

THE CONCEPT OF ‘INVENTIVENESS OF MACHINES’: HOW READY IS PATENT LAW TO AFFORD THE CREATIVE INVENTIVENESS OF ARTIFICIAL INTELLIGENCE?

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ABSTRACT

Making science fiction a reality, Artificial Intelligence (AI) has become a transformative drive in almost every aspect of human life today. With the advancements of modern technology, AI has acquired the ability to think like humans and create inventions that are economically worthwhile. The concept of ‘inventiveness of machines’ has become a focal point in the field of intellectual property law at present. It has compelled the world to reconsider the parameters of patent law in terms of protecting AI inventors and inventions of AI. Simultaneously, the procurement of patents for inventions of AI has posed challenges not only in the legal field but also in ethical and moral aspects. As AI is gradually becoming an undeniable part of human life, every nation will have to adopt the developments of AI technology into their legal systems sooner or later. Taking the prevailing definitions of ‘inventor’ into account, this research mainly discusses whether machine inventors and human inventors be given equal protection of law or whether there should be different dimensions of protection. This paper also discusses the moral and ethical dilemma of granting legal recognition for AI inventors while examining the capability of existing legal framework including Sri Lanka in accommodating the inventiveness of machines. This research was carried out using mixed method approach. Literature review, qualitative and empirical research methodologies and comparative analysis were incorporated to strengthen the study. The paper concludes by highlighting the need of legislative intervention of competent authorities to reconsider the legal parameters to accommodate the possible challenges waiting to be imposed by inventiveness of machine in future. This paper also introduces the concept of ‘collaborative inventiveness of humans and AI’ and suggests recommendations to amend existing laws in a manner that they afford the technological advancements of modern times.

KEYWORDS: Artificial Intelligence, Patent Law, Inventiveness, Machines

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1. INTRODUCTION

**“Invention by Artificial Intelligence is the future of innovation”
(Schuster, 2018, p.1945)**

Having hypothesized and theorized in the 1950's, Artificial Intelligence has become a practical prospect of daily human life today. It has revolutionized the traditional methods in industries, modes of communication, problem solving, businesses, the way things work and even the ways of thinking. As advancements in AI technologies continue to evolve, there emerge critical legal and ethical questions, especially within the realm of intellectual property law, including patent law. Despite the considerable interest mounting up on artificial intelligence and the challenges it presents to human society, there has been a notable lack of scholarly consideration given towards how AI impedes the smooth function of patent law. According to Ebrahim (2020), academics have given very little or insufficient attention to the obstacles AI imposes on the continual function of patent law both theoretically and policy-wise. In an era, in which the world is greatly driven by AI, the need for more academic research on patent law and AI is indispensable in-order-to clarify and pilot across the complexities arising due to rapid technological advancements. This paper attempts to initiate a timely conversation on the concept of 'inventiveness of machines' focusing on the preparedness of patent law to afford the inventive prowess of AI, internationally and locally.

The major objectives of this research are; 1. To investigate the present status of patent law in relation to AI and the necessity of reconsidering the 'inventor' in the context of AI technology. 2. To analyze the legal, moral and ethical repercussions in recognizing AI inventorship. 3. To assess the effectiveness of prevailing laws in protecting inventions created by AI and 4 To propose statutory recommendations to accommodate the creativeness of machines into current legal frameworks. Hence, this research will be guided by four research questions; 1. How should the conventional definition of 'inventor' be reconsidered to assimilate inventiveness of machines within the prevailing IP law framework? 2. What are the legal, moral and ethical repercussions of recognizing AI

inventorship? 3. How effective are the existing domestic and international legal frameworks in protecting inventions created by AI? 4. What statutory interventions are necessary to address the contemporary and future challenges posed by inventiveness of machines?

The theoretical framework of this study underpins the correlation of IP law, ethics, morality, science and technology. It further adopts the theories of legal positivism to evaluate the prevailing conventional definitions of 'inventor' and 'inventiveness' and securities extended by patent law. It further draws in normative ethical theories to approach the ethical and moral implications of inventorship of machines. Last but not least, this study also adopts a socio-legal approach in order to comprehend how contemporary legal systems could employ modern technological advancements in a positive manner. This framework supports an extensive analysis of not only legal but also ethical, moral and technological dimensions of inventorship of machines, comprehensive analysis of both the legal and ethical dimensions of AI inventorship, directing this study towards proposing practical legislative reforms.

2. METHODOLOGY

With the aim of suggesting amendments to the Intellectual Property Act No. 36 of 2003 to uplift the patent law of Sri Lanka in a manner that the law integrates the global technological advancements into domestic law, this research attempts to study the controversial concept of 'inventiveness of machines' considering the legal and moral facades associated with it. A mixed method approach characterized by a fusion of research methodologies was adopted during this research in order to ensure a comprehensive investigation. A thorough examination of existing scholarly literature, legislation, case law and related resources was conducted to provide a robust theoretical foundation for the study. An array of domestic and international research instruments, judgements and legislation were studied. Furthermore, empirical research techniques were also employed while integrating qualitative and comparative research methodologies. Direct observations were made and firsthand experiences were gained on the innovation eco-systems and patent legislation of China and Sri Lanka

making the study largely backed by empirical data accumulated during the said course. These diverse research approaches were deliberately integrated to strengthen the study's depth and breadth while fostering a comprehensive analysis of the subject matter.

3. LITERATURE REVIEW

3.1 Artificial Intelligence: Definition and Evolution

While there is no universally accepted definition for AI, the generally accepted consensus is that 'AI denotes to the development of software or computer programs that can execute tasks which usually require human intelligence; such as machine learning or learning from experience, reasoning, understanding, identifying patterns, problem solving and many more (Copeland 2024). Watanabe (2021,) suggests that, the existence of a diverse range of AI technologies and their unpredictable advancements are the biggest hurdles in compiling and bringing AI under one classification. Nevertheless, scientists and scholars have been able to classify AI into two main categories; 1. Weak/Narrow AI and 2. Strong/General AI. Weak AI is usually designed to perform specific tasks, thus considered narrow and distinctive. Unlike weak AI, strong AI is designed to learn and think. Therefore, it possesses human-resembling cognitive capabilities ranging from answering a simple question to creating a patentable invention on its own.

In the last fifty years, AI has seen tremendous advancement from being able to play chess, to becoming the groundbreaking technology in self-driven cars (Zhi Shi and Zheng, cited in Stamatis 2019) And today, AI is identified as a subset of computer science which replicates and expands the intellectual abilities of human mind through computerized neural networks (Stamatis 2019). The origin and evolution of AI could be segregated into few key eras.

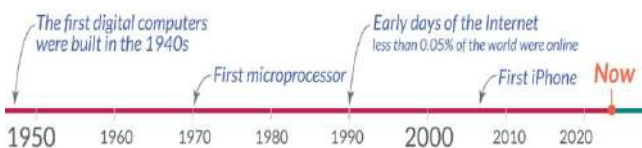


Figure. 1 Roser (2022), Evolution of AI

First Roots of AI (1950s-1960s): 'Alan Turing' is considered the pioneer in AI as he initiated the foremost effort of building an AI system in 1950 (Butterfield et al, cited in Greer 2022). But the earliest successful AI system 'Theseus' was designed by Claude Shannon in 1950. 'Theseus' was a remote controlled mouse, capable of remembering a path and finding its way out of a maze (Klein, cited in Roser 2022). Even though such a system was built in the early 1950s, the term 'Artificial Intelligence' was first introduced in 1956 during Dartmouth Conference by John McCarthy, where scientists gathered to discover possibilities of inventing a technology that could mimic human intellect (Greer 2022). A program called 'The logic theorist', designed to mimic the problem solving skills of humans presented at 1956 Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI) is considered to be the first AI program. However, early research was centered on symbolic reasoning and systems were built to crack predefined problems using predefined rules.

Knowledge-Based Systems (1970s-1980s): In early 1970s, research on AI shifted its course towards knowledge based systems, which employed pre-recorded guidelines and knowledge databases to solve problems. Computer systems capable of replicating human proficiency in specific fields became popular in this period.

AI Winter – Decreased Focus (1990s): Beginning of the 1990s brought lack of enthusiasm, technological limitations and decreased monetary backing for research, impeding AI's advancement. But the late 90s saw much needed resurgence in research. For example, IBM developed a computer program for playing 'Chess' named 'Deep Blue' in 1997 (Watanabe 2021,). Founded in as early as 1911 as a Computing-Tabulating-Recording (CTR) company, The International Business Machines Corporation or IBM is the largest industrial research organization in the world and it holds the record of being the generator and owner of most annual US patents by a business for a period of 29 consecutive years from 1993 to 2021 (Bellis, 2020). IBM made history when 'Deep Blue' succeeded in defeating human chess world champion, grandmaster Garry Kasparov in a game of chess, boosting the enthusiasm in AI research (O'Malley, cited in Robinson 2021). According to Anyoha (2017),

the first successful speech recognition software built by Dragon Systems instigated on Windows could be considered as a giant leap in the history of AI.

Machine Learning Renaissance (2000s): The dawn of new millennium was fueled by escalated computing power. It resulted in rocketing improvements in machine learning to a revival of curiosity in AI. AI systems were designed to copy and mimic human skills by implementing specific algorithms which permit machines to learn and adjust to given conditions and solve problems during this period (Stamatis 2019,). Development of techniques like neural networks, fuzzy systems and genetic algorithms contributed to further advancements in image and speech recognition in this era. (Neural networks are extensive sets of artificial neurons, corresponding the structural and operational characteristics of biological neurons while fuzzy systems construct algorithms relying on computational 'improbabilities/uncertainties' to learn and make decisions and genetic algorithms are used to replicate the progression and transmutation of genetic material themselves to generate a persistently changing computerized intelligence network (Maries Scarlet 2012)). The following figure exhibits the hype and descend of AI technology from the 970s to the 21st century.

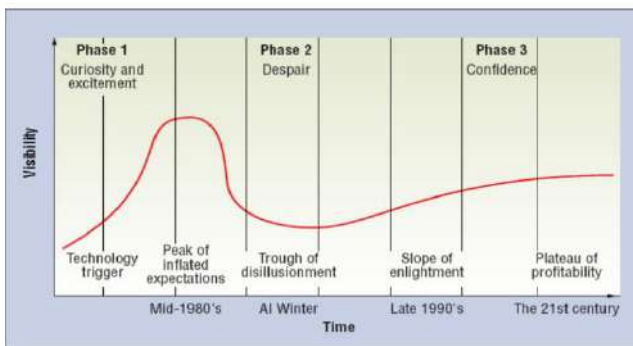


Figure. 2: Smith (2006), The Hype Cycle and AI Winter

Rapid Advancement – Everyday Usage (2010-2020):

Time from 2010 onwards started showing a remarkable expansion in AI technologies. Applications of AI became endless and cohesive with human life. With the aim of automating and alleviating everyday life, scientists and researchers were able to develop better technology that

could stimulate human intelligence enabling machines to solve problems in real-world processes (Stamatis 2019). Virtual assistants such as 'Siri', 'Alexa' and 'Chat GPT', speech recognition, image recognition, recommendation systems, smart phones, computer vision and autonomous vehicles are few examples for widespread common applications of AI (Smith et al., 2006).

During this time, AI promptly steered the man kind towards an advanced, automated and autonomous direction, where computers became capable of inventing on their own (Abbott, cited in Jain 2021). Thus, conversations and debate about responsible AI development and deployment gained prominence within this period.

Ongoing Advancements and Emerging Ethical

Concerns (2020 onwards): According to Jain (2021), today's AI technology possesses the ability of accomplishing tasks in just minutes which were beyond human capability for the last 1000 years. Artificial intelligence transcends just science fiction as it demands collaborative research in numerous fields such as cognition or understanding, algorithms, linguistics, statistics, neuroscience, law, ethics and beyond. AI has become a matter with its own comprehensive intellectual challenges at presents as it cannot be narrowed down to limited applications or to particular genetic constructions (Smith et al., 2006). Hence, the mounting impact of AI has given rise to legal, ethical and moral concerns related to human privacy, partiality, transparency, and specially job displacement due to automation, at present.

3.2 An overview of patent law

Patent law provides inventors a mechanism to safeguard their rights and advantage from their inventions while contributing to economic growth by encouraging innovation. It also seeks to strike a deliberate balance between the interests of inventors and general public. Therefore, understanding and studying the core principles of patent law is essential for all stakeholders affected by patent rights.

A 'Patent' is an exclusive right awarded for an invention that is related to a product or a process which reveals an innovative method of performing a task or provides an

original technical solution to an existing problem (Marsoof, Kariyawasam and Talagala, 2020). A patent is usually granted for a period of 20 years. It permits the inventor a monopoly to produce, manufacture, trade, import and gain financial benefits for the allowed period of time. Simultaneously, it holds the inventor under obligation to reveal all methodical and technical details related to the invention on the lapse of patent time. Patents foster innovation and encourage technological advancements by serving as a deterrent against unlawful imitation of original work and by allowing inventors reap the harvest of their intellectual labor (Stamatis, 2019).

The treaties laid out by World Intellectual Property Organization (WIPO), the Agreement on the Trade Related Aspects of Intellectual Property Rights or TRIPS laid out by World Trade Organization (WTO) are key treaties that set out the primal international standards with regard to the protection of all intellectual property including inventions and patents (Marsoof, Kariyawasam and Talagala, 2020). According to Article 27.1 of TRIPS, there are three major requirements of patentability. An invention should be 1. new (novelty), 2. should consist of an inventive step (non-obviousness) and 3. be useful in an industry (industrial applicability). The inventions that fulfill the above criteria are considered to be eligible for patents. Particular subject matters such as, abstract ideas, scientific theories or discoveries, laws of nature, certain medical treatment, etc. may not be eligible for patent protection. Patent rights are generally territorial in nature, therefore the scope of patentable subject matter may differ from jurisdiction to jurisdiction (Hewage, 2015). Subsequently, landmark judicial decisions across various jurisdictions have made a significant impact in shaping the general standards of patentability. Some of these cases have redefined patent eligibility criteria, challenged the patentability of abstract ideas and also provided clarity on the scope of patentable subject matter. A notable example for such landmark judgement is *Diamond v. Chakrabarty* [1980] in which the US supreme court ruled out that living organisms which are genetically modified could be patented, expanding the patentable subject matter. In *Bilski v. Kappos* [2010], the US supreme court addressed the patentability of business techniques setting out new standards of patent eligibility. Reshaping the scope of biotechnology patents, in the case, *Association for Molecular Pathology v. Myriad Genetics* [2013], it was

ruled that naturally occurring DNA sequences are not patentable. *Enfish, LLC v. Microsoft Corp.* [2016] could be recognized as a case which provided clarity on the patent eligibility of software related inventions. Indian judgements such as *Vifor International Ltd. v. MSN Laboratories Pvt. Ltd* [2021], *Allergan Inc v. The Controller of Patents* [2023], *Novartis AG v. Natco Pharma Limited* [2023] etc. have helped clarify and broaden the scope of patentable subject matter. Furthermore, European cases also have made a profound impact in reshaping European IP law covering not only patents but copyrights, industrial designs and trademarks as well (Heath and Sanders, 2012, p.90). These landmark judgements have not only influenced national and regional patent systems but also emphasized the importance of fostering innovation while maintaining the balance between patent laws and public interest. It could also be noted that, the global patent ecosystem has undergone significant transformation in recent years influenced not only by written law but also by landmark judicial decisions.

3.3 Intersections between patent law and artificial intelligence

When it comes to the connection between patent law and AI, there are multiple legal, ethical and technological aspects that should be taken into account. Therefore, the degree of human contribution in the perception of 'inventiveness of AI' should be carefully considered and understood in order to determine why, whether, or how the prevailing legal contexts should accommodate the interests generated by AI.

The traditional concept of 'inventiveness' is closely associated with human intelligence, imagination and creativity. The conventional 'inventor' is considered to be a natural person and is bestowed with patent rights. The general perception is that, there should be restrictions on patents, seeking to proclaim rights over certain living or biological materials, laws of nature, specific groups of software, etc. (Stamatis, 2019). But the emergence of AI has posed much dilemma about the traditional concept of inventiveness as AI systems have gained the ability to invent autonomously without human intervention. This dilemma revolves around whether AI systems should be perceived as inventors or if recognition should be

accredited to human operators, programmers or a combination thereof.

The prevailing patent legal frameworks mandate naming of a human inventor when claiming patent rights. In the latest judgement on DABUS, in *Commissioner of Patents v. Thaler* [2022] the full Australian federal court ruled out that an 'inventor' could only be a natural person (O'Callaghan and Shueard, 2022). This has led to much conversation on whether/how and why patent law should accommodate inventions by machines in patent law. Jain (2021) classifies AI related inventions in to two groups; 1. cases in which AI assists humans to invent, and 2. cases in which AI independently invent without human intervention. Though artificially intelligent, machines or AI cannot own or possess property including the intellectual property. The question lies within; if AI cannot own property then who will? Who will own and benefit from the monopolistic rights generated by a patent? This special situation involves several relations of ownership such as AI's owner, developer, user, data supplier and investor depending on their contribution to the creation of invention (Jain, 2021).

If the law does not address the predicament of inventiveness of AI, it would potentially lead to non-claiming of patent rights which would have undue impact on financial benefits expected under patent law (Watanabe, 2021). Scholars suggest distinct ways to address this issue. Many suggest that, a patent application would face potential voidness if either a natural person or an AI system exclusively claims patent rights as the inventor (Watanabe 2021.). A rational and realistic way to determine the ownership of AI is to decide on the contractual terms entered between stakeholders such as owner, programmer, user, data supplier, investor, etc. (Jain, 2021). Moreover, AI created inventions fulfill the traditional interpretation of inventiveness and its statutory requirements by designating minimally a single human as an inventor (Robinson, 2021).

Determining precisely where AI fits within traditional definition of inventor has become a challenging task due to the dynamic nature of both law of patents and AI technology. Fortunately, it is still not possible for AI to function completely autonomously without the assistance of humans (Watanabe, 2021). But one cannot predict the

exact time frame that AI will take to surpass human intervention. Therefore, the touch of human intervention shall be maintained all times during the patenting process of inventions by AI.

4. DATA ANALYSIS

4.1 Patent eligibility of AI

When patent eligibility of AI is concerned, it should be carefully assessed whether such inventions pass the parameters of novelty, non-obviousness and industrial applicability.

The requirement of novelty functions as the key criterion in distinguishing the margin between inventive creations which genuinely contribute to society and the ones that simply attempt to replicate existing inventions (Marsoof, Kariyawasam and Talagala 2020). The novelty requirement of inventions of AI mainly depend on the inventive process used by AI algorithms. Absence of novelty may arise when the employed algorithm lacks diversity in its outputs or depends on similar datasets, while the algorithms which integrate variability are more likely to create original inventions (Fraser, 2016). But AI is likely to create original creations as it has the ability to review prior art rapidly and precisely more than any human inventor.

Secondly, an invention should comprise of an 'inventive step' to be able receive patent protection. The test of PHOSITA has been accepted in numerous jurisdictions as the parameter of deciding inventive step or non-obviousness (Lemley cited in Jain, 2021). According to PHOSITA test, an invention involves an inventive step if it is not obvious to a Person Having Ordinary Skills in the Art. An invention could lose patent eligibility if a PHOSITA discovers obviousness between the invention and prior art. In terms of feasibility, it is impractical for any human being to have and hold all knowledge about the patent seeking subject matter (Jain, 2021). With its ability to evaluate and process more information than a human, it would be realistic for a machine to pass the PHOSITA test than a human inventor. Scholars suggest that, there may be a need to reevaluate the parameters of ordinary skilled person and obviousness, when such

extremely large computational power is considered (Fraser 2016).

Thirdly, an invention is considered patentable if it could be applied or used in an industry or a commercial setting (industrial applicability/utility requirement). Industrial applicability is often interpreted in a broad manner and does not necessarily mean that an invention has to be commercially exploited to be patentable (Jain, 2021). But, the invention should not be completely theoretical yet should showcase an amount of practical utility.

However, the existing legal frameworks do not explicitly create limitations on the individual who completes the task of inventing. It rather considers whether an invention fulfills the major requirements of patentability. Therefore, AI generated inventions are not explicitly disqualified by conventional patent law. In theory, such inventions could obtain patent rights as long as they meet the legal requirements.

4.2 Ethical considerations

Challenges are being posed on the conventional perceptions of 'inventor and inventiveness', as AI technology becomes more important in the course of innovation day by day. It is continuing to raise confrontations not only legally, but also morally and ethically. AI algorithms are becoming more useful and dominant in daily life, even if we do not always recognize them to be AI. However, when those algorithms start functioning intelligently like humans, the AI also should take over social responsibilities that are associated with such intelligence (Bostrom and Yudkowsky, 2014). Partiality, discrimination, transparency, security, privacy, transparency, accountability and job displacement could be recognized as the key ethical considerations generated due to inventiveness of machines.

Partiality and discrimination are two major moral challenges posed by AI. Artificial intelligence has the potential to take on partiality or bias in the data sets that were used to train it, which may lead to discrimination in fields like image recognition, loaning and employment (George and Walsh, 2022). Security of personal information and invasion of privacy is another significant

apprehension arising from AI's tendency for processing extensive amounts of data. AI algorithms with their data hungry nature, could possibly misuse personal information and cause privacy breaches (Stahl et al., 2023). Such breaches could pose serious threats to personal security and privacy of billions of people across the world.

AI systems are generally complicated and obscure. Therefore, it is challenging for human beings to fully understand the rationale behind certain actions of AI. This might lead to lack of transparency in AI driven systems causing issues in accountability particularly in areas like healthcare, banking and autonomous vehicles (Stahl et al., 2023). Simultaneously, AI has raised concerns about job displacement on a large scale, as AI's capacity to exceed human intellect and speed is moving the world towards automation.

Scholars warn that, these ethical considerations could create long-term effects on human society in future (Chikhaoui and Saghir, 2020). Addressing these concerns calls for a multidisciplinary approach between patent law, science, technology, ethics, policy making as well as society in order to ensure that the benefits of technological advancements are well balanced with ethical values and social welfare.

4.3 International perspectives

Patent rights are territorial in nature. Even though there are international agreements laying out minimum standards of protection, patent laws vary from jurisdiction to jurisdiction. According to scholars there is almost no internationally accepted laws or regulations with regard to inventions created by AI and most jurisdictions necessitates patent applicants to name a human inventor to safeguard the rights of natural persons (Abbott, 2019). Meanwhile, some countries like South Africa and Australia have already begun to accept the concept of inventiveness of machines within their jurisdictions.

South Africa made history when it granted a patent for a non-human inventor for the first time on 28th July, 2021 (Nissanka, 2022). This patent was granted for an invention autonomously created by the AI system DABUS (Device for the Autonomous Bootstrapping of

Unified Sentience) developed by Dr. Stephen Thaler. Though South Africa granted a patent attributed to an AI inventor, the South African courts have not yet decided whether an AI network could be considered as an 'inventor' under South African Patents Act No. 57 of 1978.

In the case of DABUS, Dr. Thaler initially applied for patent rights for DABUS in a number of countries but the applications got turned down due unavailability of a human inventor. For instance, in the case *Thaler v. Commissioner of Patents* [2023] NZHC 554, the High Court of New Zealand rejected the application ruling that the 'inventor' is limited to natural persons (Halberg, et al., 2023). Quite lately, in winter 2023, the supreme court of UK unanimously ruled that UK law does not permit an AI to be named as an inventor (Assmus et al., 2024).

Meanwhile in the case *Thaler v. Commissioner of Patents in Australia* [2021] an Australian court recognized DABUS to be the inventor (Zipper, 2022). Even though this groundbreaking judgment was the first of its kind to recognize AI as an inventor, it was later ruled out that AI does not serve the purposes of 'inventor' under patent law. In the latest ruling of *Commissioner of Patents v. Thaler* [2022], the full federal court of Australia unanimously held that a non-human agent cannot be named as an inventor for the purpose under the Australian Patents Act 1990. The full Court determined that only a natural person is capable of being named as an 'inventor', effectively shutting down the concept of AI-led patent applications in Australia and DABUS judgements have made significant implications in the field of patent law and have raised imperative policy questions about AI created inventions (O'Callaghan and Shueard, 2022). Simultaneously, UPSTO - United States Patent and Trademark Office, US federal courts, EPO-European Patent Office and FPC-German Federal Patent Court have ruled out that artificial intelligence cannot be allowed to be considered as an inventor (Assmus et al., 2024).

The above cases concerned, harmonizing AI related patent laws internationally deems to be a demanding task. But it is important to reconsider the existing parameters of patentability and appropriate laws put in place as AI is evolving at a rapid pace comparing to the intelligence of human kind. It will also be beneficial in incentivizing AI related innovation and in terms of economic aspects

associated patent law.

4.4 Sri Lankan perspective

Sri Lanka's legal framework on patents is governed by the part IV of the Intellectual Property (IP) Act No. 36 of 2003. The act came into effect on 1st January 2025 repealing the previous law: Code of Intellectual Property Act No. 52 of 1979. Sri Lanka is also a party to several international agreements regarding the protection of patent rights. Being a founding member of WTO Sri Lanka is a party to TRIPS agreement endorsed by WTO. Sri Lanka is also a party to the Paris Convention on the Protection of Industrial Property (Paris Convention) endorsed by WIPO. According to Marsoof, Kariyawasam and Talagala (2020) TRIPS and Paris Convention mandate its member states including Sri Lanka, only to give effect to the 'minimum standards' laid out in the agreements. The enactment of IP Act No. 36 of 2003 aimed at aligning the country's IP laws in accordance with its commitment to TRIPS and was crafted following the 'model laws' endorsed by WIPO (Hewage, 2015).

Patent regulations in Sri Lanka's IP act do not necessarily state any legal provision on 'inventiveness of AI'. The Act does not explicitly recognize nor excludes inventiveness of machines. Article 62(1) defines 'invention' as an idea of an inventor which permits in practice the solution to a specific problem in the field of technology. According to Article 62(2), the act recognizes that an invention could be related or could relate to a product or a process. Article 62(3) excludes inventions that cannot be patented under Sri Lankan Law such as; discoveries, scientific theories, mathematical, methods, living beings other than transgenic micro-organisms, biological/microbiological processes that produce living beings, business methods, mental acts, methods of treating/diagnosing on human or animal bodies, etc.

Even though section 62(3) does not explicitly exclude AI generated inventions from patentability, section 62(3) (f) states that certain inventions may be prevented from commercial exploitation within Sri Lanka if their use poses a possible danger to public order, morality, life, health or the environment. It could be asserted that inventions of AI may be obliquely refrained from patenting if their use falls under the context of this sub

section 62(3)(f). Sections 63 – 66 states general provisions on novelty, inventive step and industrial applicability. Article 67 mandates that right to a patent shall belong to its inventor or joint inventors. But the act does not interpret whether the inventor should be a live person or otherwise.

Sub-section 69(2) holds much significance as it provides that 'where an employee whose contract of employment does not require him to engage in any inventive activity, makes in the field of activities of his employer, an invention using data or means placed at his disposal by his employer, the right to the patent for such invention shall be deemed to accrue to the employer, in the absence of any provision to the contrary in the contract of employment'. According to sub-section 69(2), patent rights shall be vested in the hands of employer, in cases where an employee, who is not mandated involve in inventing activities, invents something using employer's data or resources. If the term 'employee' is interpreted in the context of 'AI or a machine' it is affirmative to state that patent rights for an invention generated by AI shall belong to its owner or employer under Sri Lankan legal context. Article 70(1) mandates naming of an inventor in the patent. As this article uses the terms 'he, him and his', it could be determined that the act requires the inventor to be a living person.

IP Act No. 36 of 2003 does not explicitly address or accommodate the concept of inventiveness of machines in Sri Lankan law. Simultaneously the act neither excludes the concept unambiguously. Even though current regulations may not provide specific guidelines or criteria regarding AI created inventions, it is affirmative that the prevailing regulations could be interpreted in a broad manner if any such need arises in future.

5. DISCUSSION

**“Innovation is born out of necessity.”
(Chesbrough 2005)**

If someone attempts to explain a person born in last couple of decades, that the very first computers did not have access to internet, they will probably be surprised and ask what people used computers at all (Watanabe,

2021). The main purpose of early computers was to aid humans work better and faster. Computers evolved rapidly from generation to generation and new era of technology dawned with the development of artificial intelligence.

The mankind has come a long way from the first industrial revolution. It could be argued that the human race is sitting on the verge of fourth industrial revolution which will be unlike any of the previous three revolutions (Chowdhury, 2021). Scientists have developed software that uses ideas from 'Darwinian's theory of evolution' such as 'the survival of the fittest' to construct AI algorithms to that could improve from generation to generation without human interference (Chowdhury, 2021). Now that AI has the capability of functioning and inventing on its own, ignoring the intervention of humans in the process could result in unanticipated consequences where AI might eventually supersede nature and human beings posing significant threats to mankind. Hence, policy-makers should constantly observe and analyze the dynamic nature of patent law, AI technology and their potential impacts to guarantee that the core foundation of patent law is conserved (Fraser, 2016).

International agreements like TRIPS and Paris Convention, lay out only the minimum standards to defend IP. They do not mandate member states to blindly follow the laid out legal frameworks. TRIPS allows WTO members with flexibility to maneuver and customize their patent laws according to their distinctive legal frameworks and national interests (Marsoof, Kariyawasam and Talagala, 2020). Countries are allowed with freedom to amend their own laws in accordance with new technological advancements the world is going through. And the existing international agreements do not barricade if a country is willing to accept the concept of 'inventiveness of machines' into their respective legal systems. Even though laws, rules and regulations on 'patentability of AI' are not yet clearly established on a global scale, countries may alter and improve their residential legal systems to clarify the confusion caused by AI inventors affording their unique domestic interests.

When it comes to Sri Lanka, the IP Act No. 36 of 2003 or any other law neither recognizes nor forbids the inventiveness of machines. With respect to economic

interests, Sri Lanka also cannot completely deviate from the rest of the world. With the world slowly addressing the novel concerns raised by 'inventiveness of machines', it would be a clever move for Sri Lanka to amend the patent law to clarify its national opinion and provide for patentability of AI created inventions under stringent conditions (Nissanka, 2022). Such action would help avoid possible challenges and confusion arising from rapidly advancing AI technology in future.

6. RECOMMENDATIONS

After a thorough examination of extensive research and literature, it could be recommended that inventiveness of AI shall be accepted under clear and stern conditions in patent law including in Sri Lanka. It is suggested that the prevailing patent laws should recognize the concept of 'collaborative inventiveness' of human and AI, and the natural person or the entity consisting of natural persons who uses AI to create or invent a patentable technology alone with the AI inventor should be considered as 'collaborative owners' of patent. A patent should not be granted if there is not at least one natural person mentioned when filing an application as AI cannot practically own property rights or held liable before a court. The human owner shall be allowed to own, possess and make use of the rights generated by such patent. At the same time, the human owner shall be held liable to fulfill the disclosure requirement after the lapse of time granted by patent and he shall be held vicariously liable for any illegal situation (unlawful act or omission) arising from AI. If proven, such vicarious liability should be extended to the creator of AI if an unlawful act or omission is caused due to an intentional act of the creator of AI. Subsequently, the definition of 'invention' should be amended to cover the inventions by AI. (In Sri Lankan law section 62(1) of IP Act No. 36 of 2003). Furthermore, the requirements of novelty, non-obviousness and industrial applicability should be thoroughly considered before granting a patent to avoid accumulation of impractical and worthless patents. Last but not least, the parameters of PHOSITA should be reconsidered and AI should be considered as a PHOSITA in cases of AI related patent applications.

7. CONCLUSION

“The foundation of human ingenuity lies in the faith that there is always an easier way that something can be done.” (Sahal, 1985,)

The traditional notions of inventiveness and patentability are constructed around human inventors. The novel conception of 'inventiveness of machines or AI' has posed several challenges and triggered much debate in the patent law landscape on a global scale. Invention via AI is the future of innovation. The machines, the technology that build machines and the intelligence of machines are evolving and advancing at a rapid speed, the human kind never imagined of. Therefore, the issues and complications caused by non-human inventors to the well-established principles of patent law cannot be underrated or entirely disregarded (Saw and Chan, 2023).

As the concept of patentability of inventions by AI is quite novel, the patent law regimes of many countries including Sri Lanka are not equipped or prepared yet to address how, why or whether they should allow AI inventors into their legal systems. We are still at an early juncture and it is too early to arrive at a conclusive decision on the pros and cons of AI technology. However, regardless of our preferences, sooner or later, the future of innovation will start relying on inventions created by AI (Schuster, 2018). Therefore, the laws should be ready and in line to afford the future advancements of AI in order to uphold the human control over machines.

This comprehensive study tried to initiate a timely conversation on the challenges posed by inventiveness of machines highlighting their legal, ethical and technological components. Keeping the contribution of AI technology to economy in mind, this research concludes that, the concept of 'collaborative inventiveness of AI and human' should be recognized within the existing regulatory frameworks on patents. Thus, the rights and duties generated by a patent for an invention of AI should be accredited on both the AI and natural persons that utilize AI to develop such patentable inventions.

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