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GREEN INNOVATION, INTELLECTUAL PROPERTY RIGHTS AND ENVIRONMENTAL PROTECTION: Ways and Means to Achieve Sustainable Goals

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GREEN INNOVATION, INTELLECTUAL PROPERTY RIGHTS AND ENVIRONMENTAL PROTECTION: Ways and Means to Achieve Sustainable Goals

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[Abstract: *Green innovation is an important element in the pursuit of sustainable development, and fundamental to achieving the goals outlined in the 2030 Agenda of Sustainable development. World Intellectual Property Rights (WIPO), while explaining the interconnection between innovation and sustainable development, highlighted the importance of Intellectual Property (IP) rights in promoting green technology and fostering sustainable economy, by attracting the foreign investment. Green innovation is the responsible of both State and private entities, contributing for to the broader aim of reducing environmental degradation. IPR as a catalyst, can play a pivotal role in protecting and promoting green innovations, by granting exclusive rights to innovators, and by incentivizing research and development (R&D) activities leading to the creation of new eco-friendly technologies. However, the intersection of green innovation, IPR and environmental protection poses several challenges. This article explains the concept, green innovation and green IPRs and the driving forces in fostering these two, and the benefits of developing sustainable innovations. The article will also analyze the market demand for green IPRs and the interrelation of green innovation with the sustainable development goals. The highlights the incentivization policies adopted by the IPR regulatory frameworks of other countries for promoting green innovation.*]

I

Introduction

Innovation is the creation, development and implementation of a new product, process or service, with the aim of improving efficiency, effectiveness or competitive advantage. Innovation is an inquiry into the nature through the intellectual mind of the human being to create a better future. In its 2030 Agenda for Sustainable Development, WIPO summed up the importance of IP right to green technology and sustainable economy as

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following: '*A nation's ability to innovate, attract foreign investment, and develop valuable businesses offering products and services that can compete on a global scale is intrinsically linked with Green Innovation and Intellectual Property and its supporting innovation ecosystem*'.[1] Innovation is not a concept limited to industries and technology, it connects the state, market and society, and contributes in developing a conducive ecosystem for the future sustainable development of humankind, which is inclusive and sensitive to the aspirations and needs of the country.

Green innovation is the concept developed in the 21st century, a shift towards a sustainable, environmentally friendly and resource-efficient economy and society. Green innovation leads to sustainable development and eases the transition towards an eco-friendlier economy. Green technologies protect the environment, are less polluting, and implicate sustainable use of renewable resources.

In contemporary times, transitioning to environmentally sustainable practices has transcended mere preference to become an imperative for the preservation of human civilization. Pioneering a path ahead rooted in ecological stewardship is not only advisable but indispensable in the 21st century. The reverberations of climate change have galvanised citizens globally to contemplate and cultivate an ecological milieu capable of thriving in perpetuity. The exigencies of the global climate crisis have presented an imposing challenge to corporations, governmental bodies, and policymakers worldwide, prompting concerted efforts to confront this challenge and engineer progressively viable solutions. This collective endeavour has engendered a fertile ground for innovation. The practical manifestations of novel concepts, coupled with the transfer and dissemination of emerging technologies, are catalyzing global efforts toward sustainability. Consequently, this discourse on green innovations and clean technologies, underscores the emergence of the concept of Green Intellectual Property, herein referred to as 'Green IP'. Green IPR legally covers innovations that are beneficial to the preservation of the environment. The green IPRs are initiatives in the field of invention and science that can help mitigate climate crises. Green IP is quite a recent phenomenon, and it helps incentivize an eco-friendly environment, which further helps in the growth of research and development in this field. However, green intellectual property will shape how the resources and the technology will be used judicially to care for environmental concerns.

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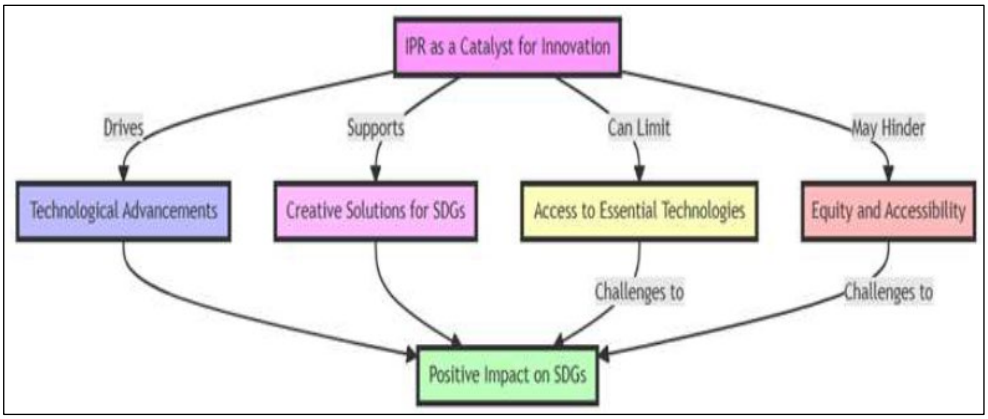
[1] *Green Innovations call for strong IP Protection,* DENNEMEYER (Jul. 28, 2021) *available at*: https://www.dennemeyer.com/ip-blog/news/green-innovations-call-for-strong-ip-protection/



Source[2]

II

Green Innovation

Green innovation was defined by Kemp and Pontoglio as 'a product, production process, service or management or business method that is novel and which results throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use compared to the relevant alternatives. Green innovation refers to innovations that focus on preventing pollution, reducing waste, and implementing environmental management systems in organizations.[3] OECD defines green innovations as the *"implementation of new, or significantly improved products (goods and services), processes, marketing methods, organisational structures, and institutional arrangements which – with or without intent – lead to environmental improvements compared to relevant alternatives."*

The concept of green innovation has been derived from the idea of 'green techno-economic paradigm' proposed by Christopher Freeman, a famous economist. A techno-economic paradigm is defined as a set of 'common-sense guidelines for technological and investment decisions as pervasive new technologies mature'. This paradigm

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[2] Muhammad Hamza Zakir et al., *The Role of Intellectual Property Rights in Achieving Sustainable Development Goals: a Comparative Analysis of Policy frameworks and Their Impact,* RESEARCHGATE (Dec. 2023), *available at*: https://www.researchgate.net/publication/378852365_The_Role_Of_Intellectual_Property_Rights_In_Achieving_Sustainable_Development_Goals_A_Comparative_Analysis_Of_Policy_Frameworks_And_Their_Impact.

[3] Pablo Cisneros Chavira, *et al., Defining green innovation, its impact, and cycle – A literature analysis,* 17 CLEANER ENGINEERING AND TECHNOLOGY (2023) 100693 *available at*: https://www.sciencedirect.com/science/article/pii/S2666790823000988.

involves switching to greener technologies and modes of production[4]. Green innovation is the process of developing and implementing technologies that reduce the environmental impact of human activities. Green innovation can help address the challenges of climate change, pollution, resource depletion, biodiversity loss and social inequality. Green innovation can create new opportunities for economic growth, job creation and social welfare.[5]

Green innovation is not only about those sectors typically labelled as 'green' or 'cleantech', like renewable energy, but is much broader, encompassing a wide diversity of technical, organization and business innovation. Green innovation is anticipated to have impacts on both climate change and global policy initiatives to reduce emissions. Green innovation strategy requires both facilitation of green innovation across the economy, and targeted support for core green technologies.

III

Green IPR

The term 'Green Intellectual Property' refers to the safeguarding of innovations in the realm of green technology.[6] The UN Rio Declaration on Environment and Development of 1992 stated that Green Technology means "*environmentally sound technologies that protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which* they were substitutes".[7]

Green innovation faces many barriers, such as high costs, market failures, regulatory uncertainties and lack of awareness. Green innovation possesses distinctive, differentiating characteristics that imply a requirement for specific governance and policy methods to promote them. One of the key factors that can facilitate or hinder green innovation is the intellectual property rights regime. Intellectual property rights are the legal rights guaranteed to the creators to encourage them for their creations. IP provides incentives for green innovations by playing an important role in the development of green technologies.

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[4] Technology and Innovation Report 2023, UNCTAD, *available at*: https://unctad.org/system/files/official-document/tir2023_en.pdf.

[5] *Green Innovation and Intellectual Property Rights*, SURANA & SURANA INTERNATIONAL ATTORNEYS, *available at*: https://suranaandsurana.com/green-innovation-and-intellectual-property-rights/.

[6] V. C. Mathews, *Green Intellectual Property*, LEXOLOGY (Jul. 6, 2022), https://www.lexology.com/library/detail.aspx?g=8182bd04-4c4f-4c70-ae09-167c11fe7481.

[7] The United Nations Program of Action from Rio, 1992, Agenda 21, Ch. 34.

Article 7 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement) provides as follows: 'the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge, and in a manner conducive to social and economic welfare, and to a balance of rights and obligations'. This Article of TRIPS agreement carries the essence of green innovation and promotes green technologies under IPR regime, by promoting the phrase 'Green IPRs'.

Green Patents

Green patenting refers to the patenting of green technologies. In terms of Sustainable Development, green patenting refers to providing patents to those ideas or technologies which are environment friendly that help combat climate change and foster development along economic, social, and eco-friendly lines. Green patenting is, therefore, patenting of green technologies that promote sustainable human development without compromising the environment. As per the reports by Times of India, between the years 2016 and 2021, every second patent issued in India pertained to green technology, with one-fourth of such patents specifically addressing alternative energy production. This trend aligns with the endeavours of the central authority towards promoting the increased adoption of green technology to stimulate economic growth and foster consumer preference for products derived from such technology.[8]

Green Trademarks

The trademarks which are committed to and can demonstrate the products which are sustainable in nature are called green trademarks. A green trademark is a symbol, logo or phrase used to denote the commitment of its owner to environmental responsibility. It signifies that a product or service has been manufactured, sourced, or delivered in a manner that minimizes its impact on the environment. According to the EUIPO, *"a green trademark is a collective term for specific trademarks, service marks, and certification marks that communicate environmentally friendly products, services, or practice"*.[9] Brands that convey environmental or sustainability attributes through verbal representations, graphics, symbols, or the utilization of green coloration may be potentially classified under the category of green brands. Green trademarks typically feature words such as "eco", "green", "sustainable," or "organic" and combine the same with visually striking elements such as foliage, flowers and earthy colours. Their primary objective is to differentiate environmentally conscious goods and services within the marketplace,

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[8] Chetan Kumar, *Every 2nd Patent Granted Since 2016 Relates To Green Tech; Most Linked To Waste Alternative Energy*, TIMES OF INDIA (Feb. 8, 2022) *available at*: https://timesofindia.indiatimes.com/india/every-2nd-patent-granted-since-2016-relates-to-green-tech-most-linked-to-waste-alternative-energy/articleshow/89420047.cms.

[9] Taylor Wessing, *Green Brands: What Can Be Trade Marked?*, LEXOLOGY (April 25, 2023), https://www.lexology.com/library/detail.aspx?g=fdb0ac47-ad11-404d-aeaf-eaa922c810a5.

facilitating consumers in making informed purchasing choices predicated upon the ecological ramifications of said product or service. The society we live in today is consumeristic, the population of which scrutinizes labels of all the products before making a purchase and tend to show an inclination towards the one that meets the environmental sustainability ideals. This shift in the nature of purchase has induced the companies, may it be SMEs or the MNCs, to make false or exaggerated claims about being committed to developing models associated with sustainable environment. A significant rise in the concept of 'greenwashing' can be found. This includes claims related to production methods or material composition, such as *"100% recyclable," "compostable," "100% natural," or "zero emissions,"* use of vague terms like *"natural," "green," or "eco-friendly"*. It is essential that these trademarks which are claimed to be green must be transparent and meaningful, true and not misleading in their green claims.

Green Copyright

The concept denoted as 'green copyright' delineates the confluence of copyright jurisprudence and environmental sustainability, encompassing an examination of the interplay between copyright statutes and their effects on environmental preservation. The objective of green copyright is to mitigate the environmental challenges inherent in extant copyright laws, including but not limited to, the environmental ramifications of digital dissemination and the ecological repercussions of copyright enforcement measures. One facet of green copyright entails scrutinizing the impact of copyright regulations on the recycling endeavours of electronic apparatuses, such as computers and mobile phones, aimed at mitigating electronic waste accumulation. Additionally, it encompasses an evaluation of the environmental effects stemming from copyright enforcement actions on consumer behaviour, notably regarding the frequency of technological upgrades, exemplified by instances such as the recurrent demand for updated iterations of smartphones.

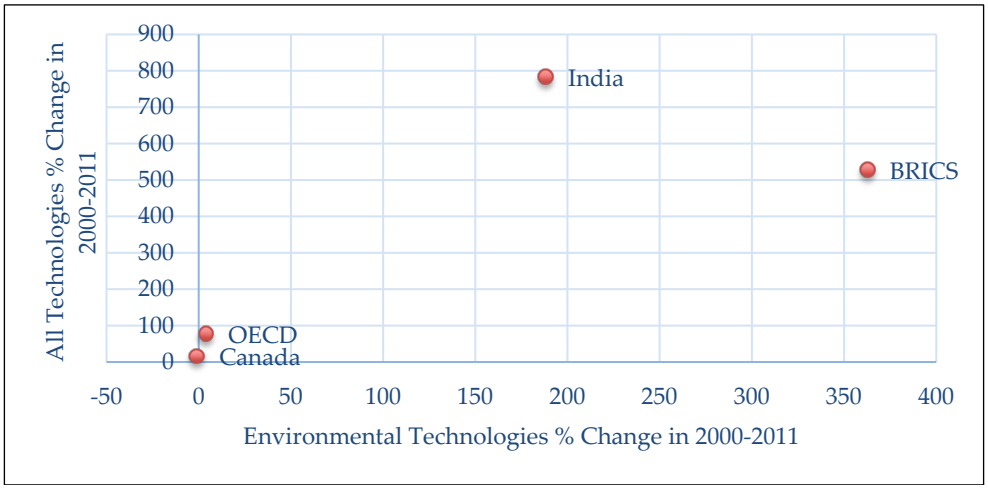
The purview of green copyright extends to an analysis of how copyright legislations influence the innovation landscape within environmental technology and processes, with a specific focus on patents of eco-friendly inventions. Furthermore, it delves into the role of copyright in either fostering or impeding environmentally sustainable practices, including the promotion of shared computing resources and network-based services aimed at curtailing the necessity for multiple electronic devices.

IV

Market of Green IPR

In the 21st century, environmental protection, and sustainable development goals (also known as global goals) have taken front seat in the debates relating to green innovation and intellectual property rights. "Going Green" became the success mantra for businesses and trade both domestically and internationally. Green innovation became quintessential to achieve the sustainable development goals i.e., end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. Green innovation aims to mitigate environmental impact through eco-friendly green goods. In its 2030 Agenda for Sustainable Development, WIPO summed up the importance of IP right to green technology and sustainable economy as following: '*A nation's ability to innovate, attract foreign investment, and develop valuable businesses offering products and services that can compete on a global scale is intrinsically linked with Green innovation and Intellectual Property and its supporting innovation ecosystem'*.[10]

Chart 1: Indicating growth rate in the development of different types of technology



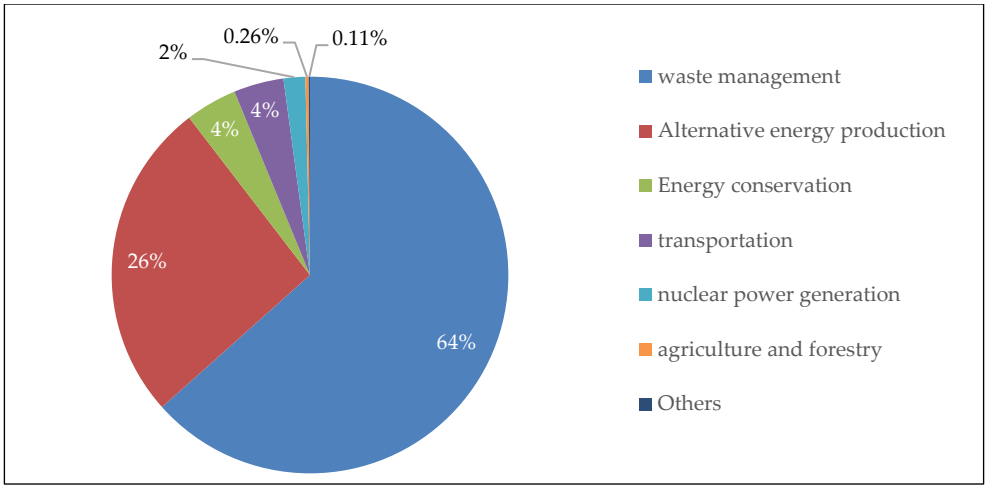
Source: OECD Home

Between 2006 and 2020, global patent applications for green energy and energy-efficient technologies increased by roughly 120% under the International Patent Cooperation Treaty (PCT). Chart 1 indicates that the growth in environmentally related patents is way faster than the growth in overall innovation worldwide with a substantial increase in such technologies found in the BRICS nation.

[10] *Supra*, note 1.

When we look into the figures of India, data from the Ministry of Commerce and Industry revealed that more than 91,500 patents were granted between 2016 and 2017 and 2021 and 2022.

Chart 2: Showing the percentage share of different types of patents granted for green technologies in India so far



In total, 61,186 patents for green technologies were granted within the specified time, and 90% of these are for waste management and alternative energy generation technologies, with 38,837 (63%) linked to waste management and more than 16,000 (26%) related to alternative energy production. The remaining green technology patents cover energy conservation (2,555), transportation technologies (2,481), nuclear power generation (1,079), agriculture and forestry (161), and others (69) [as indicated by Chart 2]. India has always believed that nature and human well-being are inextricably intertwined and that humans and the planet are interdependent.[11]

V

Sustainable Goals vis-a-vis Green Innovation and Green IPR

SDG 13 focuses on *taking urgent action to combat climate change and its impacts.*[12] It emphasizes the need to strengthen resilience and adaptive capacity to climate-related

[11] Gopi Trivedi and Jinal Bhavsar, *role of intellectual properties in advancement of green technology*, LIVELAW (Mar. 28, 2024) *available at*: https://www.livelaw.in/law-firms/law-firm-articles-/intellectual-property-green-technology-yj-trivedi-co-253609#:~:text=Currently%2C%20the%20data%20from%20India's,management%20and%20alternative%20energy%20production

[12] *The Global Goals, available at*: https://www.globalgoals.org/goals/13-climate-action/

hazards and natural disasters. Green innovation and green IPR makes an effort towards development and implementation of new products, processes, services, or technologies and encompassing legal protections to such innovations thereby, playing a crucial role in developing climate-friendly solutions and technologies to combat climate-change effectively. For instance, introducing more sustainable and efficient agricultural practices through technologies like soil analysis tools that use DNA sequencing and intelligent computing to optimize farming; advancing sustainable transportation via innovative electric vehicles, public transit systems and urban planning among others. All of these instances fortify SDG 13 in general and Target 13.2 and Target 13.2 in general. Indian startups like Enviro Recyclean Private Limited established by Rahul Poddar in 2020 that lays the innovative idea of a compact integrated system that generates renewable green energy from renewable sources like solar light and wind energy that uses less space for installation of system and helps provide energy in an environment-friendly manner, saving the cost and installation time of the user, provides for increasing awareness among the youth to attain the Global goals for combating climate change.

SDG 8 *promotes sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*.[13] Innovation drives economic growth and job creation. Moreover, this SDG is in direct line with the issue of IP infringement in the growing digital space and as was also brought out initially in the Puma case, namely, how to ensure that the rights of IPR holders are sustained while also not hampering the growth of the digital economy with over-regulation and scrutiny. The need is, therefore, to find sustainable solutions that maintain this delicate balance and ensure sustainable growth for the intermediaries and IPR holders alike, in accordance with target 8.1 of the SDG. Also, IPRs promote diversification, technological upgrading and innovation, in line with target 8.2 and hence are required to be safeguarded. Notably, IPR infringements may affect not only well-established brands but also growing MSMEs who may not have the technical expertise or resources to deal with such complex and unprecedented technology-based issues, hindering target 8.3 of SDG 8.[14] Counterfeiting and piracy diminish the profits derived from innovation and impede economic progress due to their adverse effects on businesses, consumers, and governmental entities,[15] therefore marring target 8.4 of the SDG i.e. *improving resource efficiency in consumption and production.* Hence, maintaining this balance is crucial to ensure the effective attainment of SDG 8 especially.

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[13] *The Global Goals, available at:* https://www.globalgoals.org/goals/8-decent-work-and-economic-growth/

[14] *Id*.

[15] Joint Economic Committee, *The Impact of Intellectual Property Theft on the Economy* (Aug. 2012), *available at*: https://www.jec.senate.gov/public/_cache/files/aa0183d4-8ad9-488f-9e38-7150a3bb62be/intellectual-property-theft-and-the-economy.pdf.

Shooting Three Birds with a Single Stone: The Interplay Between SDGs 8, 12 & 17

For the digital ecosystem to sustain, sustainability and inclusivity are among the key, long-term components to be ensured. Specifically, for IPRs, for innovation to foster and develop in times to come, adopting methods which incorporate SDGs is essential. However, it is important to note that SDGs may not function in silos. They are interrelated and policy interventions aiming for one SDG might as well have implications for other SDGs as well. While SDG 8 may be most important to understand the delicacy between ethics and economic growth, SDGs 12 and 18 bring out the importance of sustainable consumption and partnerships; all of which are pertinent to the discussion herein. While SDG 8 brings out the issue at hand (balancing the economic interests of the e-commerce platforms with the opportunities of growth for IPR holders) from the end of the content creators and IPR holders, SDG 12 brings out the other side of the spectrum i.e. the responsibility of consumers to support IP protection and not hinder their progress and in turn help in fostering an innovative ecosystem. SDG 17 is ultimately important in formulating solutions to the problems encountered i.e. inculcating effective partnerships between the stakeholders in the whole process. Hence, understanding the interplay between some of the most relevant and directly related SDGs for coming up with integrated solutions for IPRs in the digital marketplace is significant.

Further, as desirable as it may be for a judicial tribunal to administer personalized justice in each instance, this aspiration is impractical and lacks coherence within the realm of digital contexts. Therefore, in response to an increase in online sales of pirated and counterfeit products, voluntary cooperation between online platforms and right holders has proven successful, to some extent, but has not been fully effective in stopping online counterfeit sales. These measures are deliberately planned by web and social media platforms themselves (the new janitors), drafted in liaison with right holders, or supported by the executive and administrative officials.[16] Therefore, the importance of partnerships between all possible stakeholders cannot be understated.

VI

Comparative Regulatory Framework

Globally, intellectual property organizations are sanctioning technologies pertaining to climate change, endorsing specific provisions and establishing forums to convene inventors with similar objectives. For instance, the International Patent Classification

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[16] *The Global Digital Enforcement of Intellectual Property,* WIPO MAGAZINE (Sep. 2018), *available at:* https://www.wipo.int/wipo_magazine/en/2018/si/article_0005.html

Committee has established the '**IPC Green Inventory',** which retains and facilitates convenient user access to data concerning patents and their involvement in green technologies, encompassing alternative energy generation, energy conservation, transportation, waste management, agriculture, forestry, and related design components. The World Intellectual Property Organization (WIPO) has instituted WIPO GREEN, a platform designed to link environmentally sustainable technological solutions with the international innovation ecosystem, thereby fostering exchange and collaboration through its digital repository. In furtherance of its objectives, the World Intellectual Property Organization (WIPO) had initiated the "*Women in Green*" interview series in the year 2020, with the specific purpose of advancing female engagement and entrepreneurial activities within the green technology innovation sector. Moreover, WIPO Green has instituted a pro bono program designed to provide legal support to entities in developing nations pertaining to green innovation endeavours.[17]

Again, most of the countries across the globe are incorporating measures towards incorporating and accomplishing sustainable economic growth to conform to the global goal of achieving the SDGs. The EU Intellectual Property Office (EUIPO) acknowledges the growing importance of sustainability and has published a report on "Green Trademarks" that analyses the rise of trademarks focused on environment-friendly products and services. This gives a boost to the demand for environment-friendly products thereby, inducing companies and sellers to invest, research and develop this area. An EUIPO study from September 2021 showed a large increase in the number of applications for trademarks covering green goods and services. In 2020, 16,000 such trademarks were applied for at the EUIPO, approximately 14% of all EUIPO trade mark applications.[18] On November 25, 2020, the European Commission adopted an Action Plan that focuses on enhancing a range of current intellectual property measures and adapting them to the digital era. This includes enhancing the supplemental protection certificates (SPC) for patented medical and plant protection goods, as well as modernising EU design protection. Their objective was to enhance the safeguarding of agricultural geographical indications (GIs) and assess the viability of implementing a GI protection framework for non-agricultural products at the European Union level. The Commission initiated an industry discussion to discuss and tackle the effects of emerging technologies, such as artificial intelligence and blockchain, on the intellectual property system. By protecting inventions related to green technologies, the EU aims to stimulate innovation that drives sustainable economic growth. The EUIPO works with international partners on initiatives like "AL-INVEST Verde IPR" to promote the use of IPRs for sustainable development in Latin America and encourage innovation in green technologies and practices, contributing to environmental sustainability. This further

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[17] *Supra*, note 11.

[18] Taylor Wessing, *Green Brands: What can be Trademarked?*, LEXOLOGY (Apr. 25, 2023), *available at*: https://www.lexology.com/library/detail.aspx?g=fdb0ac47-ad11-404d-aeaf-eaa922c810a5.

foster knowledge sharing and strengthens the global IP framework for green technologies.

In United States, the Patents for Humanity Awards Program by the United States Patent and Trademark Office (USPTO) provides business incentives for patent applicants, holders, and licensees whose inventions rapidly address climate change concerns through green energy technologies like wind, solar, green hydrogen, hydropower, geothermal, and biofuels. It provides startups with a platform of recognition in public and an acceleration certificate to expedite selective matters of patent grant. The Green Technology Pilot Program in 2009 by USPTO aims at expediting the review of patent applications that concern green technology, energy conservation, environmental protection and reduction in carbon emission.[19] Furthermore, the Climate Change Mitigation Pilot Program initiated by the USPTO in June 2022, expediates the evaluation of patent applications pertaining to innovations addressing climate change through the reduction, elimination, prevention, and/or monitoring of greenhouse gas emissions. Eligible applications are prioritized to receive an expedited initial Office action.

It is not just the nations that are striving at their sovereign standard to make regulations or frameworks promoting development of green technologies against the climate change concerns, but giant corporations too can be seen joining hands in bringing in revolutionary programmes or pledges to address the same. For instance, the Eco-Patent Commons, an initiative established in 2008 by the World Business Council for Sustainable Development (WBCSD),[20] is a form of IP collaboration between firms whereby, participating companies like IBM, Nokia, and Sony among others pledged their patents in the green sector.[21] Such initiatives demonstrate a commitment to fostering innovation, collaboration, and the dissemination of knowledge within green technology. Ultimately, this will contribute to the protection and advancement of green intellectual property on a global scale.

India is swiftly attempting to overhaul the energy industry to achieve zero carbon emissions by 2070. India has implemented several national initiatives to promote green technology and innovations. One such initiative is AGNI, which is sponsored by the Indian government and falls under the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STAIIC). AGNI serves as a platform to facilitate the

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[19] Anand Barnabas, *Green Innovation and IP: Legal Frameworks for Sustainable Technologies in India,* MONDAQ (Feb. 5, 2024) *available at*: https://www.mondaq.com/india/patent/1419990/green-innovation-and-ip-legal-frameworks-for-sustainable-technologies-in-india.

[20] *Id*.

[21] Pratheeba Vimalnath, Frank Tietze, Akriti Jain, Viola Prifti, *IP Strategies for Green Innovations- an Analysis of European Inventor Awards,* CENTRE FOR TECHNOLOGY MANAGEMENT (Jan. 2020), *available at*: https://api.repository.cam.ac.uk/server/api/core/bitstreams/3526d566-ec1a-49c4-bbf2-921613a68935/content

commercialization of technological innovations. Additionally, other initiatives, such as Climate Launchpad 17, have been launched, which is recognized as the world's largest competition for green business ideas and is co-founded by the European Union. However, despite a substantial growth in green IPR in India, the nation lacks an IPR regime that effectively addresses innovation and clean technologies. The country must adopt other regulatory practices associated with the relaxation of trade barriers and inclusion of especially fast-track patent prosecution process for environmental-oriented inventions.[22]

VII

Conclusion

It is realistic to realize that the debate on climate change is indeed congruent with the broader development challenge. It becomes a necessity to consider radical actions that remove the fundamental friction that intellectual property places on the dissemination and distribution of technological products and know-how. Intellectual Property Rights play a pivotal role in the promotion of sustainable development within the jurisdiction of India. Recognizing the critical importance of IPRs in achieving its developmental goals, the nation has instituted various legislative enactments and initiatives aimed at fostering innovation and safeguarding intellectual property. India has devised strategies to mitigate potential impediments posed by IPRs to the accessibility of essential medications and technologies, particularly for socioeconomically disadvantaged and marginalized segments of the population. Despite notable advancements, persistent challenges persist in the realm of IPRs and sustainable development in India. These efforts encompass augmenting the effectiveness of intellectual property statutes and regulations, fortifying enforcement mechanisms, and fostering heightened public awareness and comprehension of IPRs. Ensuring a balanced equilibrium between the protection of intellectual property and the promotion of access to critical goods and services, particularly in domains such as public health and environmental preservation, assumes paramount importance.

Findings

The principal conclusion drawn from these analyses is that intellectual property rights (IPR) legislation must strike a delicate balance. It should foster incentives for innovation while simultaneously ensuring accessibility to fundamental technologies, especially within the realms of health and environmental preservation. Stringent IPR protection

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[22] Z. A. Khan and Shireen Singh, *Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability*, 22 NATURE ENVIRONMENT AND POLLUTION TECHNOLOGY JOURNAL 2145.

lacking provisions for the utilization of essential medicines and green technologies may detrimentally impact public health (SDG 3) and efforts to combat climate change (SDG 13). IPR frameworks ought to incorporate mechanisms such as compulsory licensing, research exemptions, and safeguards for both traditional knowledge systems and contemporary innovations. Such flexibility serves a pivotal role in addressing the unique challenges of sustainable development, particularly in developing nations, enabling them to access a broader spectrum of knowledge, cultivate indigenous inventions, and preserve biodiversity (SDGs 2, 15). Facilitating effective technology transfer through collaborative IPR arrangements can significantly contribute to the attainment of Sustainable Development Goals (SDGs), notably in the domains of renewable energy (SDG 7) and agricultural productivity (SDG 2). Thoughtfully crafted IPR policies have the potential to catalyze innovation and economic progress, thereby advancing multiple SDGs including SDG 9 *(Industry, Innovation, and Infrastructure)* and SDG 8 *(Decent Work and Economic Growth).* Nonetheless, such policies should be accompanied by reasonable limitations.

Use of compulsory licensing to evade the anti-competitive practices like refusals to license, unreasonable pricing or restrictive licenses; easier and transparent licensing platforms and markets can assist developing countries like India in their goal of adhering to green innovations. Furthermore, entrepreneurs shall be given the benefit of more joint research and development projects, subsidies, insurance and loan guarantees for the development, diffusion and transfer of climate technology; infrastructure for information sharing and licensing platforms, global patent pools, access to publicly funded research and complete use of flexibilities granted by TRIPS. The least developed countries (LDCs) face an urgent requirement for access to products at low prices that will maintain and increase energy access as they have little to zero capacity for production and innovation of complex clean technologies or funds necessary for the development of the same. This gap can be filled by emerging economies like India that have the potential to become production and distribution centres themselves which is again fortified on the easy accessibility to granting of licenses or patents, as required. The UNFCCC should be empowered to establish an intellectual property exchange dedicated to technologies aimed at mitigating and adapting to climate change. This exchange would facilitate secure, efficient, and transparent transactions for intellectual property licenses, consolidating all relevant processes under the authority of the UNFCCC. The Green Xchange, launched in 2009 through collaboration between Creative Commons and various enterprises, serves as a precedent for such an initiative, applying the patent commons model originally introduced by Creative Commons in the realm of copyright to patents related to environmentally sound technologies.[23]

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[23] Dalindyebo Bafana Shabala, *Climate Change, Technology Transfer, And Intellectual Property: A 'Modest Proposal' For an IP Enforcement Moratorium*, FORDHAM ENVIRONMENTAL LAW REVIEW 1 (2020).