing of autonomous cars to agriculture and farming.¹³⁸ AI applications will enable innovative solutions, improved risk assessment, better planning, and faster knowledge-sharing necessary for the achievement of SDGs.¹³⁹ However, there are also general legal challenges posed by AI, which include issues of accountability when decisions are made by machines, questions of liability, and the possibility of human rights infringements as well as the violation of existing patents. The question that springs to mind is whether the era of AI requires a modernised patent doctrine. The protection of AI-generated inventions will drastically alter or transform the patent system. By implication, this requires a proper and balanced regulation of AI.

¹³³ Ning (2023) at 448.

¹³⁴ This was the case when personal computers first came onto the market several decades ago.

¹³⁵ Intellectual Property Policy at 4.

¹³⁶ WIPO (2021) at 1 & 13.

¹³⁷ See Azoulay A “Towards an ethics of artificial intelligence” (2018) *United Nations UN Chronicle* available at <https://www.un.org/en/chronicle/article/towards-ethics-artificial-intelligence> (accessed 17 August 2023).

¹³⁸ Ning (2023) at 422; Nahar (2024) at 2; WIPO (2021) at 4.

¹³⁹ Azoulay (2018); WIPO (2021) at 4.

An Australian judge remarked that “[n]ew thinking is going to be required if the law is to play its full part in society”.¹⁴⁰ This statement holds true and is consistent with the principle of legal certainty. Redefining IP rules so as to cater for generative AI is needed sooner rather than later. Technology is constantly developing, and laws ought to be in sync with current developments. It is against this backdrop that developments coming from AI cannot be ignored. The law needs to evolve to provide legal protection for AI-generated inventions. Denying such inventions patentability would not be progressive since AI is proving to be a powerful tool that can lead to important inventions and reduce the time required for their creation.¹⁴¹ As indicated earlier, generative AI is by its nature able to analyse large and complex data, something which may lead to the creation of inventions that could not have been realised in the absence of AI. Lack of legal protection will undermine the patent system’s goal of facilitating and incentivising the dissemination of innovations and inventions for the benefit of society.¹⁴²

The issue of what must be contained in the AI legal framework requires an inclusive and coordinated global approach.¹⁴³ Policy considerations need to be balanced with innovation. The extent and scope of protection granted to AI, therefore, needs scrutiny in order to ensure that it aligns with the basic principles of patent law. The DABUS patent application created an international platform for engagement on AI inventorship. Bearing in mind that negotiating an international agreement is a lengthy process, any change to the international patent system will be slow.¹⁴⁴ WIPO does not yet have an AI legal framework and has been leading conversations on the impact of AI on IP Policy.¹⁴⁵ By implication, individual countries, such as South Africa, need to take a legal position, supported by law, regarding AI-generated inventions. The law regulating AI-generated inventions needs to promote the realisation of the benefits of AI while minimising its risks.¹⁴⁶ South Africa needs, at the national level, to develop an inclusive and appropriate IP system which is sensitive to the local context. This means that public policy priorities must be taken into consideration to ensure that the protection of AI-generated inventions does not negatively impact the welfare and advancement of human beings. With properly calibrated patent laws, South Africa can maximise AI benefits while mitigating potential risks harmful to human creativity.

Over-protectionism will discourage innovators and creators from further investing in AI, which might be a threat to development. It would not be in the public interest if society is deprived of inventions from which it could have benefited. It is submitted that generative AI will not replace human-led innovation. Instead, it will complement and

¹⁴⁰ Mitra-Kahn (2022) at 388.

¹⁴¹ Merritt (2023) at 212.

¹⁴² Merritt (2023) at 230.

¹⁴³ There is a need to avoid a “pick-and-choose” approach to ethics. See Azoulay (2018).

¹⁴⁴ Mitra-Kahn (2022) at 388.

¹⁴⁵ WIPO “The WIPO conversation on intellectual property and artificial Intelligence” available at https://www.wipo.int/about-ip/en/artificial_intelligence/conversation.html (accessed 25 November 2024).

¹⁴⁶ See generally Abbott (2020) at 3.

supplement human innovation with its innovative solutions, products and processes. Society stands to benefit from both human inventions and AI-generated inventions. A global approach to the protection of AI-generated inventions would be ideal for the benefit of society. The consequences and impact of protecting AI-generated inventions call for a cautious and balanced approach. Existing IP laws are not fit for purpose and ill-suited for AI since they were not designed with this form of innovation in mind. It might also be problematic to conflate human and AI-generated inventions given AI's potential to disadvantage human creativity.

This leads to the question of whether the recognition of an "artificial inventor" should place it on par with a human inventor or if a differentiation is required. Applying the same patent requirements to AI-generated inventions is like forcing a round peg in a square hole since AI is an entirely a new development. Legal reform or amendment to the law is imperative not only in South Africa but the world at large since the existing rules were not designed to cater for AI.¹⁴⁷ Authors such as Koay and Li make a compelling argument that no major legal reform is needed to ensure certainty.¹⁴⁸ A specific set of rules appended to the existing patent law to deal with AI would suffice.

Abbott in turn points to the principle of "AI legal neutrality" as a new guiding tenet to AI regulation.¹⁴⁹ The basis of this proposal is that the law should not discriminate between AI and human invention and therefore the legal system should be neutral. However, Abbot also acknowledges that there are occasions where differential rules for AI and human beings should apply.¹⁵⁰ It is important in the latter regard to emphasise that AI-generated inventions are fundamentally different from human inventions. Therefore, the protection of AI-generated inventions under the IP system has to consider the differences that exist and find a balance in the protection of IP rights and innovation. A clear distinction is required since a one-size-fits-all approach would be untenable. The threshold for patentability of AI inventions will need to increase since AI can easily make inventions that would result in patent offices granting junk patents.¹⁵¹ An increase in infringement cases from "patent trolls" would harm innovation and economic growth.¹⁵² Monopolisation through the granting of "junk patents" would inadvertently do more to hinder innovation than help it.

5 CONCLUDING REMARKS

Whether and how AI-generated inventions should be protected is a controversial issue and one far from settled. The same applies to the inventorship question. There is no doubt that, on the one hand, important to protect human creators and the human-involvement requirement, or that, on the other, recognition and legislative protection of AI-generated inventions is necessary given the current state of technology. It is argued

¹⁴⁷ Koay & Li (2020) at 403.

¹⁴⁸ Koay & Li (2020) at 403.

¹⁴⁹ Abbott (2020) at 3–4.

¹⁵⁰ AI behaves like a person, but it does not qualify as a person: Abbott (2020) at 4.

¹⁵¹ Oriakhogba (2021) at 93.

¹⁵² Oriakhogba (2021) at 93.

that a proper balance should be struck between a human-centered patent system and technological advancements through AI. Calculation of the risks arising, for example, from the black-box problem and loss of livelihood for human creators or inventors is also necessary. The German approach to AI systems is instructive. The fact that AI cannot be named as an inventor should not prevent owners from listing themselves and indicating in the application that the invention is AI-generated. This is a significant step in the right direction given the advancements in generative AI technology and the crucial need to ensure that South Africa remains competitive.

Balanced laws would create the conditions necessary for innovation to flourish. The objectives of the patent system, among them the promotion of innovation and transfer of technology, provide a basis for the protection of AI-generated inventions. AI, however, requires a different approach involving the development of a clear, specific set of rules and patentability requirements. It is argued that AI-generated inventions cannot be subjected to the same criteria for patentability as human-created ones since they do fall into the category of traditional inventions. This calls for different patentability requirements and a higher threshold to be satisfied for such inventions. A similar approach is in effect used in the registration and protection of non-conventional trademarks. A unique and differentiated approach should be extended to AI-generated inventions, as one cannot apply the same rules in their case. This appears to be both a practical solution to, and a progressive approach for, ensuring that innovation by AI is promoted and protected within the patent system.

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