

# PATENTABILITY OF INVENTIONS CREATED BY ARTIFICIAL INTELLIGENCE: A COMPARITIVE ANALYSIS

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**Abstract-** The Artificial intelligence has gained momentum in the recent years due to the ongoing technological advancements taking place around the world. Its not just bringing an ease to the human civilization rather it is also changing the way of getting things done. With the inception of this technological breakthrough multi-national companies and separate individuals are working on evolving Artificial Intelligence at such a great extent at which we are seeing a rise of a new found question of whether the inventions created by Artificial Intelligence is capable of getting the right of patentability or not, which on other hand is also challenging the age-old notion of granting the patentability right to a living person only. To answer this new found question this work will delve into the emergence of AI technology and how the age-old patent laws in separate jurisdictions are evolving with the passage of time.

**Keywords-** Artificial Intelligence, Patentability, Inventor rights

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## INTRODUCTION

Our world as we know, is continuously evolving. We are currently living in the 4th Industrial Revolution era, which began with the commencement of the 21st Century. The entire human civilization has expanded itself in the fields of “AI (Artificial Intelligence), Big Data and IoT (Internet of Things)”<sup>2</sup>, but it does not end here. As a matter of fact, with each ongoing advancement taking place in the field of IT (Information Technology), our civilization is steadily paving the path for the commencement of the 5th Industrial Revolution era, which will gradually change the perspective of our way of living and perceiving changes happening around us. The upcoming technological development phase will promote intense innovation and such a form of ideology will aid in regulating Deep, multi-level cooperation between human civilization and machine consciousness<sup>3</sup>.

With the continuous advancements taking place in the field of artificial intelligence, it brings upon a major role as it plays a very crucial phase of development in the evolution of mankind. The continuous changes brought upon by Artificial Intelligence in the

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<sup>2</sup> “The Future of AI: How Artificial Intelligence Will Change the World” (Built In2014) <<https://builtin.com/artificial-intelligence/artificial-intelligence-future>>

<sup>3</sup> Regenesys Business School, “The Fifth Industrial Revolution (5IR) and How It Will Change the Business Landscape - RegInsights” (RegInsightsSeptember 8, 2020) <<https://insights.regenesys.net/the-fifth-industrial-revolution-5ir/>>

field of Intellectual Property Rights during the ongoing developments have been highlighted and raised in the “*WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*”<sup>4</sup>, the entire session of the WIPO conversation was organized in order to view and observe the impacts or changes that could come into existence with the development taking place in the field of AI. In recent times, tech giants like Meta, formerly Facebook, Google, Microsoft, etc., have commenced adopting AI technology in the services provided by them to make day-to-day activities easier than before. Currently, many start-ups/ companies have come up with the willingness of investing in technology of Artificial Intelligence and are enhancing the capabilities of AI in such a manner which will enable itself to create things/ inventions for the benefit of mankind<sup>5</sup>. Yet with this continuous effort of enhancing the capabilities of AI, a concern is raised over here whether an invention which was built and developed by us to make our life easier, will it reach the capability of designing and creating further machines by itself which can get the right of patent holder? Further, it is seen around the globe the existing laws of patents only allows humans to be the creator for an invention but here with the turning of tables, will AI machines will be made eligible to become creator of inventions is a huge question of the hour<sup>6</sup>. The entire dissertation will comprise of various jurisdictions for getting a wider scope of existing and upcoming changes in respect to AI patentability. Different jurisdictions will be “*South Africa, United States of America, Australia, European Union, United Kingdom, and India.*”

## RESEARCH QUESTIONS

1. What would it take for artificial intelligence to be deemed as an ‘inventor’?
2. Can the inventions created and developed by Artificial Intelligence machines can get recognition by the laws governing the present patents system around the globe?

## 1. INCEPTION OF ARTIFICIAL INTELLIGENCE SYSTEMS AS INVENTORS

### 1.1. WHAT IS ARTIFICIAL INTELLIGENCE?

Initially, computers were only used to conduct computations and tasks based on pre-programmed software. However, advancements in the field of artificial intelligence (AI) have shifted the function of computers from merely being a calculating device to a problem-solving technology that can interpret language, retain knowledge, and learn from its experiences much like humans. As a result, understanding the term “artificial intelligence,” which was the key to bringing about a technological revolution, is critical. It was introduced to the world in the year 1956 by John McCarthy at the Dartmouth Conference. According to him, “*Artificial Intelligence*” means the science and engineering of making intelligent machines, especially intelligent computer systems<sup>7</sup>. McCarthy's statement does not give an independent definition of artificial intelligence; rather, it specifies its purpose, which is to produce systems that are considered to be intelligent. Therefore, it is essential to understand what intelligence means. According to R. Sternberg, “*Intelligence is the cognitive ability of an individual to learn from experience, to reason well, to remember well, to remember important information, and to cope with the demands of daily living*”<sup>8</sup>. Anything can be considered intelligent if it has the inherent ability to learn, process, and solve issues in the usual course of events. Intelligence is the computational component of a person's capacity to achieve goals in the real world<sup>9</sup>. We assess someone's intellect by conversing with them, asking them questions, and monitoring their replies. In other words, we can say that AI is the art of making machines behave intelligently. Since machines lack consciousness, the term “*artificial*” is being used to describe competence exhibited by a nonhuman object. But since machines do not have consciousness, it is necessary to understand why machines are considered intelligent. For the purpose of which, Alan Turing attempted to answer this dilemma by applying the “*Turing Test*” to define machine intelligence in practical terms. In this experiment, a human interrogator would sit in one room, while two participant's, one machine and one human, would sit in another. The interrogator will pose questions to both participants by computer, and the participants will respond via computer exclusively, removing the possibility of discovering the participants identities via voice or handwriting. The interrogator must determine which of the participants is a computer and which is a person based on their replies. If the computer successfully deceives the interrogator, it passes the ‘*Turing Test*’ and is regarded as intelligent<sup>10</sup>.

<sup>4</sup> World Intellectual Property Organization, Artificial Intelligence (Geneva: World Intellectual Property Organization 2019) <<https://www.wipo.int/publications/en/details.jsp?id=4386>>

<sup>5</sup> Madhurjya Chowdhury, “How Companies Are Using Artificial Intelligence?” (Analyticsinsight.net August 30, 2021) <<https://www.analyticsinsight.net/how-companies-are-using-artificial-intelligence/>>

<sup>6</sup> “The Story of Artificial Intelligence in Patents” (*Wipo.int* 2021) <[https://www.wipo.int/tech\\_trends/en/artificial\\_intelligence/story.html](https://www.wipo.int/tech_trends/en/artificial_intelligence/story.html)>

<sup>7</sup> McCarthy J, ‘What Is AI? / Basic Questions’ (*Stanford.edu* 2012) <<http://jmc.stanford.edu/artificial-intelligence/what-is-ai/index.html>>

<sup>8</sup> ‘Artificial Intelligence in the 21st Century: A Living Introduction (EBook, 2016) [WorldCat.org]’ (Worldcat.org 2016) <<https://www.worldcat.org/title/artificial-intelligence-in-the-21st-century-a-living-introduction/oclc/948565380?referer=di&ht=edition>>

<sup>9</sup> Kurzweil R, ‘What Is Artificial Intelligence Anyway?.’ (2022) 73 American Scientist 258 <<https://eric.ed.gov/?id=EJ321513>>

<sup>10</sup> ‘Artificial Intelligence: A Modern Approach (Book, 1995) [WorldCat.org]’ (*Worldcat.org* 2018) <<https://www.worldcat.org/title/artificial-intelligence-a-modern-approach/oclc/31288015>> accessed 22 June

## 1.2. INVENTIVE AI

The advancement brought by AI has transformed technology from a mere tool of creativity to a significant contributor towards creation. The medical community is adopting AI machines for pharmaceutical discovery. Microsoft is developing a computer called “*Hanover*,” which would keep all data connected to medications used in cancer therapy and, by using all of the data, would aid in forecasting the aggregation of medicines that would be more efficacious for the diagnosis of individual patients<sup>11</sup>. These machines are known as inventive AI, and they develop new creations with almost no human intervention. One of the most prominent AI machines that have been contributing to the creation of new inventions can be understood through this example<sup>12</sup> -

Dr. Stephen Thaler's “*Creativity Machine*” has been producing unassisted inventions since 1994. His machine came closest to replicating the underlying neurological mechanisms involved in idea creation<sup>13</sup>. The machine is outfitted with an artificial neural network, which is made up of a collection of on/off switches that interact automatically to generate programmes without the need for human intervention. Initially, the computer is fed a big amount of data, and the artificial neural network will automatically identify which data is useful and which is not while producing a new idea. Dr. Thaler fed his favourite music into the machine, and it went on to create 11,000 new songs in a single weekend. The machine not only made music, but it also designed the cross-bristle design of an Oral-B cross-action toothbrush.

## 1.3. AI CREATION IMPLICATIONS

AI inventions have caused ripples in the conventional patentability paradigm. This new technology has brought new challenges to the patent system, which requires a brief analysis of certain issues pertaining to patents.

### 1.3.1. INVENTORSHIP OF AI CREATIONS

The patent system grants the creator a limited monopoly over the invention. The inventor owns the patent rights, and if the inventor is not revealed, the patent may be declared unenforceable. The problem with innovative AI is that if a machine generates an independent product, then in that case, can the computer be termed an “inventor,” and who would hold the patent rights under AI creation?

The Indian Patent Act, Section 6(a), allows anyone claiming to be the actual and original inventor of an invention to apply for a patent<sup>14</sup>. Similarly, in the United States, an inventor is defined as a person who invented or discovered the subject matter of the invention. It is safe to assume that the term “*inventor*” refers to a person or an individual<sup>15</sup>. In *Diamond v. Chakrabarty*<sup>16</sup>, a decision that really enlarged the subject matter criterion for patents in the United States, the court held that “*everything under the sun that is manufactured by man is patentable*”<sup>17</sup>. The purpose of using this strategy was to ensure that the idea remained in the hands of the person who imagined it, rather than a formal body like a corporation.

### 1.3.2. OWNERSHIP OF PATENT RIGHTS IN AI CREATIONS

Even if we presume that an inventive AI is patentable, who will own the patent rights? Because it is not recognised as a legal entity, the machine is unable to hold the rights. Furthermore, AI devices still do not have the ability to exercise rights autonomously. Another argument against awarding inventive AI inventor status is that it would give no encouragement to the machine. Because AI machines have not yet attained the level of emoting, a patent incentive would be pointless to them. Instead of a machine, ownership of the rights must be entrusted to a human entity capable of exercising these rights efficiently. Another method is to make the machine a co-inventor, vesting ownership of the rights in the person who is jointly associated with it<sup>18</sup>.

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<sup>11</sup> Agrawal P, ‘Artificial Intelligence in Drug Discovery and Development’ (*undefined*2018)

<<https://www.semanticscholar.org/paper/Artificial-Intelligence-in-Drug-Discovery-and-Agrawal/4e3cf1f761b8749afbac46ab949ed30896d3f44a>>

<sup>12</sup> Tyagi M, ‘Patentability of artificial intelligence creations: issues and challenges’ (2019), Vol.11, Issue-1, DLR

<[http://www.dehradunlawreview.com/wp-content/uploads/2020/02/8\\_Patentability\\_of\\_Artificial\\_Intelligence\\_Creations-79-87.pdf](http://www.dehradunlawreview.com/wp-content/uploads/2020/02/8_Patentability_of_Artificial_Intelligence_Creations-79-87.pdf)>

<sup>13</sup> ‘Imagination Engines’ (*Imagination-engines.com*2013) <<https://imagination-engines.com/ie.html>>

<sup>14</sup> Indian Patent Act, 1970

<sup>15</sup> ‘35 U.S. Code § 100 - Definitions’ (*LII / Legal Information Institute*2012) <<https://www.law.cornell.edu/uscode/text/35/100>>

<sup>16</sup> 447 U.S. (1980)

<sup>17</sup> Daily JE and F. Scott Kieff, ‘Anything under the Sun Made by Humans: Patent Law Doctrines as Endogenous Institutions for Commercializing Innovation’ (*Emory Law Scholarly Commons*2013)

<<https://scholarlycommons.law.emory.edu/elj/vol62/iss4/7/>>

<sup>18</sup> Abbott R, ‘I Think, Therefore I Invent: Creative Computers and the Future of Patent Law’ (*Digital Commons @ Boston College Law School*2016) <<https://lawdigitalcommons.bc.edu/bclr/vol57/iss4/2/>>

### 1.3.3. LIABILITY ISSUE

Given the pace at which we are developing autonomous AI capable of inventing on its own, the problem of responsibility in the event of patent infringement by AI will undoubtedly pose a threat to the patent system. Inventive AI requires just minimal human support and generates a one-of-a-kind product on its own.

Dr. John Koza's AI machine, which he refers to as an '*inventive machine*,' has already developed autonomous inventions on its own, and there have been instances when it has replicated or infringed on an already existing patent. In circumstances like this, where AI creates something that infringes on the rights of an existing patent holder, the question of who will be held accountable for AI's conduct emerges. At the moment, the patent system does not consider non-human entities to be infringers. If we follow this method, the owner or user of the AI will most likely be held accountable for the violation in these kinds of circumstances. But how far would the liability extend? Even though human intervention is limited to disclosing the machine's pre-existing knowledge, any result that is autonomously derived by the AI machine through use of machine learning and various other logic algorithms is beyond the control of the machine's owner.

One solution to this issue is to adopt the '*absolute liability*' concept, which states that if an AI machine infringes on a patent, the owner will be held liable. This principle may resolve the liability issue, but it may seriously hinder research and development in inventive AI machines, as companies may be unwilling to invest in AI due to the risk of absolute liability, resulting in a stagnation of innovation in this field with the ability to revolutionize society. On the other hand, if there is a failure to identify the infringer, it will encourage patent infringement through AI, which will be detrimental to both the patent holder and society.

## 2. INTERLINKAGE OF ARTIFICIAL INTELLIGENCE WITH INTELLECTUAL PROPERTY RIGHTS

AI systems are evolving at an exponential rate, with increasingly sophisticated software being added into them. The most notable market where AI has a substantial impact is the intellectual property industry. With the plain sight of AI's astonishing level of creativity and intelligence, concerns about intellectual property protection should be on the minds of those enforcing intellectual property rights<sup>19</sup>. "*AI-enabled systems have progressed from simple computation to the creation of poetry, painting, and other more complicated creative works. This raises the question of whether such work, like any other type of work generated by an identifiable human source and protected by IP regulations, may be accorded any unique status under IP laws or not*"<sup>20</sup>.

In January 2017, the European Parliament issued a report with recommendations to the Commission on *Civil Law Rules on Robotics*<sup>21</sup>. According to this report, "*the Commission should adopt EU law that defines a 'smart robot' as one that has autonomy through the use of sensors and connectedness with the environment. Furthermore, it requests that the commission develop standards for 'own intellectual invention' for copyrightable works created using AI.*" Furthermore, there are computers that automatically create works that would qualify for copyright protection if they were created by a person. Similarly, under patent law, "*if AI computers make innovations, questions about ownership of such creations would emerge. Thus, there are many more comparable sorts of prodigious computationally resourceful inventions that have attracted and sparked discussions all over the world for the re-evaluation of intellectual property standards with regard to AI.*" DABUS is a prime example of this<sup>22</sup>.

### 2.1. PATENT LAWS AND ARTIFICIAL INTELLIGENCE

In today's technological environment, the interlinkage between patent laws and artificial intelligence is growing rapidly. AI has been widely employed to ease the performance of simple activities and, more importantly, to reduce human effort. At first glance, AI-enabled systems appear to function similar to simple calculators and similar devices. However, it works in a far more sophisticated way. Today, AI-enabled systems accomplish tasks based on their own important learning, giving them the potential

<sup>19</sup> Saba, 'Mounting Artificial Intelligence: Where Are We on the Timeline?' | SCC Blog' (*SCC Blog*7 June 2018)  
<<https://www.sconline.com/blog/post/2018/06/07/mounting-artificial-intelligence-where-are-we-on-the-timeline/>>

<sup>20</sup> Ibid

<sup>21</sup> Parliament E, 'Carriage Details | Legislative Train Schedule' (*European Parliament*2014)  
<<https://www.europarl.europa.eu/legislative-train/theme-area-of-justice-and-fundamental-rights/file-civil-law-rules-on-robotics>>

<sup>22</sup> Maheshwari A, 'Dawn of Artificial Intelligence Changing the Face of Patent Regime' (*ResearchGate*2019)  
<[https://www.researchgate.net/publication/347449810\\_Dawn\\_of\\_Artificial\\_Intelligence\\_Changing\\_the\\_Face\\_of\\_Patent\\_Regime](https://www.researchgate.net/publication/347449810_Dawn_of_Artificial_Intelligence_Changing_the_Face_of_Patent_Regime)>

to develop something<sup>23</sup>. While this is a significant technological advancement, it raises new and difficult legal concerns, especially in the context of patent law<sup>24</sup>.

### 2.1.1. EXISTING LEGAL FRAMEWORK FOR PATENTING ARTIFICIAL INTELLIGENCE INVENTIONS

A patent is defined as the exclusive right to an innovation. This ‘*invention*’ has been defined as any product or procedure that offers users a novel way of accomplishing a certain task, including those that offer a new solution to an existing technological challenge. For a brief time, the holder of such a right has the legal right to prevent others from creating, selling, or even utilising the protected innovation. As a result, the right given in such a case legitimises the development of a monopoly for the benefit of the original creator<sup>25</sup>.

### 2.1.2. NEW DIMENSIONS OF ‘INVENTION’ AND THE ‘INVENTOR’

According to Section 6 of the Indian Patents Act, 1970, “*an application for a patent for any invention may be made only by the true and first inventor of the invention or those designated by such person*”. In contrast, Section 2 (y) of the Indian Patents Act, 1970 limits “*the concept of true and first inventor to barring the first importer of an invention into India or the person to whom an invention is first transmitted outside India, and nothing more*.” These laws do not specifically state that an inventor must be a natural person. As a result, a cursory reading of these laws suggests that an AI may fit under the definition of an inventor. In practise, however, the “*true and first inventor*” is always regarded to be a natural being. As a result, it will be intriguing to follow the jurisprudence on this front, particularly the patent office’s position when the “*real and original inventor*” on the patent application form is not a natural person<sup>26</sup>.

On the contrary, an “*inventor*” under US patent law is defined as an individual or a group of individuals who develops or discovers the subject matter of the invention. In the case of *Townsend v. Smith*<sup>27</sup>, it was held that, “*for anything to be considered as a genuine product of an invention, it must go through the stage of ‘conception,’ i.e., a permanent idea must have been formed in the mind of the inventor before the same can be put into reality*.” If something is reduced because of a predetermined concept, it cannot be called an innovation, and the person who reduces it is not an inventor. This invalidates the idea that legislative intention in the United States sought to encompass innovations or the potential of inventions being generated by anybody other than humans<sup>28</sup>.

AI offers opportunities to enhance and supplement human intellect while also improving people's lives and workplaces. As a result, “*AI is undoubtedly playing a significant role in the growth of patent law*.” To broaden the scope of the innovation, sophisticated natural language processing has been used to generate versions of existing patent claims. The publication of these patent claims using such technology would assist in preventing obvious and readily derived concepts from being copyrighted since they would form the corpus of prior art available in the public domain. If the practise of using such services gains traction in the business, it will significantly increase the uncertainty associated with patent enforcement by increasing the likelihood of failing to uncover prior art that invalidates the patent. And, it is reasonable to expect that AI will be developed to aid in the identification of previous art, which will very probably raise demand for AI (from a patent law standpoint) in this industry<sup>29</sup>.

### 2.1.3. NOVLETY AND EXPECTATION

The concept of novelty in intellectual property law stipulates only what is new at the time of filing a patent application in order for it to be patentable. Patent eligible subject-matter is granted a patent if it is novel, non-obvious, and capable of practical application. The most significant of these is the uniqueness criteria.

In order to establish novelty, the patent system prohibits the issuance of a patent to innovations that were revealed prior to the filing of a patent application at the Patent Office. A new innovation is one that does not already exist in the state of the art. The Indian Patents Act of 1970 does not define the term “*state of the art*.” The term “*state of the art*” refers to the fact that the invention had not been made public by written or oral description, usage, or any other means prior to the date of patent filing. The term “*novelty*” refers to the invention being known, utilised, patented, or described by someone else prior to the applicant's application.

<sup>23</sup> ‘An Appraisal of the Relationship between Artificial Intelligence and Intellectual Property Rights - the Jet Lawyer’ (*The Jet Lawyer* 7 April 2020) <<https://djetlawyer.com/artificial-intelligence-and-intellectual-property-rights/>>

<sup>24</sup> Tripathi S and Chandni Ghatak, ‘Artificial Intelligence and Intellectual Property Law’ (*Academia.edu* 5 March 2018) <[https://www.academia.edu/36080618/Artificial\\_Intelligence\\_and\\_Intellectual\\_Property\\_Law](https://www.academia.edu/36080618/Artificial_Intelligence_and_Intellectual_Property_Law)>

<sup>25</sup> ‘Patent Protection’ (*UNHInnovation* March 2018) <<https://innovation.unh.edu/patent-protection>>

<sup>26</sup> *Ibid* n. 17.

<sup>27</sup> 36 F.2d 292 (Fed. Cir. 1929)

<sup>28</sup> ‘Research Paper: Patenting Artificial Intelligence- Legal Implications’ (*paperbackandink* 17 June 2019) <<https://paperbackandink.wordpress.com/2019/06/17/patenting-artificial-intelligence-legal-implications/>>

<sup>29</sup> *Ibid* n. 17.

A “*new invention*,” according to the Indian Patents (Amendment) Act of 2005, an innovation or technique is any innovation or technique that has not been predicted by publishing in any document or used in the country or anywhere in the world prior to the date of submission of the application with the entire specification<sup>30</sup>. While an AI system will almost certainly have access to past art since it is overseen by human scientists who feed in knowledge. Is it actually autonomous, let alone capable of determining whether or not its innovation can account for something novel? In terms of an inventive step, if the AI system has problems detecting originality, the chances of producing advances on existing models or notions that are not evident to a human knowledgeable in the art are unquestionably greater<sup>31</sup>. Furthermore, when it comes to the patentability of computer programmes, the Court has refused to grant patents to programmes just because the functions they perform are mechanical rather than innovative (Bilsk v. Kappos<sup>32</sup>). With countries like India relaxing their strict requirement that “*only computer programmes in conjunction with novel hardware be eligible for a patent, if an AI-enabled system created software that can be used on generic machines, it would entail practical utility, possibly in more than one industry, allowing satisfaction of the industrial application requirement within the patentability test.*” On a broad level, there is an urgent need to streamline current regulations and procedures in order to grant patents to AI system-created concepts. In contrast, a more thorough study of the issues is required due to many barriers and misunderstandings regarding patentability and other difficulties that remain in existence.

### 3. COMPARATIVE ANALYSIS

In order to understand the ongoing development and status of artificial intelligence to get the recognition around world, it is essential to understand what view the major economies of the world hold right now. Examining the laws and regulations enacted by some of the countries will provide a broader scope of its applicability and usage.

#### 3.1. SOUTH AFRICA

The South African Patent Office (SAPO) granted a patent in July 2021 for a patent application relating to “food container based on fractal geometry,” with an AI system called “DABUS” (Device for Autonomous Bootstrapping of Unified Sentience) identified as the inventor. It appeared to be the world’s first AI system that was acknowledged as an inventor.

In South Africa, patent applications are primarily governed by the Patent Act and the Patent Regulations, which outline how specified forms must be filled in and what documentation must accompany applications. In contrast to US patent law, which clearly defines an ‘inventor’ as “*the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention,*” South African patent regulations contain no exact definition of an “inventor.” Instead, section 27(1) of the Patent Act of South Africa states that “*an inventor or any other person receiving from him the right to apply or both the inventor and such other person are qualified to apply for a patent in South Africa*”<sup>33</sup>.

The Companies and Intellectual Property Commission (CIPC) granted the DABUS patent based on an application filed under the Patent Cooperation Treaty (PCT), to which South Africa is a party. Sections 43A through 43F of the Patent Act control such applications principally. Section 43F of the Patent Act excludes the applicability of sections 30 (1), which deals with the form of a patent application, 30 (5), which deals with the date of application and lodgement of application, and 30 (6), which deals with when an application may not be denied a lodging date. As a result, such PCT applications must be made in line with the PCT and its Regulations<sup>34</sup>. This brings us back to how South African patent laws intend inventors to be named in patent applications.

#### 3.2. UNITED STATES OF AMERICA

The US does not have a detailed definition of invention. According to Section 35 of the United States Code, “*the term 'invention' implies innovation or discovery.*” Section 100 goes on to say that patentable innovations include methods, devices, manufactures, or compositions of matter, as well as any new and useful improvement to those. Thus, the scope of patentable subject matter is “*fairly broad and can accommodate both AI-generated and human-generated inventions.*” The Supreme Court, on the other hand, has concluded that “*natural laws, physical facts, and abstract ideas*” are not patentable under Section 101<sup>35</sup>. As a result of recent case law<sup>36</sup>, if the patent claim incorporates an “*inventive notion*” sufficient to change the law of nature, natural phenomenon, or

<sup>30</sup> Ibid

<sup>31</sup> Yu R, ‘Should an Artificial Intelligence Be Allowed to Get a Patent? - Robohub’ (2017) <<https://robohub.org/should-an-artificial-intelligence-be-allowed-to-get-a-patent/>>

<sup>32</sup> 561 U.S. 593

<sup>33</sup> Okorie C, ‘Artificial Intelligence System as Inventor in South African Patent Application: The Case of DABUS’ (*The IPKat*16 August 2021) <<https://ipkitten.blogspot.com/2021/08/artificial-intelligence-system-as.html>>

<sup>34</sup> Ibid

<sup>35</sup> *Diamond v. Chakrabarty*, 447 US 303, 309 (1980)

<sup>36</sup> *Mayo Collaborative Services v. Prometheus Laboratories*, 566 US 66 (2012) and *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347 (2014)

abstract idea into patentable subject matter, such subject matter may still be eligible for patent protection. Thus, the judgments preclude patentability of conventional (as opposed to “*inventive*”) applications of natural laws, natural events, or abstract ideas<sup>37</sup>.

For the first time in the USA the issue of patentability of inventions by artificial intelligence was raised in August 2019, when the DABUS applications highlighted broader concerns about whether undirected AI-generated intellectual property should be granted legal protection or not. The US Patent and Trademark Office (USPTO) issued a “*notice seeking public input on the patentability of AI inventions.*” Soon after, it issued a second notice seeking similar feedback on the availability of legal protections for other types of AI-created Intellectual Property. The USPTO sought advice on ways to guarantee that suitable incentives were in place to foster additional innovation in the field of AI-related technology, among other things<sup>38</sup>.

In the year 2020, the USPTO stated that an artificial system cannot be named as an inventor under US Patent Law, and that only “*natural persons*” could be credited as patent inventors<sup>39</sup>. The USPTO cited *University of Utah v. Max-Planck-Gesellschaft zur Forderung der Wissenschaften E.V*<sup>40</sup> in support of this claim.

In 2021, the US District Court for the Eastern District of Virginia on 1<sup>st</sup> September in the case of *Thaler v. Hirshfeld*<sup>41</sup> ruled that “*an artificial intelligence machine cannot be considered as an inventor under the US Patents Act.*” The AI patent that was rejected in the US court was by Researcher Steven Thaler for DABUS only<sup>42</sup>. The grounds for the rejection of DABUS were:

- According, to the US Patents Act, inventors must be an individual.
- By individuals US law on patents means individuals have to be a person.
- And, AI system cannot be considered as person.

Further, in reference to the decision held by the US federal court as mentioned above, US District Judge Leonie Brinkema stated that, “*There may come a time when artificial intelligence will reach a level of sophistication such that it might satisfy accepted meanings of Inventorship. But that time has not yet arrived, and if it does, it will be upon the government to decide how it wants to expand its scope.*”

Considering the above stated statement, it appears to be fairly clear that AI cannot be recognized as a named inventor under the current statutory structure in the United States, the question of who, if anyone, can claim credit for AI’s inventions remains unresolved. The USPTO acknowledged in dismissing DABUS as an inventor that it had made no determination as to who or what generated the invention claimed in the application<sup>43</sup>. The threshold question in determining inventorship in the United States is “*who conceives the invention.*” (*Fiers v. Revel*)<sup>44</sup> “*A person is not an innovator until he contributes to the notion of invention.*” In terms of defining an invention, the reduction to practice is immaterial.<sup>45</sup> Despite the fact that “*it is not necessary for the inventor to be directly involved in carrying out process stages...where implementation of those steps does not require the exercise of inventive talent,*” (*Fritsch v. Lin*)<sup>46</sup>

### 3.3. AUSTRALIA

In Australia, AI-generated inventions will not be eligible for patent protection in Australia, unless human inventorship can be established. The Australian courts are still contemplating whether ownership of the source code and computers of the AI system

<sup>37</sup> Lefstin JA, Menell PS and Taylor DO, ‘Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges’ [2017] SSRN Electronic Journal  
<[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3050093](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3050093)>

<sup>38</sup> ‘USPTO: AI System Cannot Be Named an Inventor’ (*Jonesday.com*2020)  
<<https://www.jonesday.com/en/insights/2020/05/reboot-required-artificial-intelligence-system-cannot-be-named-as-an-inventor-under-us-patent-law-uspto-says>>

<sup>39</sup> Hollister S, “AI Computers Can’t Patent Their Own Inventions — yet — a US Judge Rules” (*The Verge*September 3, 2021)  
<<https://www.theverge.com/2021/9/3/22656039/ai-inventor-patent-copyright-uspto-federal-court-ruling>>

<sup>40</sup> 734 F.3d 1315, 1323 (Fed. Cir. 2013)

<sup>41</sup> 1:20-cv-903(LMB/TCB) (E.D. Va. Sep. 2, 2021)

<sup>42</sup> IN, “Federal Court Rules Artificial Intelligence Cannot Be an ‘Inventor’ under US Patent Law” (*Jurist.org*September 5, 2021)  
<<https://www.jurist.org/news/2021/09/federal-court-rules-artificial-intelligence-cannot-be-an-inventor-under-us-patent-law/>>  
accessed March 30, 2022

<sup>43</sup> Krumplitsch S, Scordino E and Monica De Lazzari, ‘Can an AI System Be Named the Inventor? In Wake of EDVA Decision, Questions Remain’ (*DLA Piper*23 September 2021) <<https://www.dlapiper.com/en/us/insights/publications/2021/09/can-an-ai-system-be-named-the-inventor/#20>>

<sup>44</sup> 984 F.2d 1164, 1168, 25 USPQ2d 1601, 1604-05 (Fed. Cir. 1993)

<sup>45</sup> *Ibid*

<sup>46</sup> 21 USPQ2d 1737, 1739 (Bd. Pat. App. & Inter. 1991)

that generates the output of the subject of an invention, as well as the operation and maintenance of the AI system, constitutes sufficient human input to constitute inventorship for patent protection<sup>47</sup>.

In the year 2019, an application for patent was filed by Stephen Thaler for DABUS naming it as an inventor<sup>48</sup>. Later on, 21<sup>st</sup> September 2020, Intellectual Property Australia found that as per Australia's Patents Act – Section 15 (1) it is inconsistent for an Artificial Intelligence machine to be treated as an inventor. Hence, Australia Patent Office lapsed the application of Thaler<sup>49</sup>. In this case the High Court of Australia cited *D'Arcy v. Myriad Genetics Inc*<sup>50</sup> in which 'human action' is mentioned as an essential component of the invention-making process and moreover, such references were deliberate and followed the requirement set out in *National Resource Development Corporation v. Commissioner of Patents*<sup>51</sup>. The court concluded that "both these cases proceeded on the assumption that human agency is required in the development of the invention in a suit<sup>52</sup>."

Thereafter, Thaler sought change in the previously held decision by asking for Judicial Review, through which the Australia Federal Court on 30<sup>th</sup> July 2021, ordered Intellectual Property Australia to reconsider its given decision<sup>53</sup>.

In such circumstances Justice Beach found that there was "no specific provision in the Australian Patents Act that expressly refutes the proposition that an artificial intelligence system can be an inventor", and in such circumstances, AI can be an inventor. While the Commissioner of Patents sought to emphasize the dictionary definitions of "inventor" (given that "inventor" is not defined in the Act), Justice Beach was not persuaded and further stated that "having regard to the evolving nature of patentable inventions and their creators that, rather than resort to old millennium usages of that word, he needed to grapple with the underlying idea, recognizing the evolving nature of patentable inventions and their creators. We are both created and create. Why cannot our own creations also create?"<sup>54</sup>.

To this day, Justice Beach recognizes AI's major role in pharmaceutical research as an example of its inventive and technical contribution, indicating that a restrictive definition of 'invention' should not be used. While, like 'computer,' an inventor was once only used to describe humans, when only humans could develop inventions, the term is now frequently used to designate machines that do the same role<sup>55</sup>. As a result, in September, 2021 Australian Court set a groundbreaking precedent, by deciding that AI systems can be legally recognized as an inventor in Patent applications<sup>56</sup>.

### 3.4. EUROPEAN UNION

The European Patent Convention (EPC) does not define invention positively. Only a negative definition i.e., subject matter excluded from patentability – is set forth<sup>57</sup>. Positive definitional elements, on the other hand, can be found implicitly in the EPC, namely, the fact that the invention must be concrete and technical in nature, i.e., it must involve a technical teaching that instructs a skilled person on how to use certain technical means to solve a technical problem<sup>58</sup>. As a result, "nothing in the EPC definition of invention

<sup>47</sup> 'AI Created Inventions or Works – Are They Protected by Australian IP Laws? - Stephens Lawyers & Consultants' (*Stephens Lawyers & Consultants* 23 May 2022) <<https://stephens.com.au/ai-created-inventions-or-works-are-they-protected-by-australian-ip-laws/>>

<sup>48</sup> "IP Australia: AusPat Quick Search" (*Ipaustralia.gov.au* 2021) <<http://pericles.ipaustralia.gov.au/ols/auspat/welcome.do>>

<sup>49</sup> "Stephen L. Thaler [2021] APO 5 (9 February 2021)" (*Austlii.edu.au* 2021) <<http://www8.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/APO/2021/5.html>>

<sup>50</sup> [2015] HCA 35

<sup>51</sup> [1959] HCA 67

<sup>52</sup> 'Dr Thaler Seeks Special Leave to Appeal to the High Court from the Full Federal Court of Australia Decision Which Held That an Artificial Intelligence Machine Cannot Be Named an Inventor on a Patent Application' (*Dentons.com* 2022) <<https://www.dentons.com/en/insights/articles/2022/may/17/full-federal-court-of-australia-holds-that-an-artificial-intelligence>>

<sup>53</sup> "Thaler v Commissioner of Patents [2021] FCA 879 (30 July 2021)" (*Austlii.edu.au* 2021) <<http://www8.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/FCA/2021/879.html>> accessed March 30, 2022

<sup>54</sup> 'In the Courts: Australian Court Finds AI Systems Can Be "Inventors"' (*Wipo.int* 2021) <[https://www.wipo.int/wipo\\_magazine/en/2021/03/article\\_0006.html](https://www.wipo.int/wipo_magazine/en/2021/03/article_0006.html)>

<sup>55</sup> *Ibid*

<sup>56</sup> "Artificial Intelligence Can Now Be Recognised as an Inventor after Historic Australian Court Decision - ABC News" *ABC News* (July 31, 2021) <<https://www.abc.net.au/news/2021-08-01/historic-decision-allows-ai-to-be-recognised-as-an-inventor/100339264>>

<sup>57</sup> Article 52(2) and (3) EPC establish that the following cannot be regarded as inventions, if claimed as such: discoveries, scientific theories, and mathematical methods; aesthetic creations; schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers; presentations of information.

<sup>58</sup> 'Visser's Annotated European Patent Convention - Kluwer Patent Blog' (*Kluwer Patent Blog* 11 February 2019) <<http://patentblog.kluweriplaw.com/2019/02/11/vissers-annotated-european-patent-convention/>>

*precludes AI-generated improvements from being regarded as inventions for patentability reasons, especially since exceptions to patentability are to be interpreted narrowly.”*

According to Article 52 (1) EPC, “*in order to be patentable, inventions must be new, have an inventive step, and be capable of industrial application.*” The creative step criteria are defined in Article 56 of the EPC as follows: “*An invention shall be considered as requiring an inventive step if, having regard to the state of the art, it is not obvious to a person experienced in the art.*” If the state of the art includes materials within the meaning of Article 54, paragraph 3 [referring to the content of previously filed European patent applications], these documents shall not be taken into account in determining whether an innovative step has occurred. The European Patent Office (EPO) Guidelines, the term ‘*obvious*’ refers to something that “*does not go beyond the normal progress of technology,*” follows logically from prior art, and so does not suggest any competence beyond what is anticipated of a person competent in the art<sup>59</sup>.

In determining the inventive step, the EPO implements the so-called problem-solution approach, which is derived from Rule 42 (1)(c) of the EPC<sup>60</sup> Implementing Regulations. The method is divided into three steps:

- (1) “*determining the closest prior art*”;
- (2) “*determining the objective technical problem to be solved*”; and
- (3) “*deciding whether the claimed invention would have been obvious to a skilled person starting from the closest prior art and the objective technical problem*”<sup>61</sup>

According to Article 83 of the EPC, the patent application must disclose the invention in a way that a person versed in the art can carry it out. This indicates that the skilled person should be able to carry out the innovation without undue difficulty, even though in difficult or unfamiliar domains, some trial and error supported by adequate instructions that can lead to success which can be permitted<sup>62</sup>. When determining the sufficiency of disclosure, “*the level of skill is the same as when determining the inventive step, with the exception that, unlike the inventive step, it is assumed that the skilled person has knowledge of the invention as described (and not only of prior art).*” Thus, according to rule 42 (1)(e) of the EPC Implementing Regulations, “*sufficiency of disclosure requires a detailed description of at least one method of carrying out the invention. It also entails that the innovation be explained in terms of both its structure and function*”<sup>63</sup>.

As a result, on the basis of the aforementioned requirements, the European Patent Office (EPO) has declined to accept two European Patent Applications including DABUS as an inventor on the same grounds as in the United States of America. Both EPO patent applications are currently refused<sup>64</sup>.

### 3.5. UNITED KINGDOM

In 2018 a patent application seeking patentability of AI was filed by Thaler in the United Kingdom Intellectual Property office (UKIPO). The concerned patent filling office told Thaler for the filling of statements/ grounds of inventorship and of right to grant to a patent under UK Patents Act of 1977, to which he submitted a detailed report in the office to consider it.

In the year 2019, Thaler’s application got rejected on the grounds that only a natural person, not a machine, could be an inventor. DABUS could not so possess anything transferable, thus Thaler failed to prove that he was eligible to claim for a patent. As a result, the patent applications were considered cancelled. Justice Marcus Smith agreed with the UK IPO on appeal to the High Court that only a natural person can be an inventor of a patent under the Patents Act. Despite rejecting the appeal, Justice Marcus Smith stated that “*the owner of a thing is the owner of the fruits of that thing,*” and that a person who owns an AI system that creates an invention

<sup>59</sup> European Patent Office, ‘G-VII, 2. State of the Art; Date of Filing - Guidelines for Examination’ [2022] Epo.org <[https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g\\_vii\\_2.htm](https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_vii_2.htm)>

<sup>60</sup> Rule 42(1)(c) establishes that the description shall “disclose the invention, as claimed, in such terms that the technical problem, even if not expressly stated as such, and its solution can be understood, and state any advantageous effects of the invention with reference to the background art.”

<sup>61</sup> European Patent Office, ‘G-VII, 3. Person Skilled in the Art - Guidelines for Examination’ [2022] Epo.org <[https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g\\_vii\\_3.htm](https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_vii_3.htm)>

<sup>62</sup> Bostyn SJR, ‘A European Perspective on the Ideal Scope of Protection and the Disclosure Requirement for Biotechnological Inventions in a Harmonised Patent System’ (2005) 5 The Journal of World Intellectual Property 1013 <<https://onlinelibrary.wiley.com/doi/10.1111/j.1747-1796.2002.tb00190.x>>

<sup>63</sup> Ramalho A, ‘Patentability of AI-Generated Inventions: Is a Reform of the Patent System Needed?’ [2018] SSRN Electronic Journal <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3168703](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3168703)>

<sup>64</sup> “EPO: A Machine Cannot Be an Inventor - Kluwer Patent Blog” (*Kluwer Patent Blog* January 29, 2020) <<http://patentblog.kluweriplaw.com/2020/01/29/epo-a-machine-cannot-be-an-inventor/>>

can be the owner of an invention. The Comptroller's notice to the respondent in the Court of Appeal was based on this part of the rationale. The Comptroller wanted to make clear that there was no rule in this regard for intangible property such as patents<sup>65</sup>.

Thereafter, in the year 2020, England and Wales High Court (Patents Court) rejected its patentability<sup>66</sup>. Hence, in September, 2021 Thalers further appeal for getting DABUS registered again got rejected<sup>67</sup>.

### 3.8. INDIA

The Indian constitution, as the guiding force, establishes the foundation for defining the rights and obligations of Indian citizens. According to the most recent *Government AI Readiness Index (Oxford Insights and IDRC, 2020)*<sup>68</sup>, after the United States, China, and the United Kingdom, India has the fourth-highest number of technology unicorns, as well as the third-highest market value for technology businesses in the Forbes Global 2000, reflecting India's strong interest in AI adoption<sup>69</sup>.

While realizing the relevance of AI to the nation as a whole and with the goal of aiding the establishment and development of such systems in India, the Indian Ministry of Industry and Commerce organized an 18-member task force called "*Task Force on AI for India's Economic Transformation*." In 2018, the Task Force delivered its report, in which it addressed to the Ministry of Commerce the primary challenges India faces in incorporating AI technology<sup>70</sup>.

The Patents Act of 1970 in India does not define the term 'inventor.' However, Section 2(1)(p) of the Act defines a "patentee" as a person who is listed as a grantee or proprietor in the Register of Patents. The term 'person' is not defined in the Act, and Section 2(1)(s) simply declares that a "person" includes the government<sup>71</sup>. Section 6 of the Act states "who is qualified to file a patent application: the true and first inventor, an assignee of the true and first inventor, or the person's legal representative." This provision is similar to Section 15 of the Australian Patent Act, and given the Thaler case, it is possible to include AI within the scope of an inventor<sup>72</sup>.

In the case, *Biswanath Prasad Radhey Shyam v. Hindustan Metal Industries*<sup>73</sup>, while the Patents Act of 1970 does not contain a full list of what constitutes patentable subject matter, the Supreme Court found that the foregoing definitions demonstrate that the fundamental requirements for patentability are novelty, usefulness, and non-obviousness. The conditions of "Novelty" and "Utility" have been acknowledged as basic to Patent law<sup>74</sup>.

Yet in another landmark case of *Ferid Allani v. Union of India & Ors.*<sup>75</sup> Delhi High Court observed that, "In today's digital age, when most inventions are based on computer programmes, claiming that all such inventions are not patentable would be outdated. Artificial intelligence, blockchain technology, and other digital technologies would be built on computer programmes, but they would not become non-patentable inventions – simply because of that reason." Further, in this case the court held that "Patent offices around the world have assessed patent applications in this sector of innovation, based on the criteria of 'technical effect'"

<sup>65</sup> 'Patenting AI Inventions in the UK - Kluwer Patent Blog' (*Kluwer Patent Blog* 28 September 2021)

<<http://patentblog.kluweriplaw.com/2021/09/28/patenting-ai-inventions-in-the-uk/>>

<sup>66</sup> "Thaler v the Comptroller-General of Patents, Designs and Trade Marks [2020] EWHC 2412 (Pat) (21 September 2020)"

(*Bailii.org*2020) <<https://www.bailii.org/ew/cases/EWHC/Patents/2020/2412.html>>

<sup>67</sup> "Thaler v Comptroller General of Patents Trade Marks and Designs [2021] EWCA Civ 1374 (21 September 2021)"

(*Bailii.org*2021) <<https://www.bailii.org/ew/cases/EWCA/Civ/2021/1374.html>>

<sup>68</sup> Readiness A, 'Oxford Insights' (*Oxford Insights*2020) <<https://www.oxfordinsights.com/government-ai-readiness-index-2020>>

<sup>69</sup> 'Current Scenario of Artificial Intelligence and Patent Protection in India - RNA Technology and IP Attorneys' (*RNA Technology and IP Attorneys - Intellectual Property Attorney*29 December 2021) <[https://rnaip.com/current-scenario-of-artificial-intelligence-and-patent-protection-in-india/?utm\\_source=rss&utm\\_medium=rss&utm\\_campaign=current-scenario-of-artificial-intelligence-and-patent-protection-in-india](https://rnaip.com/current-scenario-of-artificial-intelligence-and-patent-protection-in-india/?utm_source=rss&utm_medium=rss&utm_campaign=current-scenario-of-artificial-intelligence-and-patent-protection-in-india)>

<sup>70</sup> "Artificial Intelligence Task Force" (*Aitf.org.in*2022) <<https://www.aitf.org.in/>>

<sup>71</sup> Prashanth Shivadass and Rachana Pise, '[the Viewpoint] on the Horns of a Dilemma: Inventorship of AI-Generated Inventions' (*Bar and Bench - Indian Legal news*30 September 2021) <<https://www.barandbench.com/view-point/the-viewpoint-on-the-horns-of-a-dilemma-inventorship-of-ai-generated-inventions>>

<sup>72</sup> Ibid

<sup>73</sup> AIR 1982 SC 1444

<sup>74</sup> 'Artificial Intelligence Created Inventions in India - Whether Patentable? - ALG India Law Offices LLP' (*ALG India Law Offices LLP*14 October 2020) <<https://www.algindia.com/inventorship-artificial-intelligence-created-inventions-in-india-whether-patentable/>>

<sup>75</sup> 2020 (81) PTC 489[Del]

and “technical contribution.” Even though the invention is based on a computer programme, it is patentable if it displays a “technical effect” or a “technical contribution.”<sup>76</sup>

While these provisions can be evaluated to establish if an “inventor” can include AI, Form 1 for the “Application for Patent Grant” should be relied on. According to this form “an applicant may be a natural person or a non-natural person, which may include a small entity, a startup, or others.” Furthermore, the form permits the inventors and applicants names to be identical. This broad description allows for a wide range of interpretations, including non-human-like AI. It remains to be seen how the DABUS application will be treated under the Indian patent law<sup>77</sup>.

In 2021, Ryan Abbott (Professor at the University of Surrey) offered his ideas and approaches to the Indian Intellectual Property Office and the Ministry of Commerce and Industry's response to the 161st report of the Parliamentary Standing Committee<sup>78</sup>.

#### 4. CONCLUSION: THE WAY AHEAD

Some regard artificial intelligence as the “new electricity, with enormous potential, but it is not yet mature enough to fulfil its promise.” It suffers from scientific and technological ambiguity, uncertainty, and unpredictability, as do other growing domains, which hinders the patentability of AI inventions. The patentability of AI inventions is vague and unpredictable due to unresolved legal difficulties and the unpredictability of the art. When comparing AI generated inventions to AI assisted inventions, the ambiguity is greater for AI generated inventions. Despite the fact that several courts and patent offices have concluded that artificial intelligence cannot be an inventor, the question persists<sup>79</sup>. Subject matter concerns arise in some jurisdictions when the elements that commonly comprise AI inventions, such as data sets, learning models, algorithms, procedures, and networks. Unpredictability and immaturity in the industry create questions about innovation, creative step, and disclosure rules<sup>80</sup>.

Unlike the European, United States, and United Kingdom patent offices, the Indian Patent Office has not established any rules for reviewing AI technologies, and examiners are usually unclear about the strategy they must use. They rely extensively on subject matter exclusions pertaining to per se computer programmes, mathematical methods/algorithms, and business procedures when it comes to AI techniques and functional applications, but they are not particularly explicit about applying such exceptions to AI inventions<sup>81</sup>. The broad approach to computer-related inventions is also visible in India, where computational methods, algorithms, and broad-level applications are routinely challenged. Because rules for determining inventive step and specification are inconsistent, it is currently difficult to forecast patentability of AI inventions in India with acceptable certainty<sup>82</sup>.

AI-generated inventions seem to be almost completely unregulated. Most nations require patent applications to include the name of a natural person as an inventor. This criterion exists to protect and recognise the rights of human innovators. On the other hand, “inventors do not necessarily own their patents; in reality, firms hold the majority of patents. An individual's ownership rights can be transferred to a company by a contractual assignment or by operation of law<sup>83</sup>.”

*“The law granting natural individuals the status of inventor is designed to give people proper recognition. These laws, on the other hand, were enacted with no regard for the future possibilities of machine inventions. So, it's past time to clean house and implement proper policies for AI-generated works.”*

Ryan Abbott

Therefore, in the light of the above laid down explanation pertaining to the rules and regulations of patentability of AI created inventions to consider artificial intelligence to be deemed as an inventor and whether the inventions created/ developed by Artificial Intelligence machines can get recognition by the laws governing the present patents system around the globe will be determined by the specific language in each jurisdiction's patent laws<sup>84</sup>. Legislative amendments and modifications are required in nations where plain statutory text requires an inventor to be a real person in order to clearly incorporate and recognise AI-generated inventions.

<sup>76</sup> Ibid

<sup>77</sup> Ibid n.68

<sup>78</sup> Varsha Jhavar, ‘Parliamentary Standing Committee’s Recommendations Concerning AI and IP: A Little Late or Way Too Early?’ (*SpicyIP9* August 2021) <<https://spicyip.com/2021/08/parliamentary-standing-committees-recommendations-concerning-ai-and-ip-a-little-late-or-way-too-early.html>>

<sup>79</sup> Kalyan D, ‘Artificial Intelligence (AI) Inventions and Patents’ (*BananaIP24* July 2021) <<https://www.bananaip.com/ip-news-center/artificial-intelligence-ai-inventions-and-patents/?cv=1>>

<sup>80</sup> NASSCOM, ‘Artificial Intelligence (AI) Inventions and Patents in India’ (*Nasscom.in27* July 2021) <<https://coe-dsai.nasscom.in/artificial-intelligence-ai-inventions-and-patents-in-india/>>

<sup>81</sup> Ibid n.77

In countries where the statutory language is less specific, such as Australia, courts have more flexibility in ering purposeful statutory interpretation and policy factors<sup>85</sup>.

