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The Functionality of Patent Law in Environmental Technologies and Climate Change: An Inspiration for Nigeria

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Abstract

The law is indispensable as an agent or instrument of both social control and change. Thus, it is common place to use the instrumentality of the law to effect social, political, economic, educational, socio-economic, and climatic changes. The Patent law performs part of this role by protecting human activities; it is designed for encouraging the development of advanced technologies. Its subject-matter is formed by new innovations, creativity, ideas, and inventions produced by man for man. The production of material wealth results from interactions between human beings within the society; the raw materials used in the process of production are derived from the environment. It is for this reason that nature and society must agree for any meaningful and sustainable programme to take place. Consequently, if nature is not protected, the future of the society will be in jeopardy. The patent system, in collaboration with other factors, can help in the assimilation and utilisation of ecological technologies; thus, beyond the orthodox ex-ante and post-ante analysis of the patent landscape, it is a veritable vehicle in the acquisition, adaptation, and advancement of environmental technologies in climate change.

Keywords: climate change, digital ecology, environmental technology, functionality, patent.

1.0 Introduction

In many instances, the state of the art of social change endeavour is not procedurally sophisticated enough to distinguish clearly among unpremeditated, essential, sufficient, and related conditions to produce desired effects in a society. The legal system of any country reflects all the dynamism and vibes within that particular society. "We can therefore say that law is a social science characterised by movement and adaptation. Rules are neither created nor applied in a vacuum".[1] The advantage of law as an mechanism of economic, societal, educational, political, or climatic change are attributed to the fact that law is seen by all and sundry as legitimate, more or less rational, authoritative, institutionalised, generally not disruptive, and backed by instruments of enforcement.

Law sets and enforces scientific standards for human health and enjoyment by regulating the use of air, water, and land. The law also as broader tasks that require it to make complex policy judgments, for instance, it is expected that it must decide how rigorously to control strip mining

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[1]Dejo Olowu, *Province of Law, Society and Development* (Ibadan: Kraft Books Ltd, 2017) p.65.

which pollutes streams, in the light of the demand for coal as fuel.[2] According to Anleu, the major purposes and functions of law are: establishing standards, maintaining order, resolving disputes, and protecting liberties and rights.[3]

The law of Patent is positioned around the protection of the results of human creativity; it subject-matter is molded by discoveries, inventiveness, ideas, and originations engendered by man for man; and for the well-being of the entire humanoid. The concept of environmental technology, could save our planet from the harm that has been done; although technology is a solution-enabler it is also a part of the problem. The term 'term' technology refers to the application of scientific knowledge for practical purposes and the machinery and devices developed as a result. The patent system is calculated to kindle and disseminate existing technologies that could alleviate destruction to the environment. The patent protection in particular, plays a crucial role in the growth of climate solutions, and is often more heavily scrutinised than other intellectual property (IP) rights. Thus, the concern of this paper is to examine the functionality of the Nigerian Patent Law in environmental technologies and climate change in Nigeria.

2.0 Environmental Technologies: -

Environmental technology (ET) or green technology also known as clean technology (clean tech), is the application of one or more of environmental science, green chemistry, environmental monitoring, and electronic devices to monitor, model, and conserve the natural environment and resources; and to restraint the negative impacts of human involvement. The term is also used to describe sustainable energy generation technologies such as photo voltaic, wind turbine. The core of environmental technologies is ecological improvement or development.

Environmental technologies are also used to describe a class of electronic devices that can promote management of resources that are helpful to the environment. ET is also known as *green* or *clean* technology and refers to the development of new technologies which aim at conserving, monitoring or reducing the negative impact of technology on the environment and the consumption of resources.[4] ET, in simple terms, is the scientific study or application of engineering principles to understand and handle problems that influence our surroundings with the goal of improvement of the environment.[5]

Despite the negative impact of technology on environment, a recent rise in global concern for climate change has led to the development of new environmental technology aiming at helping to solve some of the biggest environmental concerns that we face as a society through a shift towards a more sustainable, low-carbon economy. Against this backdrop, a key milestone came in 1992 whereby an international consensus was reached at the Earth Summit in Rio de Janeiro, which was attended by governments, non-governmental organisations, and interested individuals.[6] Exploring this in more depth, the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD), set the objective of stabilizing levels for greenhouse gas emissions, in a time frame which would enable the ecosystem to adapt naturally to climate change to ensure that food production is not threatened and to enable economic

[2]Magaret T. Okorodudu-Fubara, *Law of Environmental Protection* (Ibadan: Caltop Publications Ltd, 1998) pp.17-18.
[3]Sharyn L.R. Anleu, 'The Role of Civil Sanctions in Social Control: A Socio-legal Examination', *Crime Prevention Studies* (1998) (9) 21.
[4]The Impact of Technology on the Environment and How Environmental Technology Could Save our Planet, https://edinburghsensors.com accessed 21 July 2023.
[5]Environmental Technology, https://sciencedirect.com accessed 28 July 2023.
[6]UN Earth Summit, https://www.un.org/geninfo/bp/enviro.htm accessed 21 July 2021.

development to proceed in a sustainable manner.[7] The UNFCCC provides that parties should safeguard the environment for the benefit of present and future generations on the basis of equity and common, but differentiated, responsibilities and capabilities.[8] Consequently, the Paris Agreement, signed in 2016, has accommodated almost every country in the world to undertake spirited efforts to battle climate change by keeping the rise in the global average temperature at least than 2°C above pre-industrial altitudes.

2.1 Positive Impacts of Environmental Technology (ET):

2.1.1 Renewable energy: - This is energy that is collected from renewable resources which are naturally replenishable such as sunlight, wind, rain, tide waves, and geothermal heat. Contemporary ET has enabled us to capture this naturally occurring energy and convert it into electricity or useful heat through devices such as solar panels, wind and water turbines, which reflects a highly positive impact of technology on environment. Recently, it was discovered in Owerri, Imo State, that heat and electricity can be generated through moringa and mango trees that have been exposed to intense sunlight. Somewhere in Asia it was also discovered that moringa trees generate renewable energy.

Having overtaken coal in 2015 to become the second largest generator of electricity, renewable resources currently produce more than 20% of the UK's electricity. While many renewable energy projects are large-scale, renewable technologies are also suited to remote areas, especially in developing countries – Nigeria being an example – where energy is very crucial to and in human development

2.1.2 Smart technology: This technology has the ability to communicate and work with other networked, and has the ability to allow automated or adaptive functionality as well as remote accessibility or operation from anywhere.[9] Smart technologies refer to various devices, systems and applications that utilise artificial intelligence (AI), internet connectivity and other advanced technologies to enhance and automate various tasks in various fields such as home automation, transportation, healthcare, security, etc. Originally, the term 'smart' was used as an abbreviation for Self-Monitoring Analysis and Reporting Technology.[10] Smart home technology uses devices such as linking sensors and other appliances connected to the Internet of Things (IoT) that can be remotely observed and programmed in order to be as energy resourceful as possible and to respond to the need of the users. This environmental technology has been enabled by increased connectivity to the Internet as result of the proliferation in Wifi, Bluetooth, and smart sensors in buildings and cities. Experts are predicting that cities of the future will be places where every automobile, phone, air-conditioner, light, and more are interconnected, bringing about the concept of energy efficient 'smart cities'.

The knowledge of the Internet further demonstrates a constructive influence of technology on the environment due to the fact that social media can raise consciousness of global issues, and worldwide virtual laboratories can be created. Experts from different fields can remotely share their research, experience, and ideas in order to come up with improved solutions. Furthermore,

[7] Harvard University, 'Patent law and Climate Change', https://jolt.law.harvard.edu>assets>articlePDfs accessed 23 July 2023.
[8] UNFCCC, art 3 (1).
[9] Smart Technology, www.htpps://oit.williams.edu.ats-posts accessed 21 August 2023.
[10] Summary of Smart Technology, https://www.nanower.com accessed 21 Augusta 2023.

travel is reduced as meetings/communications between and among friends, family members, and nations can be done virtually, which reduces pollution from transport emissions.

This technology has helped the environment by reducing the requirement for paper. With the growing use of electronic and email communication, paperless offices have become a culture in business sector. This has helped reduce deforestation and logging. This enables land to form a smaller footprint.[11]

2.2.3 Electric vehicles (EV): The environmental technology of the electric vehicle is propelled by one or more electric motors, using energy stored in rechargeable batteries. Since 2008, there has been an increase in the manufacturing of electric vehicles due to the desire to reduce environmental concerns such as air pollution and greenhouse gases in the atmosphere.[12] All-electric vehicles, also referred to as battery electric vehicles (BEVs), have an electric motor instead of an internal combustion engine.[13] Electric vehicle exhibits a positive sway of technology on the environment because they do not produce carbon emissions, which contribute towards the 'green-house effect' and leads to global warming. In addition, they do not add to air pollution; meaning that they are environment-friendly, cleaner, and less destructive to human health, animals, plants, and water.

EV could potentially be the way forward for a greener society because companies such as Bloomberg have predicted that they could become cheaper than petrol cars by 2024[14] and according to Nissan, there are now in fact more electric vehicle charging stations in UK than fuel stations.[15]

2.2.4 Direct Air Capture (DAC) – C02 capture technology: - This environmental technology is known as 'Direct Air Capture' (DAC) and it is the process of capturing carbon dioxide directly from the ambient air and generating a concentrated stream of C02 for sequestration or utilisation; the air is then pushed through a filter by many large fans, where C02 is removed. It is thought that this technology can be used to manage emissions from distributed sources, such as exhaust fumes from cars. One major advantage of DAC is that it maintains the current level of C02 in our atmosphere by preventing further emissions, e.g. those emitted by factories.[16]

It is argued that DAC is essential for climate change mitigation; and that it can help reach the Paris Climate Agreement goals, as carbon dioxide in the air has been the chief origin of the problem after all. However, on the flip side of it, it is argued that of DAC currently means that it is not an option on a large scale and some believe that reliance on the technology would pose a risk as it may reduce emission reduction as people may be under the pretense that all their emission will simply be removed.

[11]Positive and Negative Effects of Technology on the Environment, https://mytechnopost.com accessed 21 August 2023.
[12]The Impact of Technology on the Environment and How Environmental Technology Could Save our Planet, https://edinburghsensors.com accessed 21 July 2023.
[13] Electric vehicle, https://afdc.energy.gov accessed 21 August 2023.
[14]This is will be a very tall dream in Nigeria even by 20230, given the epileptic power supply in the country. Most homes in the cities are usually without power supply for weeks.
[15]Visor D., 'Electric car charging stations surpass number of fuel stations in less than 100 years since UK's first petrol pump installed. *Nissan News*, https://uk.nissannews.com accessed 21 July 2023.
[16]What happens in direct air capture process? https://climeworks.com accessed 21 August 2023.

3.0 Climate Change:

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle.[17] Climate change encompasses global warming, but refers to the broader range of changes that are happening to our planet, including rising sea levels, shrinking mountain glaciers, accelerating ice melt in Greenland, Antarctica and Arctic, and shifts in flower/plant blooming times.[18] The Sixth European Community Environmental Action Programme, 2002 defined 'climate change' as an "outstanding challenge of the next ten years and beyond".[19] The World Health Organisation (WHO) defines climate change "as any change in climate over time, whether due to natural variability or as a result of human activity".[20]

From the above, it is observed that the transformation of awareness and understanding of climate change and recognition that it is to a large extent a man-made phenomenon is one of the most dramatic changes in ideas and perception in the last decade. There are, or rather the human race is blessed with scientists whom we have to thank for this understanding because of the great they have made in this direction. Nonetheless, the UN Intergovernmental Panel on Climate Change (IPCC) in its fourth Assessment Report on climate change noted that the warming of the climate systems is undeniable.[21]

Bjorn noted that about 80% of this man-made contribution comes from the burning of oil, coal, and gas; while 20% comes from deforestation and other land changes that have prevented atmospheric carbon dioxide from being naturally absorbed. According to him, an estimated 30-55% of the carbon dioxide produced by burning fossil-fuel is absorbed by the sea, forests and plants.[22]

The risks of climate change are real and already happening in many systems and sectors essential for human livelihood, including water resources, food security and human health. Consequently, addressing and working with climate change is a key for tis Internet age. In any event, it is clear that climate change is having consequences for society. Notably, greenhouse emissions are having an impact on temperatures. As such, addressing climate change, and the relationships with the environment more generally, has been a goal of what is termed as 'Green movement'. Interestingly, late 20th century developments were the establishment of the Club of Rome think tank in 972, the Stockholm Declaration of the United Nations Conference on the Human Environment of 1972 ('Stockholm Declaration), the Vienna Convention for the Protection of the Ozone layer of 1985, the World Commission on Environment and Development of 1987, and the Montreal Protocol on Substances that Deplete the Ozone Layer of 1987.

Climate change requires that humans adapt to it for their own good and survival as well. Adaptation has been described by the United Nations as the process through which societies make themselves better able to cope with the risks/challenges associated with it.[23] Adaptation options are diverse and range from technological options such as increased sea defenses or flood-proof houses on

[17]What is Climate Change? https://www.un.org>climate-change accessed 13 March 2023.
[18]Effects of Climate Change, https://www.climate.nasa.gov>effects accesses 13 march 2023.
[19]Decision No 1600/2002/EC of the European Parliament and the Council of July 22, 2001.
[20]Climate Change, https://www.who.nt> accessed 13 March 2023.
[21] 'Climate Change: Impact, Vulnerability and Adaptation in Developing Countries' (Bonn: UNFCCC, 2007) p.8.
[22]Berborg Bjourn, *The Skeptical Environmentalists: Measuring the Real State of the World* (Cambridge: University Press, 2001) p.258.
[23]UN, 'Climate Change as a Global Challenge', https://www.un.org/gal/ accessed 24 July 2023.

stilts, to behaviour change at the individual level, such as the sparing use of water, avoid bush burning, especially in rural areas, lower and more efficient energy consumption; early warning systems for extreme weather events, conserving and restoring mangroves to protect storms and improved risk system. To be successful, adaptation should be mainstreamed in national and international sustainable development priorities and sectoral programmes. It is exigent to state that addressing climate change is dependent on economic growth that works with, rather than against the environment. Innovative green technology solutions can help by allowing us to do more with less - be it alternative energy production, energy saving, or greener forms of transportation, agriculture and forestry.

As stated earlier, it is undeniable that human influences are changing the climate: there are now observed changes to weather extremes in every region of the world, and some of these changes will be irreversible. Consequently, technological solutions are needed to reduce greenhouse (GHG) emissions in what may call for climate technology revolution.[24] At the same time, technology is no silver-bullet; there is no fix-all for climate, or the many changes it necessitates - for instance, to agriculture, patterns of consumption, and waste management. Nonetheless, green technologies cannot have determinative impacts on meeting the time-limited Paris Agreement targets.

4.0 The Concept of Patent

The patent system is one of its kind which flourishes where an economy is liberalised, where there is an abolition of a privilege system; and this in turn is both a vital and an indispensable means of stimulating industralisation and technological advancement. Patents are granted in respect of inventions, i.e. technological improvements, great and small, which contains at least some scintilla of inventiveness over what is previously known.[25] A patent is a legal, and not an equitable, right which is granted by the Federal government - it is derived from the Constitution[26] - that permits its owner to prevent others from making, using, selling, or importing an invention.[27] There are basically three types of patent: utility patents, design patents, and plant patents. The commonest of the three is utility patent, granted for useful objects or processes. In Nigeria, the first to invent is usually granted a patent[28] - assuming the invention or discovery is not known or used by others in Nigeria or patented or described in a printed publication.[29]

Not all discoveries or inventions are eligible for utility patent protection. Patent protection is available only for a new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement.[30] Consequently, an inventor must show that the excogitation or discovery is useful, novel, and involves an inventive step (non-obvious).[31] Again, if an invention constitutes an improvement upon a patented invention, new, results from an inventive activity and is capable of industrial application in any kind of industry, including agriculture, it will be

[24]Caroline Ring, 'Patent Law and Climate Change: Innovation Policy for a Climate in Crisis', *Harvard Journal of Law and Technology* (2021) (35) (1) 374.
[25]W. Cornish and D. Llewellyn and T. Aplin, *Intellectual Property: Patets, Copyright, Trade marks and Allied Matters* (7th edn, London: Sweet and Maxwell, 2010) p.7.
[26]Constitution Federal Republic of Nigeria 1999 (as altered), Second Schedule, Part 1, section 43.
[27]See *Pfizer Inc v Polyking Pharmaceuticals Ltd & Anor* (1998) FHCL 1.
[28]Patents and Design Act, section 2 (1).
[29]Patents and Designs Act, section 1 (3).
[30]Deborah E. Bouchoux, *Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets* (4th edn, Delmar: Cengage Learning, 2013) p.334.
[31]Patents and Designs Act, section 1(1)(a).

patentable.[32]As a rule of the thumb, patent law forbids the patentingof an invention that is merely an insignificant addition to or trivial alteration of something already in the state of the art.

The right which a patent accords is to prevent all others - not just imitators, but even independent devisors of the same idea - from using the invention for the duration of the patent.[33] That core conception reveals a great deal about why invention patents are the most basic, the most valuable, and, to competitors, potentially the most dangerous, of all intellectual property - the category which demands to be studied above all others.[34] The practical applications of scientific knowledge which make up 'technology' are rooted in objective information. Inventions are discoveries about the inherent capacities of matter, and in a sense are waiting to be made.

Interestingly, the Nigerian Patent and Designs Act did not define the word 'patent'; rather, it states what is or/and what is not. By the very provisions of the Act, a product or process is patentable is patentable once it satisfies the requirements of the Act. Disclosure is a central pre-requisite for the grant of a patent and it must be holistic, with nothing of substance withheld, otherwise it might be difficult for others to make use of the invention once the patent has expired.[35]

Patents promote the public good in that patent protection serves as an inventive to inventors and investors. Thus, if inventors of useful discoveries could not protect their works from use or unlawful exploitation by third parties, there would be no moral or inventive encouragement to further invent or innovate. Meaning that in the long run, the introduction of new products and processes benefits the society. An invention which is useful to the society must not bedetrimental or fraudulent or promote illegal ends.[36] For instance, in the an American case, a patent was denied for a process of making a low-cost tobacco leaf that resembled a more select leaf on the basis that its only purpose was to deceive consumers.[37]

The usefulness required of an invention must be present usefulness (which is determined at the time of the invention). Thus, patent protection is likely to be denied a product or process whose usefulness cannot yet be shown, the result of which produces an article that has no current use. So, to ensure that an invention is useful, be it a product or a process, the application must disclose or specify the usefulness of the invention. As noted by Bouchoux, to allow a patent that does not specify its utility would be to grant a patent on an entire range of unknown applications, thereby allowing an inventor to obtain a monopoly on an entire field of knowledge.[38] Therefore, patent applications must describe their specific advantage or utility - that is their contribution to the existing body of knowledge - so that the public can benefit from their invention. In the same vein, a patent will be denied when an invention fails to operate as described or claimed in the application.[39]

4.1 Justifying the Patent System

With each passing day, both 'individual' and 'public' justifications have played significant roles in the arguments in favour of patents for inventions as for other genres of intellectual property (IP).

[32]ibid, sections 1(1)(b), 2(b).
[33]Patents and Designs Act, section 6.
[34]Cornish et al (n25) 8.
[35]*Young v Rosenthal* (1884) 1 RPC 29.
[36]Patents and Designs Act, section 1 (4).
[37]*Rickard v Bu Bon* 103 F.868 (2d Cir. 1900).
[38]Bouchoux (n30) 340.
[39]Patents and Designs Act, section 9.

Generally, the debate over patent systems tends to centre upon their functionality as a public instrument of economic policy. At various periods the idea of a patent as an instrument of justice to the inventor has proved attractive, and the power of this sort of argument remains inexhaustible.

Patents are looked upon to provide two kinds of impetus towards the technical efficiency, and hence the growing wealth of the community as a whole. They are intended to encourage the making of inventions and the subsequent innovative work that will put those inventions to practical use; and they are expected to procure information about the invention for the rest of the industry and the public generally, which otherwise might be withheld, at least for a period that could be crucial.

Other justifications for the patent system are:

(a) **The reward theory**: - inventors should be rewarded for making useful inventions and the law must be used to guarantee this reward so that inventors can receive sufficient recompense for the ingenuity. The Bible says in 1Timothy 5:18 that "the labourer is worthy of his reward".

(b) **The contract theory**: - temporary protection is granted by the patent in reward for knowledge and disclosure of new innovations (inventions). This benefits the society by stimulating investment and employment; and because details of the invention are added to the store of available knowledge.

(c) **The incentive theory**: - by constructing a framework whereby invention is rewarded, this will act as an incentive to make new inventions and to invest the necessary time and capital. This a forward looking approach for the singular reason that without the patent system, adequate incentives or encouragement for the invention of an economically viable output of intellectual products might become extinct.

(d) **The unjust enrichment theory**: - the Word of God, the Holy Bible, provides against stealing from another.[40] It is unethical and morally reprehensible to unlawfully exploit another's invention. This unjust enrichment theory is known as "reaping without owing". The same Holy Bible states, "Let him that stole steal no more; but rather let him labour, working with his hands the thing which is good, that he may have to give to him that needeth".[41] The patent system is there to guard against unjust enrichment by ensuring that others are excluded from making, using, selling, offering to sell or importing a patent without authority. Anyone who does any of the above mentioned acts, infringes patent and will face the wrath of the law. A person may also be liable for encouraging or inducing infringement or for contributory infringement by selling a component of a patented invention knowing it will be used to infringe a patent.

(e) **The natural law/moral theory**: - individuals have a right to property in their own ideas, and this right should be protected from being usurped or stolen by others. This is because a man's invention is an extension of his personality. Thus, an inventor has both proprietary and moral rights over his inventions to control the exploitation of his invention or creation.

[40]Exodus 20:15; Leviticus 19:11; Deuteronomy 5:19; Luke 18:20; Romans 2:21; 13:9.
[41]Ephesians 4:28 KJV.

5.0 The Confluence between Environmental Technologies and Climate Change

Environmental technology (ET) is one of the ways of addressing, responding to, and seeking to manage climate change; simply put, ET has a part in measuring climate change and its rate. Principle 1 of the Stockholm Declaration of 1972 provides that:

> *Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of quality that permits a life of dignity and wellbeing, and he bears a solemn responsibility to protect the environment for present and future generations.*

ET may not necessarily be the much needed silver-bullet for climate change questions, nonetheless, its place in responding to climate change cannot be ignored.

The Stockholm Declaration of 1972, had already stated that technology must be applied to the solution of environmental problems and the common good of all mankind. The UNFCCC, article 4 (5) stipulates that developed economies are to take practical steps to promote, facilitate and finance transfer of or access to environmentally sound technologies and know-how to other states, particularly to emergent countries, to enable them to implement their obligations under the UNFCCC. Furthermore, Principle 9, Rio Declaration provides that states should cooperate to improve scientific understanding through the exchange of technological knowledge and through the development, adaptation, diffusion and transfer of technologies.

ET or digital ecology responds to climate change through mitigation, adaptation, and measurement of climate change; thus, ETs are relevant in the focus of sustainable development, inclusive of health and agriculture (farming). ETs help in the reduction the implications of negative or adverse climate change, carbon capture technologies store and enable future use of existing emissions. Related to all these are treatments and vaccines for new diseases, and crops which are able to survive and grow in drought affected areas.

The effect of the Paris Agreement in its article 4 is emphasis on the role ET plays in reducing greenhouse gas emissions, particularly cumulative net carbon dioxide (C02) emissions. Reducing cumulative emissions requires both emissions stabilisation and removal of existing atmospheric C02 - a metric which places substantial reliance on new carbon dioxide removal technologies to counteract residual emissions that are not reduced by, for instance, switching to renewable energy source.[42]

Environmental technologies are expected to have determinative impacts on meeting the time-limited Paris Agreement targets. ETs, is said, play ambiguous and contested role in climate stabilisation projections; notwithstanding, there are many behavourial changes that can be made today to reduce greenhouse gas emissions. ETs is considered to be the future when it concerns the production of clean, cheap, and plentiful energy.

6.0 The Functionality of Patent in Environmental Technology and Climate Change

Patent, an aspect of intellectual property law, creates a legal means to appropriate knowledge. The patent system is designed to stimulate and disseminate new technologies that could mitigate damage to the climate.[43] The patenting system is well designed for encouraging development of advanced technology. The patent system is a good vehicle for promoting green invention and could

[42]Patent and Climate Change, https://jolt.law.harvard.edu accessed 21 July 2023.
[43]Alison Byrce (2020), *Intellectual Property: Key Role Against Climate Change*, https://lawscot.org.uk/members/journal/issues/vol-65-issues-12 accessed 20 July 2023.

be adapted to the challenges of climate change. Environmental technologies are often developed as a result of private sector innovation and creativity; and it may be the and always the subject of patent as an intellectual property right. This confers the power to restrict use of unauthorised persons of the results or fruits of this innovation and creativity. As a result, ET which could aid in addressing climate change, for the benefit of all mankind, could be under the control of a few.

The patent system will aid in the transfer of environmental technologies from the advanced countries to an advancing country like Nigeria. This is in line with article 4 (5) UNFCC which states that:

> *The developed country Parties and other developed Parties included in Annex II shall take all practical steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In the process, the developed country Parties…may also assist in facilitating the transfer of such technologies*.

By the above provision the Nigerian Patent system is expected to function actively to promote the transfer of environmentally sound technologies assimilation and utilisation. The legal framework should and can be created in such a way that will improve technical capacities which can better absorb, adapt, and improve such environmental technologies especially in high drought areas like the far Northern part of Nigeria. Consequently, Nigeria requires an active engagement in order for there to be real growth in the transfer of ETs that meet our local needs in a variety of ways.

The patent system by allowing technology transfer would enable recreation of such environmental technologies that are endogenous to us - ETs that will be 'proudly Nigeria'. although there has been much debate whether or not the patent system is an appropriate tool to promote green innovation. These debates are emerged in response to Member States negotiations at the United Nations Framework on Climate Change Convention (UNFCCC). Notwithstanding, the pragmatists view is that reforming patent law is preferable, or at least more practicable, than patent suspension. It is advocated that patent law should be used alongside environmental regulations to accelerate green innovation. Derzko, a pragmatist, proposes that a green patent regime should be modelled on collaboration with a Patent and Trademark office and the Environmental Protection Agency.[44] The patent landscape can assist in identifying problems and solutions to specific information on climate-related technologies most strategic to Nigeria as a developing country.

A recalibrated Nigerian patent system, in line with international best practices, should be well designed for encouraging development of advanced ETs. Consequently, an efficient production and transfer of green and inexpensive energy, design of efficient new machines for domestic and industrial uses; and invention of new agricultural methods capable of supplying human food without destroying the lands and water - the ecology - are all critical for the entire nation.

The Organisation for Economic Cooperation and Development (OECD) argues that patent data provides the widest and most detailed overview of technology transfer in the field of environmentally sound technologies. The authors argue that due to the cost of patenting, if a patent

[44]Natalie M. Derzko, "Using IP Law and Regulatory Processes to Foster Innovation and Diffusion of Environmental Technologies", *Harvard Environmental Law Review* (1996) (3) 20.

is sought in more than one location - and certainly in the major developed and developing country markets - it is highly likely that the technology will be utilised in those countries.[45]

Environmental technologies are increasingly viewed internationally and in most major economies as a key part of global climate mitigating efforts and a source of new energy supply. Consequently, it is critical for Nigeria to use her patent system to establish new mechanisms for the equitable distribution of environmental technologies that can and would innovate such technologies.

It is important that the Nigerian patent system in order to function effectively in environmental technologies and climate change cannot do it alone; it must work in collaboration with other factors - macroeconomics and human factors - which will help in the acculturation and utilisation ofETs; bearing in mind that environmentally sound technologies is the hallmark to combating, mitigating, and sustaining climate change. These other factors must be considered in other to make the functionality of the Nigerian patent landscape a holistic building or machinery.

7.0 Conclusion

Climate change is happening, and it here to stay, and it is regarded as the defining challenge of our time. It is thus imperative to develop and fashion a range of environmental technological solutions through the Nigerian patent system in collaboration with policy infrastructure, governance and competition systems, in order to create avenues for environmental technologies which have the potential to bring about the needed and rapid decarbonisation and mitigation of further detrimental harm through a recalibrated and patent system in Nigeria.

[45]OECD, Working Party on National Environmental Policies, *Indicators of Innovation and Transfers in Environmentally Sound Technologies: Methodological Issues* (2009) p.12.