

# LUISS



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## IP & Tech Transfer Legal Tools for Just Sustainable Transition

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## **Abstract**

This paper explores the impacts of intellectual property rights management mechanisms for advancing the global sustainable development and transition. Furthermore, this research evaluates the systemic inefficiencies and inequalities of international intellectual property rights regime, particularly in regard to diffusion of climate technologies and sustainability activities in the developing world. The goal of the research is to propose holistic, multi-institutional, non-market-based measures to ensure not only the sustainability but also the resilience of global ecosystems and societies in times of climate crisis.

The main finding of this paper is that it is imperative for policymakers to revamp the existing international intellectual property rights regime, to shift the existing narrative of intellectual property being a commodity to viewing it as a societal legacy. Even though there have been admirable attempts by the international institutions to facilitate capacity-building and mend the systemic inequalities between the Global South and the Global North, they have rarely resulted in long-lasting, truly sustainable development and are not nearly enough for successfully curbing the exponentially growing frequency of environmental catastrophes. There is a clear need for a comprehensive reorientation of international intellectual property governance by improving intra-institutional collaboration in policymaking and development activities to ensure fair, equitable and just climate transition.

**Keywords:** Just Sustainable Transition, Intellectual Property, Climate Change, Technology Transfer

## Acknowledgements

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## **List of Abbreviations**

**ANPF** – African Network of Patent Foundations

**BBNJ Agreement** – Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction

**CBD** – Convention on Biological Diversity

**CTC&N** – Climate Technology Centre and Network

**EU** – European Union

**FAO** – Food and Agriculture Organization of the United Nations

**FRAND** – Fair, Reasonable and Non-Discriminatory

**GHG** – Greenhouse Gas

**IP** – Intellectual Property

**IPCC** – Intergovernmental Panel on Climate Change

**LDC** – Least Developed Country

**MENA** – Middle East and North Africa

**SDG** – Sustainable Development Goal

**SGP** – Small Grants Programme

**TFEU** – Treaty on the Functioning of the European Union

**TRIPS** – Agreement on Trade-Related Aspects of Intellectual Property Rights

**TTBER** – Technology Transfer Block Exemption Regulation

**UN** – United Nations

**UNFCCC** – United Nations Framework Convention on Climate Change

**WIPO** – World Intellectual Property Organization

**WTO** – World Trade Organization

## Introduction

As of 2023, more than 3 billion people live in areas that are highly vulnerable to the impacts of climate change, with countries in the developing world and particularly indigenous peoples and marginalised communities globally bearing the heaviest burden by experiencing significant damages to their livelihoods and living with a direct threat to their existence. This number has been projected to rise exponentially if determined and, possibly, even extreme measures to curb environmental crisis are not taken.<sup>1</sup> The chosen topic reflects the currently widely deliberated and painfully imminent conundrum of how to tackle the detrimental impacts of climate change. However, the imperative of the thesis is to shift the prevailing narrative of viewing sustainable development from the economic perspective and, instead, focus on acknowledging the inherent impact climate policy and intellectual property regimes have on wider society, specifically indigenous and marginalised communities in the developing world. Instead of commodifying intellectual property and natural resources we should look at them as communal legacy.

### **The main aims of the research:**

- Elucidate the importance of addressing global societal inequalities by applying principles of just transition and epistemic justice;
- Analyse the different mechanisms for international intellectual property rights protection for facilitating sustainable development in developing countries and their potential for ensuring socio-economic protection of marginalised communities;
- Propose possible opportunities within the existing international intellectual property governance regime and advocate for the establishment of holistic technology diffusion facilitation mechanisms.

The thesis puts the primary emphasis on the importance of viewing sustainability in an interdisciplinary manner, not just from an economic point of view, but also by highlighting the inherent need for ensuring legal protection and recognition of traditional knowledge, alternative innovation strategies and community practices to facilitate the just sustainable transition. First and foremost, the facilitation of local capacity building and rapid development of adaptation capabilities within communities as well as bridging the prevailing knowledge gap between the

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<sup>1</sup> IPCC (2023), *Summary for Policymakers*, In *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, IPCC, p. 5, <https://doi.org/10.59327/IPCC/AR6-9789291691647.001>

Global South and the Global North was put forward as a core requirement to ensure fair and just utilisation and application of the existing intellectual property and technology transfer tools in just sustainable transition. The main research narrative challenges the existing notion of applying Western intellectual property systems globally and illustrates the benefits from utilising a customised approach based on considerations of the local socio-economic conditions and the understanding of historical-cultural contexts of the traditional communities.

**Research question:** Can interdisciplinary approach to policymaking for intellectual property rights boost the advancement of just sustainable transition?

**Hypothesis:** Holistic, multi-stakeholder intellectual property rights regime and protection mechanisms grounded in socio-economic realities and capacity-building will facilitate sustainable development and just environmental transition.

The thesis is divided in three parts. The first chapter, elucidates the significance of applying principles of justice to sustainable environmental transition and the positive impacts of ensuring epistemic recognition of traditional knowledge; The second chapter, analyses the existing intellectual property rights management mechanisms and their efficiency in addressing systemic socio-economic inequalities, particularly in the context of international climate policy and intellectual property regimes. The final chapter focuses on proposing a shift in international policymaking narrative and illustrates the potential opportunities from amending the existing intellectual property protection rights management mechanisms.

## Literature Review and Methodology

In the research, it was chosen to apply the analytical research method as it provides the best methodological approach for investigating this topic. This method is widely used in different spheres of social science to determine not only the legal, but also societal implications of regulatory mechanisms. It is the perfect tool for analysing the multi-faceted climate and intellectual property rights policies and jurisprudence as well as to examine the existing research on the topic of just sustainable transition. This method is intended to aid in finding correlations between policy frameworks and academic scholarship, enabling the proposition of interdisciplinary policy proposals and furthering the academic discourse. In the words of Marcus Aurelius: “*Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life.*”<sup>2</sup> The theoretical underpinnings of the thesis lie in examining the three tenets of justice – procedural, distributional and restorative – that are consequently syndicated and applied to existing policies and intellectual property protection and climate policy frameworks, furthering the existing academic discourse to promote the incorporation of the epistemic recognition and justice concepts in policymaking, thus facilitating just sustainable transition. The main research basis is composed of academic journals and books, whilst official publications and press articles are utilised to ground the theoretical discourse in “real-life” case studies and practical applications of scholarly narratives.

Furthermore, several semi-structured interviews (via online meeting platforms) with leading academics in intellectual property rights management and sustainability policy as well as with representatives of international institutions, such as Food and Agriculture Organisation and World Intellectual Property Organisation, that govern the sustainability transition, were conducted. The choice regarding the interviewees is a deliberate move to highlight the existing discrepancies in theory and practice of intellectual property rights regimes as well as to juxtapose differing viewpoints to facilitate a holistic, multi-pronged approach to developing and evolving the existing intellectual property rights protection tools and technology transfer mechanisms, consequently enabling the advancement of interdisciplinary policy proposals and regulatory pathways that ensure an epistemically just and indiscriminate sustainable transition.

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<sup>2</sup> Marcus Aurelius, *Meditations: Book III*, Chiltern Publishing, 2023, p. 32, ISBN: 978-1-914602-13-9

## **1. Ensuring Just Sustainable Transition**

The transition to sustainable economy and international development has been steadfastly facilitated for more than half a century and, even more so, has exponentially accelerated in the recent years due to the catastrophic environmental events occurring within an ever increasing geographical scope and the harsh realisation of the dire impacts of climate change to nature as well as livelihoods of societies around the World. At this point the situation has escalated almost to a point of no return, posing a genuine threat not only to the socio-economic and energy *status quo*, but to the actual lives of myriads of people, sometimes even whole nations. If we are to take action, that, taking into account the current state of affairs, should be concrete and decisive, it is our duty to ensure that no one gets left behind to fend for themselves solely because of the fact that they have less leverage or representation in Global policymaking. This aspect is particularly important for the marginalised communities and indigenous people in the developing states, who have long suffered from the North-centric sustainability and climate policies. These communities are often unfairly discriminated against and sometimes even completely overlooked due to viewing establishment of not fully inclusive climate policy as a trade-off to facilitate the efficiency of the sustainable transition globally. However this, as the following chapter will elucidate, is not a necessary evil and can be successfully avoided if the concepts of justice and fairness are truly understood and taken into account when negotiating and enacting climate policy.

### **1.1. What is Justice?**

There is no question that for the achievement of environmental goals and sustainable future there is a dire need to put emphasis on making the energy sector sustainable and climate friendly. This pushes policy makers to put pressure on energy companies as well as energy intensive industries, such as construction and cattle farming, to find solutions on how to reduce the negative externalities of their business processes. Namely, find a plausible way to participate in the energy transition. The concept of energy transition has existed for many years; the most famous example, probably, being the industrial revolution, which, ironically, is the one that got us in this environmental catastrophe in the first place. However, now we are in the midst of another type of energy transition – the one that is aiming to shift the energy industry from fossil-based energy sourcing to using renewable energy as their primary source. The current energy transition has been imbedded in the Art. 4 of Paris Agreement as well as in the United Nations Sustainable

Development Goals (SDGs) No. 7 and 13, promoting affordable and clean energy and climate action respectively.

However, as with all changes, there are certain pitfalls to this otherwise well-intentioned movement. For energy transition to be truly sustainable and climate friendly, it needs to also be “just”. To give context to this notion, it is important to understand that, currently, 9 of 10 of countries experiencing the biggest energy vulnerabilities are located in the Global South<sup>3</sup> and in addition to that, around 1.18 billion people are currently experiencing energy poverty, with the majority of them being from Sub-Saharan Africa.<sup>4</sup> In contrast, based on Climate TRACE’s estimation, as of February 2025 United States and the EU are the second and third biggest emitters of CO<sub>2</sub> in the world, with China, notoriously, being the outlier that occupies the first position due to foreign manufacturers.<sup>5</sup> The aforementioned facts, give light to the double inequality, where the distribution of risk and responsibility is inverted. To put that in context, the Global North is the primary culprit of the negative externalities arising from climate change, but end up being the least affected, whereas, the Global South does not contribute to climate change as extensively, but, is more likely to experience the consequences of climate change impacting their security, livelihoods and general welfare.<sup>6</sup> Very prominent injustice in the energy sector lies in the fact that there is a persistent over-reliance by the modern societies on the historically established fossil fuel industries and their modes of manufacturing to satisfy the growing demand for energy, which notoriously disadvantage the less developed regions of the world. A great example of blatant injustice is the 2012 European Parliament Directive on waste electrical and electronic equipment (WEEE Directive), which mandates the obligations of responsible recycling and reuse of electrical devices (which contain highly hazardous components) by managing waste disposal.<sup>7</sup> In practice, instead of figuring out responsible hazardous waste recycling mechanisms, the European countries/enterprises found a loophole in legislations regulating shipment of hazardous materials

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<sup>3</sup> Shen, Y., Shi, X., et al. (2024), *Quantifying energy transition vulnerability helps more just and inclusive decarbonisation*, PNAS Nexus, 3(10), p. 5. <https://doi.org/10.1093/pnasnexus/pgae427>

<sup>4</sup> United Nations Development Programme (2024, June 12), *Beyond access: 1.18 billion in energy poverty despite rising electricity access*, Available on: <https://data.undp.org/blog/1-18-billion-around-the-world-in-energy-poverty>

<sup>5</sup> Climate TRACE (2025, April 24), *Climate TRACE releases February 2025 emissions data*, Available on: <https://climatetrace.org/news/climate-trace-releases-february-2025-emissions-data>

<sup>6</sup> McCauley, D., Heffron, R. (2018), *Just transition: Integrating climate, energy and environmental justice*. Energy Policy, 119, p. 2. <https://doi.org/10.1016/j.enpol.2018.04.014>

<sup>7</sup> Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) Text with EEA relevance, *OJ L 197*, 24.7.2012, §§. 4-5

and started exporting the waste products to be recycled to countries such as Ghana, where the obsolete electronic devices are picked apart and recycled by underpaid workers, most of whom are underage, without adequate personal protection equipment and knowledge on how to recycle such materials.<sup>8</sup> whilst the Europeans paint those as sustainable practices that, put mildly, are just blatant “greenwashing” activities. This dichotomy is one of the reasons why the concept of “just transition” was established and should not only be theorised about but also critically applied to existing energy policies.

According to Abraham, the notion of “just transition” first achieved prominence when it was used by trade unions in the 1980s to emphasise that green jobs are pivotal for the transition from fossil fuels.<sup>9</sup> However, nowadays, the definition put forward by McCauley and Heffron defines it as “fair and equitable process of moving towards a post-carbon society”.<sup>10</sup> Essentially, even though on the surface level the sustainable technology and climate neutrality movement can be seen as an overall “good”, the reality is that, more often than not, these sustainability activities are inherently discriminatory for the marginalised parts of the society, which, in turn, makes them “unjust”. For example, the all too familiar electric vehicles (EVs), even though, disputably, environmentally friendly, they are also exclusionary, as their pricing perpetuates the juxtaposition of the poorer and wealthier members of the society.<sup>11</sup> The same is true for virtually all well-established sustainable technologies, which are overloaded with negative externalities. One of the first times this inequity was addressed was at COP24 in Katowice, where the just transition in Silesia strategy was enacted, with the Polish government creating Social Contract for miners, which included the choice to either retain their jobs until retirement, to relocate to transitional coal

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<sup>8</sup> Agyeman, J. Carmin, J., (2014), *Global environmental justice or le droit au monde?*, Geoforum, 54, p. 237, <https://doi.org/10.1016/j.geoforum.2012.12.021>

<sup>9</sup> Abraham, J. (2017), *Just transitions for the miners: labor environmentalism in the ruhr and Appalachian Coalfields*, New Political Science, 39(2), p. 218, <https://doi.org/10.1080/07393148.2017.1301313>

<sup>10</sup> McCauley, *supra* Note 6, p. 2

<sup>11</sup> Jenkins, K., Sovacool, B.K., McCauley, D. (2018), *Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change*, Energy Policy, 117, p. 69, <https://doi.org/10.1016/j.enpol.2018.02.036>

mines, to receive a one-time settlement payment, or, finally, to opt for early retirement package equal to 80% of their salaries,<sup>12</sup> which was a great step in the direction of truly just transition.

To address the concerns of inequality McCauley introduced the three tenets of just transitions – distribution, recognition and procedural justice.<sup>13</sup> These principles exemplify the necessary ethical considerations to ensure the equitable outcome for all members of the society, by taking into account their opinions, traditional knowledge, and social needs. These tenets provide a new outlook on how to evaluate the efficiency and viability of sustainable technologies by shifting focus from purely quantitative analysis back to qualitative grassroots approach to research and development. In practice, this means that, firstly, policymakers need to elucidate the possible concerns that might arise in the community/society, secondly, understand who the proposed sustainable development will affect and, lastly, even though there might be no way of avoiding the project, propose solutions for remediation of any damage that could be incurred by the affected stakeholders.<sup>14</sup> A great example of procedural and representative justice is the All Nepal Peasants Federation (ANPF), that managed to put enough pressure on their government that in 2017 Nepal became one of the fifteen countries in the world that has food sovereignty as a concept embedded in their constitution by enacting the Food Sovereignty Act. This umbrella organisation consists of farmers from all around Nepal, who are fighting to conserve the traditional farming methods without using state-imposed pesticides, regaining land ownership and fighting against the neo-liberal and colonialist policies of their government.<sup>15</sup> Another example of three tenets in practice is the Isle of Lewis case study where developers were intending to erect 181 wind turbines on a remote island in Scotland, estimated to generate around 6 million GBP per annum, but the local community opposition groups raised a myriad of cultural arguments against it, including the historically unjust land ownership struggles and habitation significance for the local inhabitants. At first, the energy developers discounted the opposition to be the supporters of the Not In My Backyard movement, which, in the UK, is the main governmental explanation for antagonism persisting towards substantial renewable energy projects. However, after discussions with local

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<sup>12</sup> European Commission (2023), *Just Transition Platform Case study: Regional Observatory of the Transition Process in Silesia (ROPT)*, p. 2, Available on: [https://ec.europa.eu/regional\\_policy/sources/funding/just-transition-fund/case-study-regional-observatory-transition-process-silesia.pdf](https://ec.europa.eu/regional_policy/sources/funding/just-transition-fund/case-study-regional-observatory-transition-process-silesia.pdf)

<sup>13</sup> McCauley, *supra* Note 6, pp. 1-2

<sup>14</sup> Jenkins, K., McCauley, D., et al. (2016), *Energy Justice: A conceptual review*, Energy Research & Social Science, 11, 2016, p. 175, <https://doi.org/10.1016/j.erss.2015.10.004>

<sup>15</sup> Routledge, P., Cumbers, A., Derickson, K.D. (2018), *States of Just transition: Realising climate justice through and against the state*, Geoforum, 88, p. 82, <https://doi.org/10.1016/j.geoforum.2017.11.015>

people and qualitative analysis of their opinions, the true nature of the issue was uncovered. The island, which in their eyes was an obsolete and deserted piece of land, turned out to be an integral part of the island's cultural identity. Consequently, these discussions amounted to perfect embodiment of all three tenets of just transition, as the representatives of the local community were included in the decision-making process (procedural), the cultural significance and historical aspect of the island was taken into account (recognition) and instead of building the huge windfarm the local community decided to establish the Urras Energy Society, which built its own community owned wind farm relying on existing infrastructure (distributional).<sup>16</sup> Even though the alternative was undoubtedly less profitable as the initial proposal, it kept and even possibly increased the welfare of the local inhabitants, thus proving the importance of community involvement in sustainable development to ensure truly equitable environmental action. If we want to go even further, the synthesis of the three tenets is a primary building block for moving forward to the concept of restorative justice, which scholars consider to be the final stage of just transition. This notion employs not only the information mobility and community representation but also evolves it to function as a retribution mechanism for previously over-exploited land and society. This, again, ties in with the historical practices of energy harvesting, which typically employed the land of the indigenous people, who at that time, were not recognised as the legitimate land owners, thus had no rights to protection. Specifically in the case of uranium mines in Australia and Canada, where the health and environmental detriments of extensive mining of radioactive resources for nuclear energy are prevalent, there have been efforts to communicate and, most importantly, listen to the minority communities, primarily, by acknowledging the damage that has been inflicted on them.<sup>17</sup> By pursuing restorative justice, the main goal of environmental initiatives starts to shift from fast climate mitigation activities for the achievement of arbitrary environmental targets to ensuring that we are not only trying to fix the damage already done to the climate but also put thought into how we can build livelihoods for communities and improve local technological capabilities, thus securing an all-encompassing, truly sustainable future for the future generations. The main takeaway is that for sustainable transition to really work and be just, there needs to be multi-disciplinary approach, incorporating not only quantitative but also qualitative evaluations that prioritize ecocentrism and holistic approach, focusing on community involvement.

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<sup>16</sup> Jenkins, *supra* Note 14, p. 177

<sup>17</sup> *ibid* p. 180

## 1.2. Commons and Access to Knowledge

To approach the concept of just sustainable transition, it is necessary to establish a solid theoretical background on possible avenues for incentivising fair and inclusive transitory process. For this, in this work it has been chosen to elucidate two of the most well-established and prominent mechanisms for managing the transition to sustainable society – commons and access to knowledge. The concept of commons has existed since the dawn of time, primarily functioning as a way to protect and make efficient use of resources available to a specific community, for example, ancient tribes having territorial claims on fishing places or hunting grounds to ensure that their tribe is fed. In the past, this worked as a survival mechanism to protect and ensure the prosperity of their own, however, with time and evolution of the society, this has evolved into a complex mechanism for maintaining and managing common resources. The economic/legal concept of commons was famously established by Elinor Ostrom in the second half of the 20<sup>th</sup> century, however, at the time it mainly focused on natural resources and public infrastructure, such as bodies of water, forests, roads and bridges. The main characteristic of commons, as Benkler put it, is that commons act as a pool of resources that are accessible for use to everyone establishing a symmetry of privileges.<sup>18</sup> There are a lot of examples of local communities that have developed their own autonomous way of managing their resources by establishing social norms or rules to ensure that their community resources, are not only preserved for themselves, but also for their successors.<sup>19</sup>

Nowadays, commons have been extensively developed and are prevalent in various modern industries, such as information technology sector. Possibly, the most famous example of commons mechanism in practice is the LINUX operating system, which from the start was built as a collaborative free software platform where computer developers are able to contribute to building and improving the software whilst simultaneously sharing knowledge with each other and

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<sup>18</sup> Benkler, Y. (2013), *Commons and Growth: The Essential Role of Open Commons in Market Economies*, The University of Chicago Law Review, 80(3), p. 1533, Available on: <https://chicagounbound.uchicago.edu/uclrev/vol80/iss3/12>

<sup>19</sup> Euler, J. (2017), *Conceptualizing the Commons: Moving Beyond the Goods-based Definition by Introducing the Social Practices of Commoning as Vital Determinant*, Ecological Economics, 143, p. 14, <https://doi.org/10.1016/j.ecolecon.2017.06.020>

eradicating bugs to ensure that the system runs smoothly.<sup>20</sup> Even though, traditionally, the only prerequisites for establishment of commons were that the resource in question is freely accessible and belongs to a specific community, the modern commons require a certain degree of regulatory authority to manage them as the capitalistic nature of modern world creates threats of commons being misappropriated by large corporations or external actors. Currently, for commons it is necessary to i) be produced not given, ii) involve common resource, iii) have a community, iv) be regulated, v) provide equal access and vi) involve fair decision making.<sup>21</sup> Moreover, the commons have expanded beyond belonging to a specific group of people, for example, open-access research is available not only to academics, but to everyone that wishes to gain information. If we take public research as an example, even though it is most frequently being funded by a public/governmental institution, its governance is usually left for the community. It is the community that decides what research to pursue and deem acceptable for publishing – peer-review process - to ensure that monetary contributions do not result in excessive influence over the conducted research.<sup>22</sup> As, hopefully, can be deduced from the aforementioned, the commons present as a direct opposite of intellectual property rights, which, subsequently, has created tension between the commons communities and scholars and intellectual property rights supporters – governments and large companies. There have been multiple attempts to establish legislative instruments or intellectual property rights derogations, to codify commons as an alternative mode of knowledge and information management, however, due to the resistance of large corporations and governments focused on enhancing trade relations, no such provisions prevailed. Instead, not to be discredited, the commons scholars and community activists managed to wrestle their way into influential legal documents, such as, Geneva Declaration on the Future of the World Intellectual Property Organization, where, for the first time, intellectual property rights were criticised as being disadvantageous for developing countries and hindering diverse development and innovation as well as advocating for finding the equilibrium between public domain and

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<sup>20</sup> Benkler, Y. (2001), *Coase's Penguin, or, Linux and "The Nature of the Firm"*, The Yale Law Journal, 112(3), p. 426, <https://doi.org/10.2307/1562247>

<sup>21</sup> Caffentzis, G., Federici, S. (2014), *Commons against and beyond capitalism*, Community Development Journal, 49, pp. 101-103, <https://doi.org/10.1093/cdj/bsu006>

<sup>22</sup> Bozeman, B., Gaughan, M. (2007), *Impacts of grants and contracts on academic researchers' interactions with industry*, Research Policy, 36(5), p. 704, <https://doi.org/10.1016/j.respol.2007.01.007>

exclusionary rights to ensure fair development.<sup>23</sup> Additionally, in the Adelphi Charter of 2004, leading industry experts came together to call for knowledge sharing and protection of community knowledge to protect human rights and allow access and sharing of information and knowledge to enable society to achieve its full potential for the better of the world.<sup>24</sup> Surely, by now, it should be completely certain that commons are a viable and sustainable way of preserving and sharing information and knowledge, however, the opposition persists, as they simply are not viewed as an economically prudent mode of intellectual property management and cannot compete with the established property rights based system, alas the paper is intended to convince the readers otherwise.

It is completely understandable that commons might initially appear as capitalists fever dream and socialist propaganda, however, the concept is not purely ideological. Academics, industry experts and even economists have agreed that, if properly established and managed, commons can act as possible middle ground between the market and the state.<sup>25</sup> Firstly, if looked at logically, the diffusion of information means that the knowledge reaches a larger amount of people, which subsequently, based on probability, means that the number of people that take this information and use it for further research or innovation increases. It is a universal fact, that, by nature, intellectual property rights are exclusionary, as they give the proprietary the power to forbid anyone to use their knowledge or information. According to Benkler, robust intellectual property regimes harm innovation and development by limiting the access to the inputs that could be used by myriads of experts and scientists to analyse them and weave out their short-comings and possible applications of such knowledge, thus harbouring the true potential of such information.<sup>26</sup> Consequently, it is natural to deduce that for knowledge to be innovative and improved it is of utmost importance to make it available to as many stakeholders as possible, thus ensuring that the possibility of diffusion, recombination and exchange of information creates a domino effect resulting in the creation of previously non-existing information.<sup>27</sup> Secondly, as we are living in a

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<sup>23</sup> World Intellectual Property Organization (2004), *Report on the Policy Advisory Commission (PAC) on The Geneva Declaration on the Future of the World Intellectual Property Organization*, WO/GA/31/15, pp. 1-2, Available on: [https://www.wipo.int/edocs/mdocs/govbody/en/wo\\_ga\\_31/wo\\_ga\\_31\\_15.pdf](https://www.wipo.int/edocs/mdocs/govbody/en/wo_ga_31/wo_ga_31_15.pdf)

<sup>24</sup> Royal Society for the Encouragement of Arts, Manufactures and Commerce (2006), *Promoting Innovation and Rewarding Creativity: A Balanced Intellectual Property Framework for the Digital Age*, RSA, p. 4

<sup>25</sup> Caffentzis, *supra* Note 21, p. 100

<sup>26</sup> Benkler, *supra* Note 20, p. 445

<sup>27</sup> Peuckert, J., Kern, F. (2023), *How user innovation communities contribute to sustainability transitions. An exploration of three online communities*, Environmental Innovation and Societal Transitions, 49, p. 5, <https://doi.org/10.1016/j.eist.2023.100785>

precarious time plagued by climate change and environmental catastrophes, it is more important than ever to find alternatives to the already existing climate change mitigation technologies that are proving to be fairly inefficient in combating the persistent environmental issues. The more intense the issues get, the more complicated it is for us to solve them; thus, we need to come up with even more innovative and sustainable solutions to complex issues. Maybe, the answer lies in already existing knowledge. Local communities across the world have been using sometimes even centuries-old traditional knowledge to combat natural disasters and increase the efficiency of their community processes. However, it would be unfair for developed countries and big enterprises to, let's say, accidentally stumble upon an ancient natural resource management system employed by a community from a less developed country, patent the technology and then resell it to other less developed nations with a surcharge. The exploitation of grassroots initiatives and traditional knowledge has been the *modus operandi* in innovation for a while, subsequently, unambiguously, disadvantaging the local traditional knowledge holders by making them essentially donate their efficiencies whilst getting nothing in return.<sup>28</sup> Open innovation, particularly as a resource for solving complex problems, improves the innovation outcomes because the synthesis of knowledge from different actors and linkage of various informational sources, opens up the possibility to access the previously hidden knowledge that would otherwise remain uncovered.<sup>29</sup> This notion is further supported by Ostrom, who maintained that there are clear advantages in utilising local knowledge, especially in a dynamic and swiftly changing environment.<sup>30</sup> Lastly, due to the recent push from governments and legislators to strengthen the intellectual property legislation, to make it more prohibitive and punitive, it is important to mention that even economists, who are typically very keen on exclusionary practices due to increased profitability they create, have acknowledged that the strengthening of the intellectual property right regimes has caused the faltering of the peer production sector and information commons, and, in turn, by harming access to already existing information, decreased the efficiency of economy utilising its human capital. One would think that decreased access to information would prompt researchers and scientists to innovate more and

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<sup>28</sup> Robinson, D. K. R., Simone, A., Mazzonetto, M. (2021), *RRI legacies: co-creation for responsible, equitable and fair innovation in Horizon Europe*, Journal of Responsible Innovation, 8(2), p. 213, <https://doi.org/10.1080/23299460.2020.1842633>

<sup>29</sup> Felin, T., Zegner, T.R. (2014), *Closed or open innovation? Problem solving and the governance choice*, Research Policy, 43(5), pp. 914, 922, <https://doi.org/10.1016/j.respol.2013.09.006>

<sup>30</sup> Ostrom, E. (2005), *Understanding Institutional Diversity*. Princeton University Press, pp. 279-280, <https://doi.org/10.2307/j.ctt7s7wm>

create new knowledge, however, since research and development and cost of accessing patented information is extremely capital intensive and acquiring funding is really complicated, most of them just opt to not take part in innovation creation, which in turn hinders economic growth.<sup>31</sup> Moreover, it could be said that the implications of information sharing can have significant impact on investment in innovation as investors would be informed about the existing knowledge, thus incentivise them to put their resources behind a possibly under researched technologies, that otherwise would be left astray at the local level without improvement to their capabilities. This argument, even though slightly counterintuitive, would speed up the commercialisation of such technologies exponentially, thus benefiting the local communities.<sup>32</sup> Obviously, this argument slightly contradicts the motivations behind the promotion of commons mechanisms, however, if the legislators are capable of producing robust laws that protect the initial knowledge proprietors and ensure that they are properly remunerated, such initiatives and investments can undoubtedly accelerate the innovation processes creating a win-win situation.

In fact, there are multiple examples that show the true potential of commons regimes. United Nations Development Programme has implemented the Small Grants Programme (SGP) which has been active in aiding the protection of local community-based initiatives to combat the effects of climate change. For more than 30 years, this programme has been active in developing countries, which, due to their geographical positioning, are especially vulnerable to various environmental threats.<sup>33</sup> A great example of the positive impacts of incentivising knowledge sharing and commons is The Pacific Organic and Ethical Trade Community, which promulgated the use of organic agriculture in the Pacific Islands by manufacturing ecological low-cost fertiliser. In 2015 participants from various countries of the Pacific joined in a conference where Cuban farmers exchanged their traditional knowledge on sustainable agricultural practices, including how to create an organic fertiliser from crop residues and compost. It is important to note that this initiative was led by community leaders and did not involve extensive support from the private sector. The impact of this initiative was immense, as both Fiji and Solomon Islands established their own community led farmers organisations that implemented the shared knowledge to combat

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<sup>31</sup> Benkler, *supra* Note 20, p. 445

<sup>32</sup> Runge, C.F., Defrancesco, E. (2006), *Exclusion, Inclusion, and Enclosure: Historical Commons and Modern Intellectual Property*, World Development, 34(10), p. 1722, <https://doi.org/10.1016/j.worlddev.2006.02.002>

<sup>33</sup> Global Environment Facility (2025), *GEF Small Grants Program: About the Program*, <https://www.thegef.org/what-we-do/topics/gef-small-grants-program>

soil erosion by building raised beds and box beds for plant cultivation in Solomon Islands and planting marigolds and sweet basil to deter insects from damaging their crops.<sup>34</sup> Alternatively, in the Caribbean, Small Grants Programme invested in knowledge development and innovation in Saint Lucia where a young enthusiast independently developed a technology of creating bio-fertiliser from seaweed, which was deemed to be effective by independent experts. Instead of trying to profit from this invention, which he could have easily done by patenting the formula and selling it to a big corporation, he approached SGP, which provided seed investment to ramp up the production of fertiliser by involving other community members, thus creating employment opportunities and possibility of exporting the bio-fertiliser. In addition to the economic benefits, as the invention gained international recognition, the inventor was able to share his technology and methods with other countries in the region, which helped other countries to adopt sustainable agricultural practices.<sup>35</sup> If we move closer to our latitude, a great example of commons in action has been established in Bologna, where local farmers and inhabitants have joined to form an initiative called “Campi Aperti”. This movement created a network of farmers and consumers fighting for food sovereignty. Even though “Campi Aperti” is self-regulated and decisions are made internally, they have kept the connection with the local authorities and comply with the laws governing trade.<sup>36</sup> This initiative not only functions as a means to access locally grown organic produce but also serves a bigger purpose of enabling the community to make decisions about their nutrition and land management, thus serving as a social innovation in agriculture. In addition to the social aspect of this initiative, it also serves as a catalyst for more traditional innovative practices in commons, such as the Seed Project made possible because of collaboration with the University of Bologna. In this case, farmers are regaining the control of seeds to balance the existing seed market and use shared knowledge to select seeds that are more suited for organic agricultural practices, safeguard biodiversity and work on creating more resilient and adaptive seeds that accommodate to climate change, ensuring supply of crops.<sup>37</sup> Lastly, to return to a more

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<sup>34</sup> The GEF Small Grants Programme (2020), *NATURE IS CALLING: USING SOUTH-SOUTH COOPERATION TO REPLICATE NATURE-BASED SOLUTIONS*, Available on: <https://www.sgp.undp.org/resources-155/our-stories/617-nature-is-calling-using-south-south-cooperation-to-replicate-nature-based-solutions.html>

<sup>35</sup> The GEF Small Grants Programme (2022), *Community-Based Climate Solutions for Sustainable Development*, p. 20, [https://www.thegef.org/sites/default/files/documents/2022-11/SGP\\_Community\\_Climate\\_Solutions\\_2022\\_11.pdf](https://www.thegef.org/sites/default/files/documents/2022-11/SGP_Community_Climate_Solutions_2022_11.pdf)

<sup>36</sup> Routledge, *supra* Note 15, p. 11

<sup>37</sup> Alberio, M., Moralli, M. (2021), *Social innovation in alternative food networks. The role of co-producers in Campi Aperti*, Journal of Rural Studies, 82, pp. 448-451, <https://doi.org/10.1016/j.jrurstud.2020.10.007>

classic commons regime, it is worth to mention the heavily researched and analysed Maine lobster gangs in the United States of America. Lobster fishing is the main industry in the state of Maine on the East coast of the US, thus naturally, most of the people that inhabit it either work as lobstermen or are connected to by proxy. Since this is such an established sector, there are certain traditions and norms rooted deep in the history of this state. As previously elucidated, commons regimes are quite prevalent in old practices as at the time it was virtually the only way how to organise them. In Maine, this commons mechanism has gone as far as to establish territorial divisions, create and enforce social and physical sanctions in the form of equipment damage and shunning from the community and set out strict access requirements for anyone intending to participate in the lobster catching industry. Even though, at the first glance, this might seem as a type of Robin Hood-esque form of self-governance, these commons have been so substantially developed and well-established that the governing bodies of Maine are actively cooperating and consulting the community leaders in all matters that concern their business, thus creating a sort of co-management responsibility mechanism, that works as a beautiful symbiosis of the needs and expertise from the lobstermen as well as necessary legal and normative guidance from the state institutions. This holistic approach has ensured that Maine's waters are not struggling with over-fishing, environmental damage and big corporations pirating and depleting their natural resources – including lobsters.<sup>38</sup> One would hope that the aforementioned proves that community knowledge and innovation can amount to great results if approached cautiously and with respect. Of course, it is undisputable that there is a specific role of the governmental involvement, especially in the matters of punitive actions taken by the commons members as unregulated sense of authority might result in excessive tendency to exclude inordinate amount of community members and/or carrying out of intrusive micro-management methods, however, it should be treaded lightly to ensure that the self-governing commons aspect and all the benefits arising from that stay intact.<sup>39</sup>

As previously established, commons are intrinsically linked to the protection of long-standing community knowledge, which, even though not to the extremes of intellectual property rights, could be viewed as sort of exclusionary. For this reason, and to make commons sustainable and beneficial for the larger community, the concept of access to knowledge was out forward. As

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<sup>38</sup> Brewer, J.F. (2012), *Revisiting Maine's lobster commons: rescaling political subjects*, International Journal of the Commons, 6(2), p. 223, <https://doi.org/10.18352/ijc.336>

<sup>39</sup> Hess, C., Ostrom, E. (2003), *Artifacts, Facilities, and Content: Information as a Common-pool Resource*, Law and Contemporary Problems, 66(1), p. 117

in the examples of Saint Lucia and Pacific Islands, the commons expanded and opened up to share the existing knowledge to other countries and communities to reach common good and incentivise sustainable practices in the wider region. This, of course, was made possible because of the, let's say trailblazing, commons members that understood that there would be little impact from their knowledge and technologies on climate change or environmental issues if this information would not be diffused. This, arguably, is the facet of the commons that makes them truly sustainable. If we look at the bigger picture, access of knowledge movement has been pivotal in achieving a just and fair information and knowledge sharing. The first huge successful access to knowledge initiative came in the midst of the crippling AIDS epidemic in the late 1990s. At that time, HIV/AIDS medication had recently been discovered through very capital- and labour-intensive research process, however, access to it was very scarce and the majority of affected people, especially from the nations of less-developed nations, who were disproportionately affected by the epidemic, were not able to gain access to this medicine. The already struggling governments were not willing to shell out money to satisfy the extortionate pricing of pharmaceutical companies, thus only a very lucky few were able to turn essentially a death sentence into a chronic illness. Subsequently, international campaigns led by industry experts and activists were carried out all across the world, lobbying the importance of accessible medicine to the protection of public health, which is a universally acknowledged basic human right. Initially there was a huge pushback from the pharmaceutical industry citing extensive investments poured into research and development of the antiretroviral drugs, maintaining that robust patent regime will act as funding mechanism for carrying out research activities in poorer nations, however, access to knowledge activists turned this argument against the industry stating that at the time 99 percent of the research and development carried out in the pharmaceutical sector targeted diseases that only 10% of all people impacted by illnesses have. Additionally, the argument of the industry that there is a prevalence of intellectual property thieves that infringe their patents was thrown back to them by access to knowledge advocates who stated that pharmaceutical industry directly profits off of biopiracy of traditional knowledge and genetic resources of less protected communities. This back-and-forth bickering was brought to such a high level that drug companies finally caved, at first by carrying out limited drug donation programs, then lowering prices of medicines and then eventually

granting licenses to generic suppliers.<sup>40</sup> The prevalence of biopiracy, a term coined by the Action Group on Erosion, Technology, and Concentration (ETC Group) meaning “*appropriation of knowledge and genetic resources of farming and indigenous communities by actors seeking exclusive monopoly control over these resources and knowledge*”<sup>41</sup>, garnered the attention of the World Intellectual Property Organisation (WIPO) and state governments. The first tangible impact of access to knowledge movement came when South African government, a nation that was one of the most impacted by the HIV/AIDS epidemic, amended the Medicines and Related Substances Act of 1965 to include the duty to offer interchangeable multi-source medicine (read generic medicine) to patients if as effective as branded medicines and cheaper.<sup>42</sup> Soon thereafter, WIPO followed suit by adopting the Doha Declaration on the TRIPS Agreement and Public Health, which emphasised the importance of Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) supporting public health and access to and creation of new medicines. Most importantly, establishing that TRIPS Agreement should not act to restrict governments from protecting public health and should include flexibilities.<sup>43</sup> This in turn allowed to amend the TRIPS Agreement to include article about member states having obligation to grant compulsory licenses of pharmaceutical products at an adequate price to least-developed countries.<sup>44</sup> Consequently, it is quite clear that access to knowledge movement achieved the virtually impossible task of tackling the monopolistic bio-technology industry by drawing attention to priority of rights to public health over intellectual property rights.

The archaic notion that commons and access to knowledge are economically inefficient and harm innovation, certainly the prerogative of the sustainable technology and biotechnology industries, is still quite popular. However, it is important to understand that specifically these industries, even if they are the ones that have the biggest concerns of losing future profit and make up the biggest anti-common and anti-knowledge sharing lobby, are indeed the ones that would not

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<sup>40</sup> Kapczynski, A. (2008), *The Access to Knowledge Mobilization and the New Politics of Intellectual Property*, The Yale Law Journal, 117(5), pp. 849 – 850, <https://doi.org/10.2307/20455812>

<sup>41</sup> Action Group on Erosion, Technology, and Concentration, *Patents & Biopiracy*, Available on: <https://www.etcgroup.org/issues/patents-biopiracy>

<sup>42</sup> Parliament of the Republic of South Africa, *Medicines and Related Substances Act No. 101 of 1965*, Art. 22F, Available on: [https://www.sahpra.org.za/wp-content/uploads/2019/09/Medicines-and-Related-Substances-Act\\_101-of-1965\\_Act\\_GG-40869\\_2017-05-26.pdf](https://www.sahpra.org.za/wp-content/uploads/2019/09/Medicines-and-Related-Substances-Act_101-of-1965_Act_GG-40869_2017-05-26.pdf)

<sup>43</sup> World Trade Organization (2001), *Ministerial Declaration on the TRIPS Agreement and Public Health*, Adopted on 14 November 2001, WT/MIN(01)/DEC/2, §§ 17-19

<sup>44</sup> *Agreement on Trade-Related Aspects of Intellectual Property Rights*, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (1994), Art. 31bis

only reap benefits but also gain brownie points in the eyes of international organisations for incentivising just sustainable development. It is important to remember that the exclusionary nature of intellectual property and its correlation to innovation is entirely negative, as this excessive protection of patents and other forms of intellectual property are exactly the ones slowing down innovation due to the tragedy of anti-commons.<sup>45</sup> The long standing exponential development of intellectual property rights, almost certainly slows down the development and future research, simply for the reason that commons are the perfect breeding ground for innovation, however, they cannot exist if they are pressured and bullied by the exclusionary conduct of patent holders.<sup>46</sup> Nevertheless, according to Heller, it is possible for commons to have multiple owners who have the right to use resources without being excluded,<sup>47</sup> so why are we not establishing commons where one of the parties is a private actor? Could it really be so, that the sheer lust for profit and tendency for exploitation of private companies would destroy the pivotal tenets of commons? As elucidated in the example of bio-fertiliser in Saint Lucia, it is possible to retain the technology know-how and allow the invention to be commercialised, obviously precluding that the community and inventors keep the rights to the invention and the gained profit is reinvested in the community, possibly for future research. Of course, this would require very specific and community focused amendments to the existing intellectual property regulation, however, I do not consider it an impossible task. We just need to understand what exactly we are trying to protect. In this case, it almost certainly is the traditional knowledge and local communities' rights to take ownership of it. Therefore, it is of utmost importance, whilst promoting commons and access to knowledge, to establish robust protection mechanisms, may it be in a modified form of already existing intellectual property rights, as long as it eliminates the exploitation of indigenous communities and historical commons regimes. At the end of the day, it is up to us to maintain genetic resources and traditional knowledge or face the fact that sooner than later this invaluable information might end up in the proprietary control of monopolistically tended big corporations.<sup>48</sup>

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<sup>45</sup> Buitenhuis, A.J., Pearce, J.M. (2012), *Open-source Development of solar photovoltaic technology*, Energy for Sustainable Development, 16(3), p. 381, <https://doi.org/10.1016/j.esd.2012.06.006>

<sup>46</sup> Benkler, *supra* Note 18, p. 1515

<sup>47</sup> Heller, M.A. (1998), *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, Harvard Law Review, 111(3), p. 1

<sup>48</sup> Kapczynski, *supra* Note 40, p. 826

### 1.3. Epistemic Justice and Traditional Knowledge

As we have established, indigenous groups possess invaluable knowledge that, if applied correctly and responsibly, could be the biggest aid in society's struggle to catch up with the extremely rampant environmental crisis and mitigate it successfully. However, as with biopiracy in commons and frequent disregard of the three tenets of just sustainable transition, it is equally, if not more, prevalent for traditional knowledge to be used in epistemically unjust ways, essentially synthesising the previously mentioned exploitative innovation practices. If we really want to build a just and sustainable climate transition, we should not only utilise the traditional knowledge and education opportunities, but also ensure that credit is given where it is due, by recognising the indigenous sources of such knowledge – this in turn would ensure the epistemically just transfer of knowledge.<sup>49</sup> If the scientists and researchers keep discounting the input of traditional knowledge holders, it will naturally amount to indigenous people not wanting to share the invaluable information that they have and, thus reduce the general level of social knowledge and shared informational resources.<sup>50</sup> But why is there such an attitude from the “traditional” innovators and researchers towards indigenous people and their practices? The general discourse suggests that researchers from developed nations consider traditional knowledge holders and their observations and practices as a subjective, empirical yet arbitrary and “old-wives tale”-esque information that has no solid scientific basis and cannot be proven.<sup>51</sup> Similarly to the three tenets of just sustainable transition, Fricker has distinguished between two separate types of justice – testimonial and hermeneutical epistemic justice. The former entails the distrust of decision makers and scientists in regard to the knowledge and practices utilised by marginalised communities due to their lack of academic credentials and scientific prowess, yet the latter is directly correlated to the systemic underrepresentation and overall disadvantaged societal positioning of certain communities, resulting in their knowledge and experiences not being acknowledged at the core level.<sup>52</sup> This largely societal prejudice is most clearly seen in lower-income neighbourhoods in developed nations, for example, in Thorncliffe Park neighbourhood in Toronto, Canada, where the

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<sup>49</sup> Ronghui, Z., Brown, D. (2024), *Epistemic Justice and Critical Minerals – Towards a Planetary Just Transition*, The Extractive Industries and Society, 18, p. 3, <https://doi.org/10.1016/j.exis.2024.101463>

<sup>50</sup> Baker, S., Constant, N.L. (2020), *Epistemic Justice and the Integration of Local ecological Knowledge for Marine Conservation: Lessons from the Seychelles*, Marine Policy, 117, p. 2, <https://doi.org/10.1016/j.marpol.2020.103921>

<sup>51</sup> Gebara, M.F., Ramcilovic-Suominen, S., Schmidlehner, M.F. (2023), *Indigenous Knowledge in the Amazon's Bioeconomy: Unveiling Bioepistemicicide Through the Case of Kambo Medicine*, Forest Policy and Economics, 154(2), p. 1, <https://doi.org/10.1016/j.forpol.2023.103012>

<sup>52</sup> Fricker, M. (2007), *Epistemic Injustice, Power & Ethics of Knowing*, Oxford University Press, pp. 1-2

majority of residents are either from a low-income background or immigrants (predominantly both due to generally prevalent societal injustice in modern societies), alas their input in improving their living conditions and overall welfare of their community is either i) not taken into account due to them belonging to a certain race or class, or ii) they are unable to participate in decision making due to lack of livelihood and communicational opportunities or even fear of being persecuted by the authorities.<sup>53</sup> However, to successfully and responsibly resolve either complex societal or environmental issues, communication with and input from the people truly affected by them is precisely the way to move forward, especially by promoting pluralistic and inclusive processes of scientific research.<sup>54</sup> This is further supported by Anderson, who maintains that if it is agreed that segregation promotes epistemic injustices, then, consequently community integration is precisely the way to turn this around and incentivise epistemic justice turning it into institutional excellence.<sup>55</sup> If we as a society are prudent in adhering to epistemically just practices and employ a holistic approach to sustainable development, the immense benefits of applying traditional knowledge will allow us to regenerate and ensure the longevity of environment, which has been inherently sustainable since the dawn of time.

By now, it is quite clear that the Western approach to dealing with the detrimental effects of climate change are simply proving to not be enough. It could be argued that this is due to the fact that knowledge production and utilisation is largely managed by bureaucratic governmental institutions and large research centres, thus resulting in non-diverse, hegemonic solutions to sustainability issues, putting the exploration of ecologically/socially centred means of innovation on the backburner.<sup>56</sup> According to WIPO, “traditional knowledge constitutes know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity.”<sup>57</sup> Traditional knowledge, in

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<sup>53</sup> Mohtat, N., Khifran, L. (2023), *Epistemic Justice in Flood-Adaptive Green Infrastructure Planning: The Recognition of Local Experiential Knowledge in Thorncliffe Park, Toronto*, Landscape and Urban Planning, 238, pp. 11-12, <https://doi.org/10.1016/j.landurbplan.2023.104834>

<sup>54</sup> Berger, M. (2024), *Bioethanol Sacrifice Zones and Environmental/Epistemic Injustice. A Case Study in Argentina*, Environmental Science & Policy, 157, p. 1, <https://doi.org/10.1016/j.envsci.2024.103782>

<sup>55</sup> Anderson, E. (2012), *Epistemic Justice as a Virtue of Social Institutions*, Social Epistemology, 26(2), p. 171, <https://doi.org/10.1080/02691728.2011.652211>

<sup>56</sup> Pesliak, L.D., Kilin, A. (2025), *Environmental Justice Through Epistemic Diversification: A Critical Reflection on One Health for Just Environmental Public Health*, Environmental Science & Policy, 173, p. 8, <https://doi.org/10.1016/j.envsci.2025.104222>

<sup>57</sup>World Intellectual Property Organisation, *Traditional Knowledge*, Available on: <https://www.wipo.int/en/web/traditional-knowledge/tk/index>

particular indigenous knowledge, has been institutionalised and recognised in international normative acts, for example, Convention on Biological Diversity (CBD), the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD, the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean and the Paris Agreement.<sup>58</sup>

Even now, all over the world there are various self-organized, community-led action groups that are trying to tackle climate change by themselves. These include agroecological networks, indigenous-led stewardship programs, community owned renewable energy projects and transition town cooperatives that are proving to be successful in their own right and could serve as an example for the developed nations on how to ensure a just sustainable transition.<sup>59</sup> In fact, traditional knowledge has already been applied by the wider network of scientific and private undertakings, yet in a predominantly exploitative way. This exploitation mainly manifests in more powerful actors, such as research centres and big corporations, extracting the traditional knowledge from marginalised communities on false pretences without giving any benefit or compensation to the knowledge holders or their societies. More detrimentally, the latter are often not even given credit for the gained information, thus deepening the already existing knowledge gap and general animosity between Western researchers and indigenous people.<sup>60</sup> To ensure that this exploitative nature of knowledge generation and exchange ceases it is imperative to critically analyse and understand where this knowledge actually comes from and pay particular attention to honouring the historically marginalised communities that have been overlooked for too long, possibly resulting in opportunities to collaborate and be more open to alternative resources of information as such. The biggest caveat for the scientific community in recognising traditional knowledge, according to Norstrom, is to fully accept that, for the co-creation of knowledge, it is necessary to recognise, respect and synthesise diverse, pluralistic sources of knowledge, even if they do not fit the typical scientific discovery paradigm.<sup>61</sup> It is imperative to understand that

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<sup>58</sup> Wang, J., Fan, X. (2025), *Traditional Knowledge of Arctic Indigenous Peoples and the Establishment of Area-Based Management Tools Beyond National Jurisdiction*, Marine Policy, 174, p. 1, <https://doi.org/10.1016/j.marpol.2025.106604>

<sup>59</sup> Castellaneli, C.A., Parra, C., da Rosa Pires, A. (2025), *The Politics of Possibility in Just Transitions: A Foucauldian Reading*, 129, p. 10, <https://doi.org/10.1016/j.erss.2025.104375>

<sup>60</sup> Rolin, K.H. (2025), *Resisting Epistemic Exploitation: From Institutional Remedies to Community-Based Research*, Studies in History and Philosophy of Science, 111, pp. 63-67, <https://doi.org/10.1016/j.shpsa.2025.05.005>

<sup>61</sup> Norström, A.V., Cvitanovic, C., Löf, M.F. et al. (2020), *Principles for knowledge co-production in sustainability research*, Nature Sustainability, 3, p. 189, <https://doi.org/10.1038/s41893-019-0448-2>

supporting and promoting the knowledge of indigenous people in a epistemically just way is much more efficient than trying to accommodate them to fit neatly into the established dogmatic Western knowledge systems.<sup>62</sup> In fact, it has been proven that lands governed locally by the inhabiting communities, struggle much less with biodiversity loss and land degradation, thus exhibiting higher level of adaptability and resilience in facing climate change.<sup>63</sup> So, naturally, it can be deduced that whatever it is that they are doing works beautifully and could indeed prove to be invaluable in helping to address the impending environmental challenges. However, there are preconditions for the developed world to use traditional knowledge in a responsible and epistemically just way, some of which go directly against the long-established Western scientific process. For example, i) recognising sentience and intentionality in ecological processes, ii) re-establishing the various relational patterns of cultures that non-human knowledge is made of, and iii) emphasising the deeply inherent interconnectedness of nature and culture as a whole.<sup>64</sup> In practice, a comparable initiative called Green Platform Amsterdam has been established to organise an independent partnership between entrepreneurs, resident groups, initiators and local as well as urban green organisations with the aim of combining community urban greening knowledge and practices to make valuable propositions to their municipality about green policy. Subsequently, this ambitious partnership has become a great negotiation and proposal tactic to influence municipal decision making to favour the local community as well as incentivise research in the field of urban greening studies, which takes traditional practices and opinions of the community in account.<sup>65</sup>

The importance of traditional knowledge and the traditional practices of indigenous people was first underscored by the United Nations in Principle 22 of the Rio Declaration on Environment and Development of 1992, including the need to recognise and support indigenous communities for achieving sustainable development.<sup>66</sup> This resulted in 168 countries signing the Convention on

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<sup>62</sup> Arora, S., Ghosh, B., Stirling, A. (2026), *Decolonising Innovation in sustainability Transitions for Pluriversal Justice and Wellbeing*, Environmental Innovation and Societal Transitions, 58, p. 58, <https://doi.org/10.1016/j.eist.2025.101064>

<sup>63</sup> Deaudoin, S., Chaloux, A., et al. (2026), *Promising Governance Approaches for Reversing Biodiversity Loss*, Biological Conservation, 313, p. 1, <https://doi.org/10.1016/j.biocon.2025.111607>

<sup>64</sup> Castellaneli, *supra* Note 59, p. 7

<sup>65</sup> Mabon, L. Barkved, L., et al. (2022), *Whose knowledge counts in nature-based solutions? Understanding epistemic justice for nature-based solutions through a multi-city comparison across Europe and Asia*, Environmental Science & Policy, 136, p. 659, <https://doi.org/10.1016/j.envsci.2022.07.025>

<sup>66</sup> Rio Declaration (1992), *Rio Declaration on Environment and Development*, in the Report of the United Nations Conference on Environment and Development, UN Doc. A/CONF.151/26 (Vol. 1), 12 August 1992, Principle 22

Biological Diversity (CBD), which came into force on the 29<sup>th</sup> December 1993, mandating signatories to respect, preserve and maintain knowledge, innovations and practices of indigenous communities<sup>67</sup>, especially if related to conservation and sustainable use requirements.<sup>68</sup> The treaty also stipulates that such practices and knowledge, upon receiving approval from knowledge holders, should be applied more widely and with the involvement of local communities, whilst ensuring that benefits arising from the utilisation of such knowledge or technologies are equally distributed between the involved parties.<sup>69</sup> This Convention can be considered to have started the active discourse on the rights of indigenous people and their rights to protection of their knowledge, as, after it came into force, United Nations adopted various legislative instruments further emboldening the protection of indigenous people and their knowledge. Starting with the UN Declaration on the Rights of Indigenous People of 2008, it recognized the critical role traditional knowledge plays in the cultural life of indigenous peoples, affirming their right to maintain, control, protect, and develop their cultural heritage, traditional knowledge, and traditional cultural expressions.<sup>70</sup> Later on, after extensive negotiations, the Nagoya Protocol was adopted at the tenth meeting of the Conference of the CBD Parties on 29<sup>th</sup> October 2010 to further enforce the implementation of Article 8(j) of the CBD by setting out requirements on access to traditional knowledge held by indigenous and local communities, specifically in association with genetic resources, thus allowing them to gain tangible benefits from the utilisation of their knowledge.<sup>71</sup> Finally, the importance of traditional knowledge has also been embodied in the main environmental protection and climate change mitigation legislation of the United Nations – The Paris Agreement – which calls for implementation and adaptation of traditional knowledge via integration of acquired scientific information to strengthen the resilience and reduce the vulnerability to climate change.<sup>72</sup> The latest legislative development in regard to traditional

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<sup>67</sup> United Nations, (1992), *Convention on Biological Diversity*, Art. 8(j), Available on: <https://www.cbd.int/convention/text/>

<sup>68</sup> *ibid* Art. 10(c)

<sup>69</sup> *ibid* Art. 10

<sup>70</sup> United Nations (2007), *Declaration on the Rights of Indigenous Peoples*, (A/RES/61/295), Art. 31, Available on: <https://www.ohchr.org/en/indigenous-peoples/un-declaration-rights-indigenous-peoples>

<sup>71</sup> Secretariat of the Convention on Biological Diversity (2011), *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity: text and annex*, Art. 7, Available on: <https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf>

<sup>72</sup> United Nations (2015), *Paris Agreement to the United Nations Framework Convention on Climate Change*, Dec. 12, 2015, T.I.A.S. No. 16-1104, Art. 7(5), Available on: [https://unfccc.int/sites/default/files/english\\_paris\\_agreement.pdf](https://unfccc.int/sites/default/files/english_paris_agreement.pdf)

knowledge protection is the addition of the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement), which will come into force on the 17<sup>th</sup> of January, 2026 and has been signed by 145 signatories, further incentivising the integration of local communities and traditional knowledge in sustainability sciences by establishing the concept of free, prior, informed consent or approval from indigenous communities to utilise their knowledge, as well as extra-judicial benefit sharing mechanisms and area based management tools.<sup>73</sup> The BBNJ Agreement expressly recognises traditional knowledge and further cements the collaborative approach to deal with issues relating to marine ecosystems, which are currently one of the most detrimentally impacted by climate change.<sup>74</sup> Moreover, UN Committee on Social, Economic and Cultural Rights, in their general comment No. 25, has acknowledged that traditional knowledge, as long as it has been critically analysed and is testable, can directly contribute to scientific progress in medical, industrial and agricultural industries just as efficiently as “traditional science”, further supporting the notion that by exploring local community traditions we can discover valuable information about climate variability, sustainable agriculture and biodiversity conservation.<sup>75</sup> Even though there is a robust legislative basis for the protection of traditional knowledge, in judiciary the situation is a bit different. Most cases, which will be elaborated on in the subsequent paragraph, have been decidedly unfavourable for the indigenous communities as the courts tend to reject their claims to indigenous practices on the basis of moral grounds. This was the situation in *EC-Seal Products* case, where northern indigenous communities appealed the European Union ban on the sale of seal products, including meat, oil and fur in the EU internal market, but were rejected by the court as it considered the sale of such goods to be contrary to the morally acceptable commercial practices in the European community. This decision garnered

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<sup>73</sup> United Nations (2023), *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement)*, C.N.203.2023.TREATIES-XXI.10, Available on: [https://treaties.un.org/doc/Treaties/2023/06/20230620%2004-28%20PM/Ch\\_XXI\\_10.pdf](https://treaties.un.org/doc/Treaties/2023/06/20230620%2004-28%20PM/Ch_XXI_10.pdf)

<sup>74</sup> Caldeira, M., Sekinairai, A. T., Vierros, M. (2025), *Weaving Science and Traditional Knowledge: toward Sustainable Solutions for Ocean Management*, Marine Policy, 174, p. 4, <https://doi.org/10.1016/j.marpol.2025.106591>

<sup>75</sup> Committee on Economic, Social and Cultural Rights (2020), *General comment No. 25 (2020) on science and economic, social and cultural rights (article 15 (1) (b), (2), (3) and (4) of the International Covenant on Economic, Social and Cultural Rights)*, 30 April 2020, E/C.12/GC/25, §§ 5-7, Available on: <https://docs.un.org/en/E/C.12/GC/25>

criticism from the traditional knowledge supporters and indigenous community as, in their view, ironically, it could amount to interference with the Inuit communities right to property.<sup>76</sup>

To illustrate the significance of impacts of traditional knowledge, it is valuable to look at various community initiatives employing indigenous practices for sustainable development. For example, in Seychelles its inhabitants predominantly earn money by fishing local species. They practice historical methods of fishing that employ their extensive knowledge of the behaviour of 26 different species of fish by successfully predicting their spawning patterns and locales and by subsequently being able to use the empirically gained knowledge to track the changes in fish populations and flagging of vulnerable species in their community waters.<sup>77</sup> Solely because of these specific traditional practices, which have been passed down for generations, the inhabitants of Seychelles have been able to protect their livelihood as well as to establish the Blue Economy policy in cooperation with their municipality, which enables them to turn their indigenous knowledge and vast oceanic resources from a small community project into a mechanism for economic growth by boosting responsible tourism, social well-being by benefit sharing and environmentally sustainable land resource management by securing the safety of biodiversity in the oceans.<sup>78</sup> Similarly to Seychelles, in Fiji the indigenous people of iTaukei community have shown how community knowledge of the marine ecosystem enables sustainable resource management. Interestingly, pursuant to indigenous traditions women are the ones who are the keepers of the knowledge on marine ecosystem including habitats and breeding practices, which is critical in protecting biodiversity and controlling overfishing. This knowledge has been organised in a wonderful initiative called Women in Fisheries Network, which allows women to participate in the management and decision-making at sustainable fisheries, giving a breath of fresh air to historical fishing communities in Fiji.<sup>79</sup> In Africa, Ghanaian communities have historically relied on indigenous traditional knowledge for sustainable waste management. These practices are not only convenience based, but in fact, intrinsically linked to the cultural practices of their community. For example, all organic by-products are composted in “refuse dumps” in the

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<sup>76</sup> Negishi, Y. (2025), *Multi-level legal protection of traditional knowledge of Arctic indigenous peoples: Decolonizing knowledge production for sustainable development*, Polar Science, 44, p. 3, <https://doi.org/10.1016/j.polar.2024.101135>

<sup>77</sup> Baker, *supra* Note 50, p. 6

<sup>78</sup> Failler, P., El Ayoubi, H. (2020), *Seychelles Blue Economy Action Plan*, [Unpublished report or report prepared for the Government of Seychelles/UNECA], p. 5, <https://doi.org/10.13140/RG.2.2.32242.82887>

<sup>79</sup> Caldeira, *supra* Note 74, pp. 2-3

outskirts of the village and, afterwards, together with ash from heating houses and cooking, returned to agricultural land to increase the fertility of soil. Moreover, there is a well-established culture of repurposing of waste materials by using broken ceramics in construction. Due to the similar cultural and ecological landscapes in Western African countries, this knowledge has been diffused all across the region enhancing the sustainability levels of the region as a whole.<sup>80</sup> It is understandable that nowadays practices like composting and waste disposal seem obvious to virtually all people from the Global North; however, we should take this as proof of the true significance of integrating localised sustainability solutions and recognise its true impact beyond the borders of one specific country. Conversely, in the East African country of Ethiopia the traditional stone houses of Tigrawai and bamboo houses of the Dorze and Siama communities as well as the castles of Gondar and churches of Lalibela and Dire Sheek Hussein Mosque built according to indigenous knowledge are not only the predecessors of the modern air conditioning technology in communal spaces, but also serve as attraction objects for myriads of tourists, that aid in the development of countries economic growth.<sup>81</sup> To further cement the significance of protecting traditional knowledge, it is worth to mention the traditional irrigation systems in the Middle Eastern and North African (MENA) countries. Historically, the traditional irrigation practices such as underground water canals, rainwater harvesting and participatory water management were imperative in ensuring the prosperity of agricultural sector in the notoriously tricky region. However, due to the establishment and implementation of modern water management technologies in the previous century, the indigenous practices have faded into oblivion. If there had been an epistemically just and responsible governance mechanism for protecting the local traditional knowledge, these undoubtedly effective practices would have prospered and, if documented properly via an improved cooperation mechanism with the knowledge holders, possibly, the current ever persistent issues of water scarcity in other regions of the Global South could be resolved in a more efficient manner.<sup>82</sup> In Europe, there is plenty of

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<sup>80</sup> Anokye, K., Mohammed, A.S. (2024), *Indigenous Traditional Knowledge for Cleaner Waste Systems and Sustainable Waste Management System in Ghana*, *Cleaner Water Systems*, 9, pp. 1-2, <https://doi.org/10.1016/j.clwas.2024.100165>

<sup>81</sup> Mekonnen, Z., Kidemu, M., et al. (2021), *Traditional Knowledge and Institutions for Sustainable Climate Change Adaptation in Ethiopia*, *Current Research in Environmental Sustainability*, 3, p. 3, <https://doi.org/10.1016/j.crsust.2021.100080>

<sup>82</sup> Ben Hassen, T., El Bilali, H., et al. (2025), *Traditional Irrigation Knowledge for Sustainable Water Resource Management in Arid Environments: Insights from the MENA Region*, *Journal of Arid Environments*, 231, p. 2, <https://doi.org/10.1016/j.jaridenv.2025.105466>

traditional knowledge, but due to the historically industrial climate in the continent, there are only a few examples of traditional community led knowledge systems left. As recent as in the 20<sup>th</sup> century, there were traditional biological practices. For example, in the South Western Spanish community of Donana farmers had established mechanisms for improving and managing agricultural practices. They were able to forecast weather by observing the strength of wind, cloud and moon shapes and patterns of bird migration. For improving soil, they employed the practice of burning bushlands, thus enabling the minerals to enter their soil, which helped the reforestation of the area with domestically valuable pine trees and grain for next year's harvest. This cycle was repeated every 15 to 20 years.<sup>83</sup> Nowadays, various activist groups in Europe have been trying to re-establish the traditional knowledge from the past to help in the sustainability transition in the continent. In Greece, the Terra Lemnia project works to conserve and restore traditional agro-pastoral “mandras” to ensure the recognition of the Lemnos Island and the indigenous knowledge holders and in Norway the local seed savers have worked to establish a codification of historical farming practices by collaborating with international genebanks and archives.<sup>84</sup>

To conclude, it is important to remember that all epistemic injustices are inherently connected to other forms of social injustice including procedural, distributive and recognition injustice. The previously elucidated harms from the loss of traditional knowledge perpetrates the general tendency to disregard the holistic approach to sustainable transition, thus not being able to achieve a truly just sustainable transition. The critical minerals industry is a great example of where all three tenets of just transition go to die. Local communities in mineral rich countries find themselves excluded from any decision making process on mineral mining (procedural injustice), they are not recognised as full-fledged stakeholders in the mining process even though it is happening on their land (recognition injustice) and the capacity of their involvement in the mining industry is most frequently limited to working in the mines without gaining any information about how the industry actually works, leading to a misunderstood opinion of the true harms this does to their community (distributive injustice).<sup>85</sup> The dangers of overlooking epistemic justice are not

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<sup>83</sup> Gomez-Baggethun, E., Reyes-Garcia, V., et al. (2012), *Traditional Ecological Knowledge and Community Resilience to Environmental Extremes: A Case Study in Donana, SW Spain*, *Global Environmental Change*, 22(3), pp. 644-645, <https://doi.org/10.1016/j.gloenvcha.2012.02.005>

<sup>84</sup> Molnar, Z., Fernandez-Llamazares, A., Schunko, C., et al. (2023), *Social Justice for Traditional Knowledge Holders Will Help Conserve Europe's Nature*, *Biological Conservation*, 285, p. 7, <https://doi.org/10.1016/j.biocon.2023.110190>

<sup>85</sup> Ronghui, *supra* Note 49, pp. 4-5

limited to only societal harms of the local communities, but are also to the detriment of the general knowledge creation and innovation processes, as, by discounting traditional knowledge and focusing solely on modern typically Western research, a lot of intricacies of local processes and historical solutions to complex sustainability issues are being overlooked because of distrust in the intellectual capabilities of indigenous communities, resulting in greater disadvantage to the global sustainability transition.<sup>86</sup> For this reason, it is crucial to support initiatives like Environmental Justice Organizations, Liabilities and Trade (EJOLT) project and Global Atlas of Environmental Justice, who bring together scientific and civil communities to participate in collaborative research and propose evidence based, knowledge intensive policy proposals and evaluate already existing environmental initiatives to improve the effectiveness and justice in sustainable climate change management.<sup>87</sup>

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<sup>86</sup> San Martin, W., Wood, N. (2022), *Pluralising planetary justice beyond the North-South divide: Recentring procedural, epistemic, and recognition-based justice in earth-systems governance*, Environmental Science & Policy, 128, p. 261, <https://doi.org/10.1016/j.envsci.2021.12.002>

<sup>87</sup> Temper, L., Del Bene, D. (2016), *Transforming Knowledge Creation for Environmental and Epistemic Justice*, Current Opinion in Environmental Sustainability, 20, p. 43, <https://doi.org/10.1016/j.cosust.2016.05.004>

## 2. The Landscape of IP Governance

As can hopefully be deduced from the previous chapter, there are persistent inequalities exhibited in the current innovation and sustainability model. They are not limited only to financial aspects, but they also concern fundamental human rights that are at the core of the discourse on just sustainable transition. However, as per established in the European Convention of Human Rights, it is not enough to invoke solely human rights in the context of, for example, protection of traditional knowledge and sustainable innovation, because human rights are not absolute.<sup>88</sup> Some innovations are not just tradeable commodities for private consumption but are the pivotal prerequisites and necessities of adequate human existence. The traditional discourse on intellectual property considers these rights to be exclusionary and often liken them to the traditional property rights i.e. land, goods etc.; however, this is an entirely skewed way of approaching the much broader and complex institution of intellectual property rights, which, more often than not, are of a much more complicated origin and could have huge impact on not only the rights holders themselves but also the general public as a whole, especially if considering the field of sustainable development and energy transition. Moreover, the rigid intellectual property regimes imposed on emerging economies by wealthy states of the Global North significantly impact the diffusion of sustainable technologies, incentives for innovation and, finally, the right of self-determination of less developed countries. So far, intellectual property rights have been seen as the expression of the private sectors' inherent carving to amass maximum profit by setting up market barriers and establishing a dominant market position.<sup>89</sup> This position is completely logical to have in a capitalist society. However, what if it could be proven that, by taking on a more flexible and holistic approach to intellectual property rights, these firms could not only gain substantial profit but also aid in combating the environmental crisis, possibly even in return receiving tax deductions or favourable treatment from the governing bodies? At the end of the day, it would be quite irresponsible to disregard the existing disparity in widely differing levels of countries' financial, scientific and governance capabilities and ignore the extreme urgency of climate crisis just to gain profit, especially by disadvantaging the Global South.<sup>90</sup> This model definitely does not appear to be very

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<sup>88</sup> Lever, A., Timmermann, C. (2025), 19. *Justice in Global Intellectual Property Governance*. In A. Berger, C. Brandi & E. Kollar (Ed.), *Justice in Global Economic Governance: Normative and Empirical Perspectives on Promoting Fairer Globalisation*, Edinburgh University Press, p. 219, <https://doi.org/10.1515/9781399530156-023>

<sup>89</sup> Veugelers, R., Schneider, C. (2018), *Which IP strategies do young highly innovative firms choose?*, *Small Business Economics*, 50(1), p. 114, <https://doi.org/10.1007/s11187-017-9898-y>

<sup>90</sup> Lever, *supra* Note 88, p. 220

sustainable. Thus, in this chapter I will elucidate the several intellectual property governance mechanisms which companies, as well as governmental actors, can utilise to incentivise sustainable innovation and development without harming the market. Firstly, I will describe the traditionally market-oriented and cooperation-based mechanisms. Then, I will turn to holistic and epistemically just modes of governance. And finally, I will introduce the conceptual open-access, commons oriented intellectual property governance approaches.

## **2.1. Market-Oriented and Coordination-Based IP Governance**

As previously established, historically, intellectual property rights have been intrinsically attributed to market efficiencies, specifically to the creation of innovative technologies – dynamic efficiency. However, as research and development is very time and capital intensive, this mutuality, albeit counterintuitively, slows down innovation and sustainable transition.<sup>91</sup> No doubt that new technologies could very much be of use, however, the time that takes to invent, patent and then diffuse the technology is rather lengthy. Thus, it would be valuable to shift the focus from endlessly inventing to working on diffusing and combining existing technologies and patents that could uncover previously overlooked opportunities, admittedly, if used skilfully and in a collaborative manner. This is especially important in the context of developing countries and emerging economies that might not yet be able to conduct intensive research and development activities on their own but are often the ones in the most desperate need of innovative technologies to weather the “environmental storm”. In fact, based on Adams, stringent intellectual property rights have been found to harm the growth of developing economies.<sup>92</sup> To ensure the efficiency of sustainability transition it is necessary to explore and/or establish flexibilities in intellectual property regimes to address the particularities of the sustainable technology market.<sup>93</sup> Technology licensing is especially important for research centres, that typically operate with a very conservative budget, as it helps them in recouping their research and development costs and

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<sup>91</sup> Shabalala, D. B. (2020), *Climate Change, Technology Transfer, and Intellectual Property: A “Modest Proposal” for an IP Enforcement Moratorium*, Fordham Environmental Law Review, 31(1), p. 14, <https://ir.lawnet.fordham.edu/elr/vol31/iss1/5>

<sup>92</sup> Adams, S.H. (2009), *Intellectual property rights, political risk and economic growth in developing countries*, Journal of economics and international finance, 1(6), p. 132, <http://www.academicjournals.org/JEI>

<sup>93</sup> Drexler, J. (2024), *Responses of Intellectual Property and Competition Law to the Challenges of Climate Change*, GRUR International, 73(8), p. 715, <https://doi.org/10.1093/grurint/ikae085>

generating profit for funding further research.<sup>94</sup> Moreover, the indoctrination of intellectual property rights in trade policy could potentially create an added dimension of discriminatory power imbalance as developed nations are likely to impose trade sanctions as a deterrent mechanism on emerging economies, consequently inhibiting their capabilities to create their own national intellectual property regimes which are customised to their level of technological advancement.<sup>95</sup>

### 2.1.1. Patent Pools

According to World Intellectual Property Organisation (WIPO), patent pools typically in the form of joint venture, are aggregated depositories of different patent rights owned by multiple patent owners which can be freely accessed by all members of the patent pool and by non-members on the condition that they have purchased the license for the patent pool in question. The received licensing fees are typically divided proportionally to each member based on their patents value.<sup>96</sup> In practice there are two types of patent pools – first, in which the patent holders transfer the control of their patent to a separate undertaking, which takes on the managerial role of overseeing and licensing out the patents and second, in which one of the members of the patent pool acquires the patents of all members of the patent pool and licenses them on their own.<sup>97</sup> European Commission, in contrast with the prevailing opinion on intellectual property rights, views patent pools to be pro-competitive and innovation incentivising, as the combining of multiple patents creates a “one-stop shop” for innovators, thus removing the extensive bureaucratic process of licensing each patent separately as well as reducing the transaction costs.<sup>98</sup> This bundling is immensely helpful in industries where virtually all components needed to create a novel technology are already patented, particularly in the environmental technology sector. The licensees are generally very receptive to patent pools as they value the convenience of the “one-stop shopping”, which eliminates the risk of paying for a license of a patent which, as later turns out, is

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<sup>94</sup> Zhao, D. (2017), *Choices and Impacts of Cross-Licensing Contracts*, International Review of Economics & Finance, 48, p. 389, <https://doi.org/10.1016/j.iref.2017.01.002>

<sup>95</sup> Lever, *supra* Note 88, p. 215

<sup>96</sup> World Intellectual Property Organization (WIPO) Secretariat (2014), *Patent Pools and Antitrust – A Comparative Analysis*, p. 3, Available on: [https://www.wipo.int/export/sites/www/competition-policy/en/docs/patent\\_pools\\_report.pdf](https://www.wipo.int/export/sites/www/competition-policy/en/docs/patent_pools_report.pdf)

<sup>97</sup> Drexler, J. (2008), *Research Handbook on Intellectual Property and Competition Law*, Edward Elgar Publishing, p. 139, ISBN: 978 1 84542 047 5

<sup>98</sup> European Commission (2004), *Commission Notice — Guidelines on the application of Article 81 of the EC Treaty to technology transfer agreements*, Official Journal of the European Union, C 101, § 214, [https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52004XC0427\(07\)](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52004XC0427(07))

useless without another complementary patent. Moreover, they recognise that, if used skilfully, the value of pooled patents, can turn out to be of much greater value than the initial licensing fee.<sup>99</sup> Another benefit of patent pools is that the price of license is determined by the members themselves and is equal for the whole “package” of patents, as is the number of granted licenses, reducing the uncertainty in costs of technology development for new industry players.<sup>100</sup> There are also public effects from patent pooling, such as improvements in product variety and quality and an increasing competition in the market, since pooled essential patents or patents under a standard setting organization can clear the path for more market actors to access necessary technology.<sup>101</sup> Under Art. 101(1) of Treaty on the Functioning of the European Union (TFEU), to establish a patent pool it is necessary for the pooled patents to be essential technologies, otherwise they could lead to horizontal price fixing, thus limiting the competition in innovation markets.<sup>102</sup> This requirement is hugely important to ensure the best outcome for the end-users of the patented technology as, in markets that lack competitiveness the prices are typically much less elastic, thus the technologies become much more expensive. However, the limitations imposed by Art. 101(1) TFEU do not mean that non-essential patents cannot be pooled, given that they are mutually compatible. In fact, it is considered that the most effective patent pools are exactly the ones that bundle different yet complementary technologies, thus making it possible to start production of technology as soon as possible. The caveat is that, most frequently, patent pools give preferential pricing to the members of their patent pool rather than external innovators, which creates a significant barrier of entry for emerging technology developers.<sup>103</sup> Ironically, especially in the climate technology market, the intended surge in innovation from pooling complementary technologies is more likely to create an exclusionary “members-only” community of sustainable technology developers that carry out research and innovate in their own little playground of technology patents, thus creating a patent thicket and insurmountable barriers of entry, which seriously harm the possibility of having fresh approach to sustainability technology research and development. Interestingly enough, as opposed

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<sup>99</sup> Shapiro, C. (2001), *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, Innovation Policy and Economy, 1, p. 134, <http://dx.doi.org/10.2139/ssrn.273550>

<sup>100</sup> Kato, A. (2004), *Patent Pool Enhances Market Competition*, International Review of Law and Economics, 24(2), p. 256, <https://doi.org/10.1016/j.irle.2004.08.010>

<sup>101</sup> Hovenkamp, E., Hovenkamp, H. (2017), *Patent Pools and Related Technology Sharing*, In R. D. Blair, D. D. Sokol (Eds.), *The Cambridge Handbook of Antitrust, Intellectual Property, and High Tech*, p. 1, <https://doi.org/10.1017/9781316671313.019>

<sup>102</sup> European Commission, *supra* Note 98, § 220

<sup>103</sup> Ishihara, A., Yanagawa, N. (2018), *Dark Sides of Patent Pools with Independent Licensing*, International Journal of Industrial Organization, 57, p. 3, <https://doi.org/10.1016/j.ijindorg.2017.12.005>

to technology transfer and research and development sharing, there is no specific legislative instrument that regulates patent pools. To ensure the regulatory framework for patent pools in the European Union, authorities apply Technology Transfer Guidelines together with previously mentioned competition law provisions set out in Art. 101 of TFEU, which allows the members of patent pools to utilise the derogations, and “safe harbours” usually reserved for technology transfer agreements.<sup>104</sup>

One of the first examples of patent pool in sustainable development is the Golden Rice Project. It originated from the long-existing micronutrient deficiency in the developing world. Subsequently, two professors from Germany and Switzerland collaborated on genetically modifying the traditional rice grain to create “Golden Rice” by enriching the grains with beta-carotene (precursor of vitamin A). This project aimed to decrease the level of vitamin A deficiency globally, which causes blindness and increases the severity of infectious diseases leading to increased mortality rate, especially during childhood, and especially in least-developed countries.<sup>105</sup> The creators of the enriched grain had intended to transfer the product to developing countries, where it could be introduced in local rice varieties, alleviating the public health burden on the society. However, upon carrying out due diligence to prepare for the transfer of the product they discovered that the techniques they had used to create the “Golden Rice” had already been patented by more than 50 private and public undertakings. They did not realise it yet, but they had found themselves in the middle of a “patent thicket”. To find a solution to this issue they involved Syngenta Seeds AG to offer the 6 main patent holders to enter into a non-profit public-private partnership agreement with the inventors and Syngenta Seeds AG, thus enabling the transfer of rice grain to target developing countries. Subsequently, a humanitarian board composed of various industry experts, philanthropic organisations and NGOs was established to supervise the licensing of the “Golden Rice” and ensure that the pro-bono seed is not used for commercial purposes, i.e. annual profit from the sale of “Golden Rice” cannot exceed 10 000 USD, if it does the producer is required to pay a licensing fee.<sup>106</sup> This case study emphasises the importance of the issue of “patent thickets”, first researched by Shapiro, and the possible detrimental effects that can arise if they are

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<sup>104</sup> Drexl, *supra* Note 97, p. 145

<sup>105</sup> Palmer, A. C. (2025), *Golden Rice: A Quarter-Century of Innovation, Challenges, and the Promise of Better Nutrition*, The Journal of Nutrition, 155(9), pp. 2847-2848, <https://doi.org/10.1016/j.tjnut.2025.06.025>

<sup>106</sup> Armillotta, M. (2010), *Technology Pooling Licensing Agreements: Promoting Patent Access Through Collaborative IP Mechanisms* (1st ed.), Nomos Verlagsgesellschaft mbH, pp. 143-146, [doi.org/10.5771/9783845226316](https://doi.org/10.5771/9783845226316)

not dealt with. The “Golden Rice” illustrates an example in which just development and public health issues can be addressed by inventive practices carried out within academic institutions, granted, that they have the knowledge and opportunity to overcome the barriers of “patent thicket” by approaching the private sector and persuading them to establish a patent pool.

Arguably the most significant patent pools are to be found in the information and communication technology industry. One of such examples is the MPEG LA platform which grew out of the MPEG-2 patent pool and now administers more than 10 patent pools in the high-tech industry. The evolution of this patent pool is a perfect example of how access to essential and complementary patents is imperative in the development of emerging technologies. For example, the initial MPEG-2 patent pool established in 1997 was intended to serve as the international standard for processing audiovisual data. Initially a patent pool of 27 essential patents was created involving MPEG-2 technology developers, such as Fujitsu, Philips Electronics, Matsuhisa and Columbia University and given to an administrator to carry out non-discriminatory licensing.<sup>107</sup> This created a “one-stop shop” for telecommunications (TV, DVD etc.) manufacturing sector as well as broadcast and satellite television service providers, which enabled innovation in the telecommunications industry and most probably is the reason why we are currently able to enjoy the convenience of streaming services such as Netflix and HBO.<sup>108</sup> The above mentioned begs the question, if this practice is so beneficial for innovation and has clear empirical evidence in alleviating the burdens of research and development, why don't we pool all technology patents? Well, that is precisely what we are getting at, but first, we need to understand the pitfalls of such collaborative intellectual property management mechanisms. Besides the obvious regulatory concerns about anti-competitive practices and market distortion, there is another economic aspect that needs to be taken into consideration – division of licensing revenues. This facet could arguably be even more detrimental in the efficiency of patent pools, as firms are notoriously profit-motivated, which in turn could create friction amongst the members of the patent pool. For example, MPEG-2 agreement set out a straightforward algebraic equation: Amount of Royalty Payment = Number of pool patents the member holds in a country / Total number of essential

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<sup>107</sup> Nikolic, I., Galli, N. (2022), *Patent Pools in 5G: The Principles for Facilitating Pool Licensing*, Telecommunications Policy, 46(4), p. 4, <https://doi.org/10.1016/j.telpol.2021.102287>

<sup>108</sup> Zhang, Y., Peng, C., et al. (2024), *Patent Pool and Dominant Design: An Empirical Study of Patent Pool From MPEG-LA*, Journal of Engineering and Technology Management, 74, p. 7, <https://doi.org/10.1016/j.jengtecman.2024.101847>

patents in that country belonging to the pool x Total royalties collected in the respective country. This ensured that all the members, irrespective of the popularity of their specific patent, received a proportionate share of income generated within a specific country based on the number of patents they held.<sup>109</sup> In theory, this is the ideal case scenario, however, in other patent pools, the remuneration agreements are more complex and exhibit exploitative practices. For example, according to Layne-Farrar, companies are less inclined to join patent pools if the royalty payments are directly correlated to each member's share of patents in the pool. In this model, initiator firms or larger firms use their dominant position to introduce more patents in the pool, even if they are lower quality ones, thus gaining disproportionate revenue from the common revenues from the patent pool licenses.<sup>110</sup> In 2010, MPEG LA ventured into the medical sector by creating a molecular diagnostics licensing clearing house named Librassay<sup>TM</sup>, with the aim to aggregate patent rights for established and developing testing mechanisms that could be non-exclusively licensed to medical entities to diagnose illnesses such as cancer, cardiovascular diseases, neurological disorders and others. This initiative elucidated a shift from formerly market focused patent pooling to incorporation of humanitarian considerations in patent pooling practices,<sup>111</sup> which is at the core of intellectual property regime transition from being a proprietary exclusionary institute to holistically just tool for sustainable transition.

### 2.1.2. Cross Licensing

Similarly to patent pools, cross-licensing entails the sharing of patents between firms to be able to use the patented technology in their innovation activities to decrease the possibility of infringing on an existing patent right, thus gaining the freedom to operate (FTO). However, as opposed to patent pools, in cross-licensing agreements, this patent sharing most frequently happens between two or more competing companies that, in lieu of licensing fee, exchange specific technologies with each other without creating a patent pool of complementary technologies.<sup>112</sup> For example, in

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<sup>109</sup> Layne-Farrar, A., Lerner, J. (2011), *To Join or not to Join: Examining Patent Pool Participation and Rent Sharing Rules*, International Journal of Industrial Organization, 29(2), p. 296, <https://doi.org/10.1016/j.ijindorg.2010.08.006>

<sup>110</sup> Dequiedt, V., Versaavel, B. (2013), *Patent Pools and Dynamic R&D Incentives*, International Review of Law and Economics, 36, p. 60, <https://doi.org/10.1016/j.irle.2013.04.009>

<sup>111</sup> Van Zimmeren, E., Vanneste, S., et al. (2011), *Patent Pools and Clearinghouses in the Life Sciences*, Trends in Biotechnology, 29(11), p. 571, <https://doi.org/10.1016/j.tibtech.2011.06.002>

<sup>112</sup> Giuri, P., Torrisi, S. (2010), *Cross-licensing, Cumulative Inventions and Strategic Patenting*, European Policy on Intellectual Property, p. 2, [https://www.researchgate.net/publication/267257874\\_Cross-licensing\\_Cumulative\\_Inventions\\_and\\_Strategic\\_Patenting](https://www.researchgate.net/publication/267257874_Cross-licensing_Cumulative_Inventions_and_Strategic_Patenting)

2003, three pharmaceutical companies decided to enter into a non-exclusive cross-licensing agreement which gave them freedom to operate in form of permission to use each other's patented technologies to conduct research and development in the sphere of anti-body based medical products.<sup>113</sup> Economists and business strategists suggest cross-licensing in cases where two different firms which own complementary patents want to carry out mutually advantageous innovation as this practice offsets the licensing fee that would be paid in cases of unilateral licensing to access a patented technology by trading one patent for another, as well as eradicates the risk of patent infringement litigation. Cross-licensing is especially convenient in technology intensive industries where patented inventions are interrelated, specifically for smaller scale companies that might struggle with entry into market and freedom to operate due to possible “patent thickets”.<sup>114</sup> The benefits of cross-licensing are especially prevalent in green technology industries and, if established between competing firms, this creates healthy competition in innovation whilst promoting the development of green technologies, which helps to accelerate the just sustainable transition.<sup>115</sup> When talking about patent governance strategies it is important to understand that more often than not firms use patenting as a business strategy, especially in technology and pharmaceutical sectors. This, of course, if done extensively, can distort the market. Similarly, as with patent pools, cross licensing can create specific anti-competitive conditions in the industry and even result in price gauging practices by large patent holders. Most commonly these practices involve blocking patents (strategic non-use) and sleeping patents. According to Torrisi and Gambardella et.al., blocking patents are filed by companies as a strategic tool to decrease the chances of other companies entering their market with a similar, potentially, competing technology.<sup>116</sup> On the other hand, even though sleeping patents are not necessarily considered to be strategic, I would argue otherwise as this practice bears essentially the same results as blocking patents, since the firms that patent technologies of no use to them at the time (based on the possibility of eventual applicability in innovation processes) inherently limit the

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<sup>113</sup> Capelli, R., Corsino, M., et al. (2023), *Technological Competition and Patent Strategy: Protecting Innovation, Preempting Rivals and Defending the Freedom to Operate*, Research Policy, 52(6), p. 3, <https://doi.org/10.1016/j.respol.2023.104785>

<sup>114</sup> Grzegorzczuk, T. (2020), *Managing Intellectual Property: Strategies for Patent Holders*, The Journal of High Technology Management Research, 31(1), p. 7, <https://doi.org/10.1016/j.hitech.2020.100374>

<sup>115</sup> Zhang, Q., Zhu, X., Lin, G. (2024), *Green Technological Licensing Strategies with Fixed-Fee Among Rival Firms Under Emissions Trading Scheme*, European Journal of Operational Research, 318(1), p. 111, <https://doi.org/10.1016/j.ejor.2024.04.036>

<sup>116</sup> Torrisi, S., Gambardella, A., et al. (2016), *Used, Blocking and Sleeping patents: Empirical Evidence from a Large-scale Inventor Survey*, Research Policy, 45(7), p. 1375, <https://doi.org/10.1016/j.respol.2016.03.021>

access to said patents by other firms, effectively prohibiting the establishment of technologies that could be created from using them. There are mechanisms that are intended to inhibit such exclusionary practices, however, a robust, comprehensive framework is yet to be adopted. One of regulatory mechanisms, that I will elaborate on in the following paragraph, that tries to address these issues is Fair, Reasonable and Non-discriminatory (FRAND) terms which are predominantly enforced by existing judicature and European Union regulation on standard essential patents.

Even though, as of yet, there are no specific legal instrument for regulating licensing practices, the European Union, in collaboration with the European Union Intellectual Property Organisation, submitted a proposal in 2023 for a regulation on issuing standard essential patents, which intended to ensure fair outcome of good faith negotiations between licensing parties and set out a concrete definition for what FRAND terms entail. The main reasoning behind establishing this regulation was the fact that there is virtually no transparency on SEP ownership, lack of information on FRAND royalty rates and, pivotally, the bureaucratic burden on national and European courts that arises from arbitrating the legitimacy of FRAND terms in licensing agreements.<sup>117</sup> However, this initiative was met with harsh criticism from stakeholders including public and private sector as well as governmental institutions, thus was withdrawn in February 2025. This withdrawal cemented the existing mechanism of arbitrating FRAND terms pursuant to preceding case law and essentially closed the door on the possibility of unified licensing term legislation. The most prominent cases in FRAND judicature concern mobile network technologies (3G, 4G and 5G), especially for setting specific global rates backed by injunctive relief and determining relevant jurisdiction.

For example, in 2020 case *Unwired Planet v. Huawei*, Unwired Planet (the Claimant) brought action against Huawei (the Respondent) for the infringement of five UK patents which the Claimant argued to be standard essential patents, previously acquired from Ericsson in 2013. The Respondent had previously licensed said patents from Ericsson, set to expire in 2012; however, the Respondent kept using the patented technology after the expiration date.<sup>118</sup> The core issue adjudicated was whether the licensing offers of the parties were FRAND and, if not, determine

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<sup>117</sup> European Parliamentary Research Service, Madiega, T. (2023), *Briefing, EU Legislation in Progress, Standard Essential Patents Regulation*, COM(2023)232, pp. 3-6, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754578/EPRS\\_BRI\(2023\)754578\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754578/EPRS_BRI(2023)754578_EN.pdf)

<sup>118</sup> *Unwired Planet International Ltd and another v Huawei Technologies (UK) Co Ltd and another*, [2020] UKSC 37 (UK Supreme Court August 26, 2020), § 16

what would satisfy the FRAND requirements. At appellate instance, the court held that due to the global scope of the Claimants patent portfolio and the Respondents global business practices it is reasonable to conclude that the Parties had agreed on a worldwide license instead of an exclusive UK license.<sup>119</sup> The Respondent appealed on all grounds and failed, with the exception of claim that royalty rates can be a range rather than specific percentage point. In cassation, the Supreme Court of the United Kingdom reiterated the decisions of previous instances and gave judgement on 5 key issues: (i) Does the English court have the jurisdiction to impose the Parties to enter into a global licensing agreement under multinational patent portfolio?<sup>120</sup>, (ii) Is England an appropriate jurisdiction?<sup>121</sup>, (iii) What does the non-discrimination facet of FRAND stand for?<sup>122</sup>, (iv) Is dominant undertaking entitled to seek an injunction restraining the use of standard essential patents?<sup>123</sup> and (v) Are damages preferred over injunction as the punitive award?<sup>124</sup> The most influential aspects of this case in the context of patent regulation are the determination of jurisdiction and the meaning of non-discriminatory terms. In regard to jurisdiction, the court held that England is the preferred forum of choice for worldwide patent disputes as other states have not yet found that they have the authority to decide over worldwide patent disputes without the Parties agreement.<sup>125</sup> As for the non-discriminatory terms, the Defendant argued that the Claimant had offered less-favourable rates to them, in comparison to their competitor Samsung. The Defendant argued that the terms for equal licenses should be the same for all licensees to keep in line with the FRAND terms.<sup>126</sup> Notably, the Supreme Court held that price discrimination is the established norm of licensing practice and that there might be various reasons for applying different royalty rates to different licensees, such as “fire sales” and other economic reasonings behind setting different royalty rates for different licensees.<sup>127</sup> Furthermore, the Court suggested that the Claimant had not infringed on the FRAND terms as long as the terms offered to the Defendant were fair and reasonable, thus establishing a divide between the different prongs of

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<sup>119</sup> *Unwired Planet International Ltd v Huawei Technologies Co. Ltd & Anor*, [2017] EWHC 711 (Pat), HP-2014-000005 (High Court of Justice of the United Kingdom 05 April 2017), §§ 543, 804

<sup>120</sup> *Unwired Planet v Huawei* (2020), *supra* Note 118, §49

<sup>121</sup> *ibid* § 92

<sup>122</sup> *ibid* § 105

<sup>123</sup> *ibid* § 128

<sup>124</sup> *ibid* § 159

<sup>125</sup> *ibid* § 104

<sup>126</sup> *ibid* § 105

<sup>127</sup> *ibid* § 124

FRAND terms i.e. de-twinning fair and reasonable from non-discriminatory requirements.<sup>128</sup> The Court precluded, referring to the *Post Danmark A/S*<sup>129</sup> and *Huawei v. ZTE*<sup>130</sup> decisions, that in order to prove the imposition of discriminatory pricing, licensing terms should be looked at from the competition law perspective by analysing whether the licensor holds a dominant position in the market and whether it is abusing it by putting the licensee at a competitive disadvantage.<sup>131</sup> On the other hand, royalty rates are currently being determined according to the precedent in 2024 case *InterDigital v. Lenovo*, where InterDigital (the Claimant) brought a claim against Lenovo (the Defendant) for infringing upon their standard essential patents and sought compensation based on FRAND terms. In the first instance, the court established a per unit licensing rate to be applied to all the Defendants sales since the 2007 when their licensing agreement came in force, resulting in a lump sum payment of 138.7 million USD in addition to interest in the amount of 46.2 million USD.<sup>132</sup> Upon appeal, the Claimant challenged the court's decision on the per-unit royalty rate by arguing for a higher rate to account for the lost earnings from applying non-FRAND terms which was disputed by the Defendant who held that limitation period should be applied.<sup>133</sup> Upon deliberation, the Court concluded that limitation periods do not apply in FRAND cases as the process of determining FRAND terms entails an analysis of the relationship between a willing licensor and licensee rather than a decision on damages for patent infringement.<sup>134</sup> Moreover, the Court reiterated the necessity in awarding interest to the Claimant for delay in receiving FRAND royalties.

All of the aforementioned cases have borne immense significance in licensing practices, cemented the United Kingdom as the preferred forum of choice for FRAND term arbitration and set procedural precedent for license agreement resolution. Even though the judicature is fairly recent, it has already had a great impact on overall licensing negotiations between parties and has given much needed clarity on previously ambiguous and easily manipulated FRAND terms. One could argue that due to the effectiveness of such judicature there is no necessity for specific international legal instrument regulating licensing agreements. However, it is quite clear the

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<sup>128</sup> *ibid* § 122

<sup>129</sup> Case C-209/10, *Post Danmark A/S v Konkurrencerådet*, ECLI:EU:C:2012:172 (CJEU, March 27, 2012)

<sup>130</sup> Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp.*, ECLI:EU:C:2015:477 (CJEU July 16, 2015), § 77

<sup>131</sup> *Unwired Planet v Huawei* (2020), *supra* Note 118, §135

<sup>132</sup> *InterDigital Technology Corp v Lenovo Group Ltd* [2024] EWCA Civ 743 (EWCA (Civ) 2024), § 2

<sup>133</sup> *ibid* §185

<sup>134</sup> *ibid* § 531

administrative burden on courts, largely imposed by the immensely technical nature of licensing litigation, should be alleviated. Taking into account the growing prevalence of high-tech licensing agreements and, subsequently, disputes arising from them, there is a pressing need to establish a designated arbitral institution, which, hopefully, with time, could establish truly fair and non-discriminatory ways of licensing conduct and incentivise the innovation and diffusion of novel technologies, thus, possibly, aiding in just sustainable transition. All in all, it is certain that technological licensing, especially in green technologies, is a perfect vehicle for firms to not only recoup their R&D expenditure but also ensuring long-term growth by strengthen their strategic position in the technology market. Consequently, it can be argued that these practices are certainly the ones at the crux of developing highly efficient sustainable technologies and accelerating the speed of the ecological transition.<sup>135</sup>

### 2.1.3. Technology Transfer

The process of technology transfer is often described as the process during which expertise or knowledge related to a specific technology is being transmitted from one user to another in order to boost profitability of an enterprise.<sup>136</sup> For example, in the agricultural sector, technology transfer can significantly improve productivity and sustainability by creating opportunities to adopt genetically modified strains of critical crops and advance existing cultivation practices.<sup>137</sup> Generally, people associate technology transfer agreements with nefarious dealings between big industry players to gain extreme profits on the expense of marginalised communities. This is extrapolated by the fact that, indeed, big companies, especially in the manufacturing and energy sector, often use technology transfer as a guise for shifting their business operations to a less developed region where they enjoy significantly lower taxes and cheap labour costs, whilst pretending that they are investing in regional development and increasing the welfare of emerging economies. Art. 18 of the Convention on Biological Diversity sets out a commitment to promote and encourage international technical and scientific cooperation and transfer of technologies,

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<sup>135</sup> Zhang, *supra* Note 115, p. 111

<sup>136</sup> Mehta, C., Shankar, U., Bandopadhyay, T.K. (2016), *Low Carbon Technologies for Our Cities of Future: Examining Mechanisms for Successful Transfer and Diffusion*, India Quarterly: A Journal of International Affairs, 72(4), p. 416, <https://doi.org/10.1177/0974928416671590>

<sup>137</sup> Marin-Garcia, E. J., Ocampo-Lopez, C., et al. (2025), *Impact of Technology Transfer on Food Security in Developing Territories: a Bibliometric Analysis and Systematic Literature Review*, Sustainable Futures, 10, p. 2, <https://doi.org/10.1016/j.sfr.2025.100770>

particularly in regard to developing countries,<sup>138</sup> with the aim to enable sustainable development and technology diffusion. However, even though the executive powers being vested in public entities provides a great opportunity for direct technology transfer, due to the specific means of implementation being left in the hands of states,<sup>139</sup> the technology transfer matters are usually left for the private sector, resulting in continuing systemic inequalities. It is nearly unanimously acknowledged that climate change mitigation and adaptation technology patenting is directly correlated to economic growth; however, to enable successful and holistically sustainable technology transfer, it is not sufficient to share the know-how, but also to understand the underlying systematic knowledge, namely, the know-why that is direly needed to manage fair and just technological transition.<sup>140</sup>

As with most patenting mechanisms, there have been persistent concerns about the possibility of collusive and anti-competitive practices between undertakings, however, in contrast with others, technology transfer agreements are quite robustly regulated by international legislation, namely, Technology Transfer Block Exemption Regulation (TTBER). TTBER was enacted to create a “safe harbour” for technology licensing agreements, provided they do not contain any “hardcore restrictions” or exceed the determined market share, to facilitate the manufacture of novel technologies or to provide high-tech services using previously patented technologies. It covers patents, know-how and software copyright licenses.<sup>141</sup> This instrument sets out specific definition for technology transfer - (i) technology rights licencing agreement entered into between two undertakings for the purpose of the production of contract products by the licensee and/or its sub-contractors, or (ii) assignment of technology rights between two undertakings for the purpose of the production of contract products where part of the risk associated with the exploitation of the technology remains with the assignor.<sup>142</sup> The difference in

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<sup>138</sup> Convention on Biological Diversity, *supra* Note 67, Art. 18

<sup>139</sup> Morgera, E., Tsioumani, E., Buck, M. (2014), *Unravelling the Nagoya Protocol: A Commentary on the Nagoya Protocol on Access and Benefit Sharing to the Convention on Biological Diversity*, Brill, p. 318, <https://doi.org/10.1163/9789004217188>

<sup>140</sup> Ferreira, J. J.M., Fernandes, C.I., et al. (2020), *Technology Transfer, Climate Change Mitigation, and Environmental Patent Impact on Sustainability and Economic Growth: A comparison of European Countries*, Technological Forecasting and Social Change, 150, pp. 2 – 5, <https://doi.org/10.1016/j.techfore.2019.119770>

<sup>141</sup> Turner, M., Callaghan, D. (2004), *Software Licensing Under the Competition Law Spotlight - the New Technology Transfer Block Exemption*, Computer Law & Security Report, 20(4), p. 274, Available on; <https://www.docscrids.eu/s/docs-crids/pdf?ids=466865&template=item>

<sup>142</sup> Commission Regulation (EU) No 316/2014 of 21 March 2014 *on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of technology transfer agreements (TTBER)*, Official Journal of the European Union, L93, 28 March 2014, Art. 1(1)(c)

the perception of technology transfer agreements lies in the fact that technology patent rights are consistently associated with research and development process, which, according to the European Commission, is the main facilitator of economic efficiency by reducing repetitive research activities and incentivising new research, thus promoting competitive market practices, which, in turn, drive innovation in the market.<sup>143</sup> Unlike patent pools, technology transfer involves licensing of individual technology, thus, in intellectual property law context, they are considered to be much more compatible with the EU competition legislation. Even more so, such agreements are preferred to such extent that the EU legislators have established competition law derogations embedded in Art. 101(3) of the Treaty on the Functioning of the European Union (TFEU), thus making it very unlikely for companies to end up in breach of competition law in the context of Art. 101(1) TFEU prohibiting collusive agreements.<sup>144</sup> For example, in *Nungesser* case, a man was allowed to register plant varieties in his own name under the condition that the seeds would be sold in Germany and two thirds of the production should be imported from France.<sup>145</sup> Even though the Commission found a breach of restrictive practices under Art. 101(1) TFEU, this particular case was in line with exemption provided by Art. 101(3) TFEU based on the fact that, in the absence of exclusive license, diffusion of new biotechnologies would be significantly inhibited, thus distorting the competition in the internal market.<sup>146</sup> Therefore, it can be concluded that, generally, agreements that concern innovative technologies and promote R&D in the internal market will generally be determined to fall under the exception of Art. 101(3) TFEU and, consequently, protected by the Block Exemption Regulation. This, of course, is not absolute and depends on case-by-case basis as there is a fine line separating fruitful innovation via exclusive licensing and anti-competitive practices. Famously, in the landmark *Tetra Pak* case, even though Commission acknowledged that even licensing agreements falling under Art. 101(3) TFEU or TTBER can be found to distort competition in the internal market, for example, in cases where an important patent holder is

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<sup>143</sup> Barazza, S. (2014), *The Technology Transfer Block Exemption Regulation and Related Guidelines: Competition Law and IP Licensing in the EU*, Journal of Intellectual Property Law & Practice, 9(3), p. 186, <https://doi.org/10.1093/jiplp/jpt235>

<sup>144</sup> Kur, A., Dreier, T., Luginbuehl, S. (2019), *European Intellectual Property Law*, Edward Elgar Publishing, pp. 493-494, ISBN: 978 1 78536 154 8

<sup>145</sup> Case C -258/78, *L.C. Nungesser KG and Kurt Eisele v Commission of the European Communities* ECLI:EU:C:1982:211, (CJEU of 8 June 1982), § 10

<sup>146</sup> *ibid* §§ 76-78

acquired by a dominant undertaking, thus constituting abuse of dominant position in breach of Art. 102 TFEU.<sup>147</sup>

To understand the reasoning behind the preferential treatment of technology transfer agreements it is important to be aware of the gradual yet intentional evolution of international climate legislation, which slowly but surely established technology transfer as the go-to mechanism for incentivising green innovation. The beginning of the international shift towards sustainable development and climate change mitigation (by creating new technologies) can be traced back to 1992 when UN member states joined in an international treaty – the United Nations Framework Convention on Climate Change (UNFCCC) – which came into force in 1994. In particular, Art. 4.5 of the UNFCCC established the commitment to “*promote, facilitate and finance, ..., the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties*” and “*support the development and enhancement of endogenous capacities and technologies of developing country Parties*” by urging members and organisations to assist in facilitating the transfer of sustainable technologies.<sup>148</sup> Moreover, UNFCCC is the first supranational legislation that emphasises the detrimental effects of greenhouse gas emissions and requires all signatories to incentivise and work together for the development, application, and diffusion, including transfer, of GHG mitigation technologies.<sup>149</sup> The UNFCCC is precisely the reason why, nowadays, UN member states convene for a yearly COP (conference of the parties) to decide on climate action by setting targets, negotiating binding commitments and working together to figure out the most viable action plans to combat the environmental crisis. This conference has established itself to be the primary global forum for enacting international climate change treaties and global environmental policies, arguably the most notable being the Paris Agreement. The first major treaty resulting from the UNFCCC regime was the Kyoto Protocol adopted at the COP3 in 1997, which established the first legally binding emissions reduction targets for industrialised nations. As with most initial climate legislations, Kyoto Protocol focused on market-based mitigation methods, most famously by establishing the Clean Development Mechanism (CDM), even though it was intended to be a project not

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<sup>147</sup> Case T-51/89, *Tetra Pak Rausing SA v Commission of the European Communities*, [1990] ECR II-539 (Court of First Instance of the European Communities), § 23

<sup>148</sup> United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107, Art. 4.5.

<sup>149</sup> *ibid* Art. 4.1

technology-based mechanism.<sup>150</sup> Within the CDM, according to Art. 12 of the Kyoto Protocol, with the approval of the host country, developed countries can, submit a project to the Executive Board of the CDM outlining their intended emissions mitigation activities and subsequent long-term benefits in a developing country. Upon approval by the executive board and successful implementation, the developed country can receive certified emission reduction credit for carrying out emissions mitigating activities in developing countries that result in “additional” emissions reductions in comparison to the ones usually expected.<sup>151</sup> Furthermore, the certified emission reduction credits can later be traded in the internal emissions market to ensure compliance with the emissions limits set by the Kyoto Protocol during the commitment period.<sup>152</sup> As can probably be deduced, the trading aspect set the precedent for the later established European Union Emissions Trading Scheme (EU ETS). The established cooperative approach and public interventions as promoted by the UNFCCC regime and the additionally possible financial benefits arising from the certification trading are a real incentive for the fostering of innovation and promotion of tangible benefits from technology transfer.<sup>153</sup> However, as is common with complex multi-faceted international legislations, the ratification of the Kyoto Agreement was stalled for nearly 10 years due to disagreements over the implementation mechanisms, particularly the emissions trading under the CDM and the exact means of financially supporting the developing nations in adoption to climate change and ensure fair technology transfer. The turning point in the ratification of the Kyoto Protocol came in 2001 with the adoption of the Marrakesh Accords. This pivotal decree established (i) the precise scope for capacity building of the developing countries, including national climate change programmes<sup>154</sup>, developments in transfer of technology<sup>155</sup> and provision of assistance for participation in international negotiations;<sup>156</sup> (ii) the requirement of developed nations to provide financial and technological resources to assist developing countries, specifically least developed countries and small island developing states in a prompt manner via entities

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<sup>150</sup> Ahmad, Z. (2021), *WTO Law and Trade Policy Reform for Low-Carbon Technology Diffusion: Common Concern of Humankind, Carbon Pricing, and Export Credit Support*, Brill, p. 71, ISBN:978- 90- 04- 44609- 0

<sup>151</sup> UNFCCC, *supra* Note 148, Art. 12

<sup>152</sup> *ibid* Art. 17

<sup>153</sup> Sajid, M. J., Zhang, Y., Janjua, L.R. (2024), *Breaking Barriers: Assessing Technology Transfer for Climate-Resilient Development*, Environmental Technology & Innovation, 33, p. 8, <https://doi.org/10.1016/j.eti.2023.103471>

<sup>154</sup> United Nations Framework Convention on Climate Change (2002), *Decision 5/CP.7: Implementation of Article 4, paragraphs 8 and 9 of the Convention*. In *Report of the Conference of the Parties on its seventh session, held at Marrakesh from 29 October to 10 November 2001* (FCCC/CP/2001/13/Add.1, § 15(d))

<sup>155</sup> *ibid* § 15(j)

<sup>156</sup> *ibid* § 15(k)

withing the financial mechanism<sup>157</sup>; (iii) an expert group and framework on technology transfer to enhance the implementation of Art. 4.5. of the UNFCCC and the Buenos Aires Action Plan.<sup>158</sup> In essence, the Marrakesh Accords established a complex yet strong institutional regime for climate change mitigation and created a largely agreed upon accountability mechanism for developed nations as well as a clearer advancement path and more substantial assurances for less developed nations in regard to just sustainable technology transition. The extensive negotiations and adoption of the Marrakesh Accords finally convinced the Umbrella States coalition i.e. US, Canada, Japan, Australia, New Zealand, Russia, Iceland and Norway, which sought more flexible approach and concessions to the Kyoto commitments, to agree to the terms of the Kyoto Protocol, thus subsequently leading to its adoption in 2005.

Currently, a hot debate in the technology transfer sphere are industry-university partnerships which, usually, operate via technology transfer offices. These technology transfer offices are typically established adjacent to a research-intensive university that is looking for ways to monetize their research through licensing yet need assistance in the management of their intellectual property in return for co-ownership rights. Technology transfer offices analyse the market to determine whether the technology is patentable, thus negating non-applicable research, for example when the market is either too small or saturated. In turn, they focus on R&D passive industries that do not have the resources or capabilities to carry out substantial innovation practices yet are interested in collaborating with university researchers to possibly gain competitive advantage.<sup>159</sup> Three modes of licensing through technology transfer offices prevail - (i) license in return for sponsoring further research, (ii) license in return for shares in the company or (iii) licensing for royalty payments.<sup>160</sup> These practices are especially important as there is a serious disconnect between university backed research and the industry, which has been proven to

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<sup>157</sup> *ibid* § 20

<sup>158</sup> United Nations Framework Convention on Climate Change [UNFCCC] (2001), *Decision 4/CP.7: Development and transfer of technologies (decisions 4/CP.4 and 9/CP.5)*, Report of the Conference of the Parties on its seventh session, held at Marrakesh from 29 October to 10 November 2001, FCCC/CP/2001/13/Add.1, §§ 1-2

<sup>159</sup> Hall, J., Matos, S., Bachor, V. (2017), *From Green Technology Development to Green Innovation: Inducing Regulatory Adoption of Pathogen Detection Technology for Sustainable Forestry*, Small Business Economics, 52(4), p. 881, <https://doi.org/10.1007/s11187-017-9940-0>

<sup>160</sup> Holgerson, M., Aaboen, L. (2019), *A Literature Review of Intellectual Property Management in Technology Transfer Offices: from Appropriation to Utilization*, Technology in Society, 59, p. 3, <https://doi.org/10.1016/j.techsoc.2019.04.008>

significantly impede effective technology transfer and possibility for academic spin-offs.<sup>161</sup> Researchers have elucidated significant untapped potential of industry-university cooperation and joint ventures, as co-creation has been proven to boost economic and technical benefits by combining strong research capabilities with industry specific knowledge of consumer demand and market particularities.<sup>162</sup> Considering that successful technology transfer has multiple dimensions, not only economic development but also promoting environmental protection and increasing overall social welfare, different strategies for technical cooperation should be explored and the process should be approached in a more holistic manner, shifting from direct basic licensing and acquisition to joint ventures and research collaborations.<sup>163</sup> This practice can directly facilitate adherence to the technology transfer commitments by developed countries to aid LDCs in ecological transition under the UNFCCC requirements, as currently, the most prominent hurdles in technology transfer between developed and developing countries are exactly the knowledge gaps and organizational constraints. The practical industry knowledge in combination with the epistemic knowledge possessed by universities improves productivity, saves manufacturing costs and provides an avenue for attaining sustainable long-term economic growth in the developing world.<sup>164</sup> To carry out successful technology transfer, for example to rural communities, there is an inherent need to understand and accommodate to community's social, environmental and cultural practices, insights which academic researchers are often familiar with. One such example can be found in Colombia, where in 1991 the government was trying to figure out a solution for combating hunger by shifting from traditional fishing practices i.e. fishing fike, and incentivising trout farming. Initially, due to lack of oversight and holistic considerations, this initiative failed as the government was not able to provide adequate assistance in commercialising the fisheries. However, after some time, a collaboration between various research teams and companies from different regions in Colombia and fishery cooperative AROPESCA was established to figure out a way to overcome the management, technical and marketing obstacles. This resulted in trout farming becoming the primary economic activity in Cauca region of Colombia, with local universities carrying out research in more efficient preservation and processing practices whilst

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<sup>161</sup> Li, X., Li, J. (2026), *From Lab to Market: A Hybrid Model for Closing the Knowledge Gap in Technology Transfer*, Technovation, 150, p. 1, <https://doi.org/10.1016/j.technovation.2025.103437>

<sup>162</sup> Al Ghamdi, M.S., Durugbo, C.M. (2021), *Strategies for Managing Intellectual Property Value: A Systemic Review*, World Patent Information, 67, p. 6, <https://doi.org/10.1016/j.wpi.2021.102080>

<sup>163</sup> Mehta, *supra* Note 136, p. 416

<sup>164</sup> Sajid, *supra* Note 153, pp. 8-9

the private sector and cooperative collaborated to improve the existing technologies, consequently, solidifying trout farming as an established driver of the sustainable economic development in the region.<sup>165</sup> Many recent studies show that the transfer and adoption of innovative agricultural technologies in emerging economies have become a decisive factor for not only improving productivity and production efficiency but also fosters resilient food systems, directly contributing to UN SDG 2, in times of climate and economic crises.<sup>166</sup>

## 2.2. Attempts at Epistemically Just Governance Mechanisms

The existing global intellectual property mechanism is very much market-centred which by definition prioritises exclusionary profit-based approaches to innovation. The first international climate regulations were essentially trade forums where high-income economies leveraged their status to create more favourable policies by underlining the importance of strong IP protection – an approach that does not work for emerging economies due to lack of established industries. These methods eerily remind of the remnants of colonialism and are not designed to benefit the local populations.<sup>167</sup> This clearly elucidates the need for collaborative R&D practices, which has been proven to be useful in avoiding these epistemic injustices in traditional IP regimes. For long term capacity building it is pivotal to build upon the existing sustainability technologies and adapt them for implementation and commercialisation in developing countries whilst taking into account the existing traditional practices and ensuring the recognition of local communities.<sup>168</sup> There are existing attempts at establishing epistemically just and holistic approach to IP management as will be illustrated in the forthcoming chapter; however, it is important to remember that it is in the hands of developed nations to ensure their just and sustainable application.

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<sup>165</sup> Holmen, M., Sanchez-Peciado, D.J., Ljungberg, D. (2025), *How Does Technology Transfer Evolve in Rural Regions? Transferors, Recipients, and the Role of Absorptive Capacity in Developing Economies*, Journal of Rural Studies, 118, p. 4, <https://doi.org/10.1016/j.jrurstud.2025.103688>

<sup>166</sup> Marin-Garcia, *supra* Note 137, p. 1

<sup>167</sup> Cartwright, M., Morin, J. (2025), 18. *Global Intellectual Property Governance: An Assessment of Its Terms*, In A. Berger, C. Brandi & E. Kollar (Ed.), *Justice in Global Economic Governance: Normative and Empirical Perspectives on Promoting Fairer Globalisation*, Edinburgh University Press, p. 204, <https://doi.org/10.1515/9781399530156-022>

<sup>168</sup> Shabalala, *supra* Note 91, p. 22

### 2.2.1. Access and Benefit Sharing and Traditional Knowledge

The prevailing definition of access and benefit sharing (ABS) describes it as a process in which genetic resources can be accessed and how the benefits arising from their utilisation are to be shared between users of the resources and providers of the resources.<sup>169</sup> The intention of this mechanism is to create greater social and economic justice by strengthening the rights of local and indigenous communities and creating incentives for biodiversity conservation and sustainable use of resources. Focusing on recognition of the true origin of natural resources and sustainable technological practices enables improved conservation and supporting of local welfare whilst developing new technologies garnering profit for the industry.<sup>170</sup> Before the establishment of access and benefit sharing concept, there were numerous precedents for widespread commodification of traditional knowledge resources, especially by European colonialists who refused to acknowledge the true origin of their products resulting in one of the first cases of biopiracy.<sup>171</sup> This paradigm follows the notion that, to ensure the justness of IP rights, it is necessary to reflect the legitimate interests of innovators, consumers, investors and producers (indigenous communities and traditional knowledge holders) equally yet paying increased attention to the acknowledgement of historically marginalised indigenous groups, which are largely disregarded by the market.<sup>172</sup> Similarly to licensing agreements, bearing in mind that in many cases the parties are in a power imbalance, there are various requirements for the practical implementation of the access and benefit sharing agreements, to ensure a fair cooperation. Most notably – “prior informed consent” and “mutually agreed terms” were the key concepts in the Nagoya Protocol under the Convention on Biological Diversity. Moreover, the Protocol ensured that there is no ambiguity in what benefits meant, further emphasising the intentional nature of this policy framework. The Annex of the protocol contains a non-exclusive list of both monetary and non-monetary benefits, including license fees, co-ownership rights, sharing of research and

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<sup>169</sup> Secretariat of the Convention on Biological Diversity (2010), *Convention on Biological Diversity: ABS. Introduction to Access and Benefit-Sharing*, p. 2, Available on: <https://www.cbd.int/abs/infokit/all-files-en.pdf>

<sup>170</sup> Wynberg, R. (2023), 4. *Benefit Sharing and Biodiversity Commodification in Southern Africa: A failed approach for social justice, equity, and conservation?*. In M. Bollig, A. Mosimane, R. Nghitevelekwa, S. Lendelvo (Eds.), *Conservation, Markets & the Environment in Southern and Eastern Africa: Commodifying the 'Wild'*, Boydell and Brewer, pp. 80-82, <https://doi.org/10.1515/9781800106642-008>

<sup>171</sup> Lavelle, J.-J. (2023), 6. *Towards Pro-poor or Pro-profit? The governance framework for harvesting and trade of devil's claw (Harpagophytum spp.) in the Zambezi Region, Namibia*, In M. Bollig, A. Mosimane, R. Nghitevelekwa, & S. Lendelvo(Eds.), *Conservation, Markets & the Environment in Southern and Eastern Africa: Commodifying the 'Wild'*, Boydell and Brewer, p. 139, <https://doi.org/10.1515/9781800106642-010>

<sup>172</sup> Lever, *supra* Note 88, p. 218

development results, institutional capacity-building, training programmes and so forth.<sup>173</sup> These requirements further clarified that a performative participation of the indigenous and local communities in research and development done by a prosperous country in their community, for example, as is quite popular, by using them as faces of the project in the promotional material, is not enough. Their involvement has to be effective, including the right of the community to partake in the decision-making process – clearly supporting the procedural and recognition tenets of the just transition – especially if the resources in question are considered to be traditional knowledge. Being granted “prior informed consent” and negotiating on “mutually agreed terms” ensures trust, mutual understanding and good relations between the developers and local communities, which inarguably enhances the efficacy of such access and benefit sharing agreements.<sup>174</sup> Even though this regime is quite clearly based on the commodification of natural resources and traditional knowledge by facilitating market exchange (in contrast with other climate legislation, for example the ones under the UNFCCC regime), the contracting parties of CBD were intentional in underlining the commitments to make sure that the importance of just and equitable resource sharing is not just a fleeting thought, but a primary consideration in access and benefit sharing agreements.<sup>175</sup>

The first mention of the concept of benefit sharing was expressed in the Convention on Biological Diversity (CBD) in 1992, coinciding with the discovery of lucrative commercial opportunities in the pharmaceutical and biotechnology industries due to rapid development of science and technology alas, with the impending threat of loss of biodiversity facilitating the discourse on cultural and environmental rights of the indigenous peoples.<sup>176</sup> In fact, during the negotiation process of the Convention, the typically sidelined countries from the Global South formed a strong alliance for the establishment of bilateral contracts and benefit sharing agreements to regulate bioprospecting and trade of natural resources. They used their leverage as the main

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<sup>173</sup> Secretariat of the Pacific Regional Environment Programme (SPREP) (2022), *Annex 3: Key Terms in Access and Benefit-Sharing Arrangements*, *Pacific Access and Benefit-Sharing (ABS): Implementation Guidelines*, SPREP, pp. 29-31, Available on: [https://www.sprep.org/sites/default/files/ExecBoardMeeting/2022/Eng/WP\\_9\\_2\\_2\\_Att\\_1\\_ABS\\_Guidelines.pdf](https://www.sprep.org/sites/default/files/ExecBoardMeeting/2022/Eng/WP_9_2_2_Att_1_ABS_Guidelines.pdf)

<sup>174</sup> Gupta, M. (2021), *Right of Indigenous Communities to Prior Informed Consent under Article 7 of the Nagoya Protocol and a Comparative Analysis of Its Implementation by India and Bhutan*, *International Journal on Minority and Group Rights*, 28(1), pp. 44-45, <https://doi.org/10.1163/15718115-bja10003>

<sup>175</sup> Barpujari, I., Sarma, U.K. (2017), *Traditional Knowledge in the Time of Neo-Liberalism: Access and Benefit-Sharing Regimes in India and Bhutan*, *International Indigenous Policy Journal*, 8(1), p. 15, <https://doi.org/10.18584/iipj.2017.8.1.3>

<sup>176</sup> Wynberg, *supra* Note 170, p. 79

repositories of biodiversity to push for technological transfer from developed countries to compensate traditional knowledge holders and boost their economies.<sup>177</sup> Fair and equitable sharing of benefits arising from genetic resources including granting access to and providing appropriate technology transfer to utilise such resources whilst recognising rights over these resources is the primary objective of the Convention.<sup>178</sup> The Convention is very clear that biological resources are to be viewed as the intellectual property of a sovereign state, simultaneously encouraging not only innovation diffusion, but also preservation of traditional knowledge and practices of indigenous communities and formally extend the notion that life forms are protected by intellectual property rights.<sup>179</sup> Moreover, Art. 16 of CBD sets out the obligation of the parties to grant access to and transfer technologies on favourable terms to developing countries. This, yet again, exemplifies the major importance that governments have found in sharing intellectual property, especially in the sustainability sector, to ensure not only quicker, but also more just environmentally transition. Provisions such as these are at the core of incentivising non-commercial research, which might not reap financial benefits, however, result in much wider collaboration with and capacity-building in the developing countries.<sup>180</sup> Arguably, the most impactful provision of the CBD is the long-awaited recognition of the sovereign right of states over their natural resources.

The Convention served as a great catalyst for bringing light to the notion of access and benefit-sharing and paved the way for a legally binding international agreement that enforced the practical implementation of the fair and equitable benefit-sharing from genetic resources and traditional knowledge, namely the Nagoya Protocol of 2010. The Nagoya Protocol put concrete framework on the procedure for gaining access to genetic material including the requirement for “mutually agreed terms” and the obtainment of “prior informed consent”.<sup>181</sup> Art. 5 states that Parties have to take national legislative, administrative or policy measures to ensure that benefits arising from the use of genetically resources are shared equitably based on “mutually agreed terms”.<sup>182</sup> The concept of “mutually agreed terms” implies that there is an expectation to negotiate

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<sup>177</sup> *ibid* pp. 79-80

<sup>178</sup> Convention on Biological Diversity, *supra* Note 67, Art. 1

<sup>179</sup> Boisvert, V., Caron, A. (2002), *The Convention on Biological Diversity: An Institutionalist Perspective of the Debates*, Journal of Economic Issues, 36(1), p. 152, <https://doi.org/10.1080/00213624.2002.11506447>

<sup>180</sup> Jojan, A., Dsouza, S., et al. (2018), *Critiquing Narrow Critiques of Convention on Biological Diversity*, Economic and Political Weekly, 53(44), p. 17, <https://www.jstor.org/stable/26703632>

<sup>181</sup> World Health Organization (2021), *The Public Health Implications of Implementation of the Nagoya Protocol: Report by the Director-General*, EB148/21, p. 2, Available on: [https://apps.who.int/gb/ebwha/pdf\\_files/EB148/B148\\_21-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/EB148/B148_21-en.pdf)

<sup>182</sup> Nagoya Protocol, *supra* Note 71, Art. 5

with the local communities on the ways in which the biological resources would be acquired and utilised, which is a direct juxtaposition for the previously established practice of (i) carrying out exploratory missions, (ii) scavenging for natural resources in developing countries and (iii) later exporting them for commercialisation in the developed world.<sup>183</sup> This further clarifies the practical implications of access and benefit sharing mechanism and creates a robust procedural framework to ensure fairness in sustainable development. Furthermore, Art. 6 of the Protocol states that the utilisation of genetic resources shall be subject to “prior informed consent” of the Party providing resources and, where there is a domestic legislation establishing their right over said resources, it shall seek additional “prior informed consent” and involvement of the local indigenous communities.<sup>184</sup> This provision is a bit murky as it vests the power of giving consent for the utilisation of resources to the member state, not to the specific indigenous communities themselves, unless they have established legal status. This shows a clear example of the epistemic injustices that persist in sustainable development as in most cases, the communities are in fact not involved in the decision-making process as they often lack the knowledge or capabilities to formalise their status as separate legal entities. It is quite clear that to enter into negotiations there must be representation for each respective party. This is where the provision becomes slightly out of touch. If we think of local communities and indigenous peoples, they are usually a group of people that co-habit a specific territory, within a country, under an established social contract, which, more often than not, is in the form of non-codified customary law. Of course, usually, there are hierarchal structures in such communities, but the fact that most of the time there are no organized legal entities significantly hinders not only successful participation in the negotiation process, but also attribution and obtainment of benefits arising from access and benefit-sharing agreements. In fact, as supported by Chief of the Development Law Service of the Food and Agriculture Organization of the United Nations, B. Kuemlangan, currently the lack of legal status of local communities is the biggest reason of why access and benefit sharing mechanisms, and traditional knowledge protection in general, are not being utilised to their full potential. When asked what the most successful approach to ensure a just and sustainable protection of indigenous practices and traditional knowledge is, he responded that communities should mobilise and

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<sup>183</sup> Muzan, A.M. (2017), *Some Insights on the Legal Measures for Access and Benefit Sharing of Genetic Resources in Nigeria*, Law and Politics in Africa, Asia and Latin America, 50(1), p. 39, <https://doi.org/10.5771/0506-7286-2017-1-30>

<sup>184</sup> Nagoya Protocol, *supra* Note 71, Art. 6

organize themselves to attain a formally recognised status, which will increase their efficacy and give them voice that will be listened to.<sup>185</sup> Great examples of such mobilisation are the Amazonian communities in Brazil, fishery communities in the Pacific as well as farmers in South East Asia. These representation issues are further underlined by the compliance provisions of the Nagoya Protocol, namely, Arts. 15 - 18. Even though these articles stipulate the responsibility of the state to ensure that resources have been accessed with prior informed consent and on mutually agreed terms as well as address any non-compliance with these requirements, only Art. 16, focusing on traditional knowledge associated with domestic resources, explicitly mentions the requirement to involve local indigenous communities.<sup>186</sup> The clear focus on keeping sovereignty of states, thus leaving all matters of indigenous peoples knowledge up to states discretion, does a disservice to the local communities as they are still underrepresented in negotiations and overall access and benefit-sharing processes. This shows that even the most holistic environmental legislations often overlook the marginalised communities, which are usually the most affected by the issues such laws are meant to solve.<sup>187</sup> In general, the international law on access and benefit sharing does not give the necessary recognition and legitimacy to the indigenous people as is required by the three tenets of just sustainable transition. Even though the Nagoya protocol is a good improvement of the previously existing regulations, its ambiguous wording ends up vesting too much power in states allowing them to further marginalise the non-formal institutions of indigenous communities.<sup>188</sup> It is imperative to work on ensuring a real and effective participation of local communities in the access and benefit-sharing processes in both national and international level, thus achieving the protection of their rights fully and, consequently, being more successful in achieving the conservations goals of the Convention and the Nagoya Protocol.<sup>189</sup>

As mentioned before, traditional knowledge is an important and arguably the most discussed concept under the access and benefit mechanism. Due to the often non-attributable and customs-based nature of traditional knowledge, it is very difficult to regulate it with legal

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<sup>185</sup> Interview with B. Kuemlangan, Conducted on 17<sup>th</sup> December, 2025

<sup>186</sup> Nagoya Protocol, *supra* Note 71, Art. 16

<sup>187</sup> Teran, M.Y. (2016), *The Nagoya Protocol and Indigenous Peoples*, International Indigenous Policy Journal, 7(2), p. 15, <https://doi.org/10.18584/iipj.2016.7.2.6>

<sup>188</sup> Koutouki, K., Rogalla von Bieberstein, K. (2012), *The Nagoya Protocol: Sustainable Access and Benefits-Sharing for Indigenous and Local Communities*, Vermont Journal of Environmental Law, 13(3), p. 533, <https://doi.org/10.2307/vermjenvilaw.13.3.513>

<sup>189</sup> Arjjumend, H. et al. (2017), *The Space For Indigenous Peoples And Local Communities: Participation in Policymaking and Benefit-sharing Negotiations*, World Affairs: The Journal of International Issues, 21(4), pp. 69, 71, <https://doi.org/10.5958/2456-8023.2018.00005.0>

instruments. For example, when traditional intellectual property rights mechanisms are applied to indigenous knowledge, it does not protect their claims over the use, transmission and profit of such knowledge as these rights are attributed to the State in whose territory the indigenous community is based. Often, through ambiguously worded and questionable access and benefit-sharing agreements, Western countries patent monetizable properties of an indigenous plant used in traditional medicine and subsequently exclude the indigenous community that discovered these properties from using this plant.<sup>190</sup> A good way to ensure some semblance of fairness and justness in access and benefit-sharing is to establish community protocols, which set out the procedure to be followed when engaging with the community that holds the rights to the traditional knowledge. For example, in Panama, the indigenous community of Guna Yala, which was recognised as autonomous indigenous community within a province (*comarca*) in 1953, is self-governed by two congresses – the General Congress of Guna Culture and Guna General Congress. The latter consists of delegates and one chief of each smaller community and participate in collective decision-making on matters related to their province.<sup>191</sup> Moreover, pursuant to the Panamanian Law “On the Special Intellectual Property Regime Governing the Collective Rights of Indigenous Peoples for the Protection and Defence of their Cultural Identity and their Traditional Knowledge and Enacting Other Provisions”, all expressions of traditional nature, including designs, biological material and symbols, are protected by a special registration system in the Department of Collective Rights and Folkloric Expressions of the Directorate General of the Industrial Property Registry (DIGERPI) under the supervision of the Ministry of Commerce and Industries.<sup>192</sup> In 2006, Dobbo Yala Foundation published a document titled “Kuna Knowledge, Biodiversity and Intellectual Property”, which set out guidelines that must be followed by persons intending to acquire traditional knowledge and established the rule that access to collective traditional knowledge shall be granted only after permitted by the two congresses of Guna Yala.<sup>193</sup> Even though these guidelines are not legally binding, they are adhered to, but, most importantly, show that indigenous communities are able to govern their cultural processes and traditional knowledge

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<sup>190</sup> San Martin, *supra* Note 86, p. 219

<sup>191</sup> Foyer, J., Martinez Mauri, M., et al. (2024), *The Institutionalisation of Bioculturalism through Community Protocols: The Case of Guna Yala*, *The International Indigenous Policy Journal*, 15(1), p. 2, <https://doi.org/10.18584/iipj.2024.15.1.15872>

<sup>192</sup> Law No. 20 of June 26, 2000, *on Special System for the Collective Intellectual Property Rights of Indigenous Peoples for the Protection and Defence of their Cultural Identity and their Traditional Knowledge*, Panama, Arts. 2, 4

<sup>193</sup> Foyer, *supra* Note 191, p. 15

independently, provided that the overall legislative environment in the country has established robust legal framework for protecting traditional knowledge and vesting final decision making in the hands of the indigenous communities themselves. Under the Nagoya Protocol, the regulation of protection of indigenous knowledge is left at the hands of domestic legislators, which often can promulgate the inequalities. However, there are examples where these national legislations are robust enough that they indeed protect the local communities. One such example is the Biodiversity Act of Bhutan (2022). A good example of national legislation that regulates the proper procedure of acquiring “prior informed consent” and ensuring community representation is the Bhutan Biodiversity Act of 2022, which stipulates that access to biological resources and traditional knowledge associated with them is subject to “prior informed consent” of the supervisory authority in Bhutan. However, in case of traditional knowledge, the authority is required to obtain the same level of consent from the holders of traditional knowledge, thus giving the indigenous communities the right to either agree or reject such access.<sup>194</sup> Moreover, the Act establishes a priority to support and promote communities to develop community protocols on traditional knowledge<sup>195</sup>, as well as provides concrete procedure for entering into access and benefit-sharing agreements, including material transfer agreements.<sup>196</sup> The monetary benefits arising from such agreements, shall be channelled into the Bhutan Access and Benefit Sharing Fund, which is used to finance the conservation and sustainable use of Bhutan's biodiversity and/or traditional knowledge as well as to enhance local livelihoods.<sup>197</sup> Similarly to Panama, Bhutan has established a supervisory authority that manages all matters related to access and benefit-sharing and traditional knowledge and genetic resources, the National Focal Point.<sup>198</sup> This further codifies the traditional knowledge of the indigenous communities of Bhutan and provides the necessary managerial and administrative expertise to successfully manage the rights over traditional knowledge of the indigenous peoples.

In the absence of robust national legislations that essentially transpose the Nagoya Protocol with slight tweaks to fit the domestic system, there is a real threat that biopiracy practices will prevail. Arguably, the most famous case of biopiracy is the *Hoodia gordonii* case. This case

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<sup>194</sup> Biodiversity Act of Bhutan, 2022, (2022, July 15), Section 66

<sup>195</sup> *ibid* Section 108

<sup>196</sup> *ibid* Section 85-88, 91-93

<sup>197</sup> *ibid* Chapter 7 and Section 130

<sup>198</sup> *ibid* Section 17

concerns a succulent which was first researched in the 1960s and discovered to have appetite and thirst subsiding properties by the South-African state-funded Council for Scientific and Industrial Research (CSIR). The plant had historically been used by the indigenous San community in South Africa for staving off hunger and thirst.<sup>199</sup> This discovery was patented by the South African Council for Scientific and Industrial Research in 1997. Afterwards, they tried to pitch this patent to several pharmaceutical companies such as Pfizer to develop a weight-loss drug. The patent was also licensed to Unilever to produce a diet drink. Of course, these deals were not communicated to the San community and they discovered that their knowledge had been patented only in 2001, which, together with media scrutiny and increased political pressure, prompted the Council to negotiate with the South African San Council to enter into a benefit sharing agreement.<sup>200</sup> This agreement, concluded in 2003, went down in history as the first ever benefit sharing agreement in South African history. The terms of the agreement stipulated that the San Council shall receive 6% of all royalties received from Phytopharm as a result of any commercialisation of the *Hoodia* patent, as well as 8% of all milestone income Council for Scientific and Industrial Research received from Phytopharm on the condition of them meeting performance targets. The money received was to be paid into a joint trust managed by the South African San Council and the CSIR to increase the welfare of the San peoples. This agreement, however, did not entail the San people receiving any co-ownership rights of the patent and prohibited them to enter into other licensing agreements or cooperating in research and development activities with market competitors to create a substitute invention.<sup>201</sup> Taking into account the fact that the San community spans across multiple South African countries including Namibia, Angola, the Republic of South Africa and Botswana, the fund was set to be distributed proportionally between the respective indigenous communities and the San tribes formed a council to enter into negotiations for a benefit-sharing agreement between themselves. This in turn triggered the transboundary effect set out in Art. 10 of the Nagoya Protocol concerning multilateral benefit-sharing mechanisms for the utilisation of

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<sup>199</sup> Greiner, C., Bollig, M. (2023), 2. *Fetishising the 'Wild': Conservation, commodities, and capitalism*. In M. Bollig, A. Mosimane, R. Nghitevelekwa, S. Lendelvo, M. Bollig, A. Mosimane, R. Nghitevelekwa, S. Lendelvo, L. Lacan, L. Kalvelage, C. Greiner, J. Revilla-Diez, C. Hulke, S. Ndwandwe, J. Lavelle, E. Kioko, H. Vehrs, R. Wynberg, L. Hewitson, S. Lendelwo, C. Fabiano, M. Angula, K. Matengu, J. Mbaiwa, J. Dittmann, L. Lenhart, I. Waziri, S. Sullivan, M. Shapi, D. Müller-Mahn, S. Kosmas & M. Kinyanjui (Ed.), *Conservation, Markets & the Environment in Southern and Eastern Africa: Commodifying the 'Wild'*, Boydell & Brewer, p. 36, <https://doi.org/10.1515/9781800106642-006>

<sup>200</sup> Lever, *supra* Note 88, p. 88

<sup>201</sup> Wynberg, R. (2017), 4.6. *Bioprospecting: Moving Beyond Benefit Sharing*, Global Africa: Into the Twenty-First Century, University of California Press, p. 299, <https://doi.org/10.1525/9780520962514-032>

traditional knowledge in an *in situ* transboundary situation, where the special characteristics of genetic resources and traditional knowledge are found across borders in natural circumstances.<sup>202</sup> The *Hoodia* case prompted the South African government to enact the Biodiversity Act of 2004 and subsequently establish specific access and benefit-sharing regulations in 2008.

### 2.2.2. Compulsory Licensing

The final licensing mechanism relevant for this paper is compulsory licensing. This mechanism authorises the use of a patented invention without patent holder's consent in cases where such invention is necessary for improving access to essential medicines. As obvious from the name, this is a non-voluntary licensing agreement enforced by the government between the patent holder and a third party, usually, a state.<sup>203</sup> For example, after the 11<sup>th</sup> of September attacks, the US perceived a terror threat, thus wanted to stockpile an antidote for the chemical agent Anthrax. However, its main producer Bayer was not budging in decreasing the licensing fees for the drug. Consequently, the US, together with their Canadian counterparts, threatened Bayer that they will issue a compulsory license, leveraging this mechanism to push Bayer to reduce the price of the drug, which worked.<sup>204</sup> However, this success story should not be taken to mean that all compulsory licensing is successful. In fact, this practice is not often used due to possible retaliation from the patent holders, including, but not limited to, sanctions and defamation campaigns as well as the generally high legal and administrative costs for the government that issued a compulsory patent (as the burden of proof in these cases is immense). From 2001 to 2023 there were only 45 cases of successful compulsory licensing.<sup>205</sup>

The main legislative instrument regulating compulsory licensing is the Trade-Related Aspects of Intellectual Property (TRIPS Agreement), signed in 1994 during the fourth and final round of Uruguay round of international trade negotiations, as part of the Marrakesh Agreement Establishing the World Trade Organization, which came into force on the 1<sup>st</sup> of January 1995.<sup>206</sup>

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<sup>202</sup> Turner, *supra* Note 141, p. 201

<sup>203</sup> Stavropoulou, C., Valletti, T. (2015), *Compulsory Licensing and Access to Drugs*, The European Journal of Health Economics, 16(1), p. 83, <https://doi.org/10.1007/s10198-013-0556-2>

<sup>204</sup> Ooms, G., Hanefeld, J. (2019), *Threat of Compulsory Licences Could Increase Access to Essential Medicines*, BMJ: British Medical Journal, 365, p. 3, <https://doi.org/10.1136/bmj.l2098>

<sup>205</sup> Qunaj, L., Kaltenboeck, A., Back, P. B. (2022), *Compulsory Licensing of Pharmaceuticals in High-Income Countries: A Comparative Analysis*, The Milbank Quarterly, 100(1), p. 290, <https://doi.org/10.1111/1468-0009.12557>

<sup>206</sup> TRIPS Agreement, *supra* Note 44

According to Article 31 of TRIPS, the party seeking compulsory license should prove that (i) they have not been able to acquire a voluntary license from the patent holder on “reasonable commercial terms”<sup>207</sup>, (ii) once the compulsory license has been issued, the licensee shall adequate remuneration to the patent holder<sup>208</sup> and (iii) compulsory license can primarily be used only in the domestic market.<sup>209</sup> The compulsory licensing provision is widely regarded as a TRIPS flexibility and is intended to serve as a safety net for countries when domestic situations, such as health emergencies, are too dire to comply with the TRIPS provisions. This could prove to be a crucial policy tool, especially for less developed countries, to avoid ending up in public health emergencies based on the fact that they cannot afford patented medicines due to their exorbitant prices, of course, with the caveat, that developed countries and big pharmaceutical companies do not put up insurmountable resistance.<sup>210</sup> The huge impact and public uproar about the persistent HIV/AIDS crisis at the end of the 20th century, was the major catalyst for the WTO Members to adopt the Doha Declaration on the TRIPS Agreement and Public Health in November 2001. The Declaration clarified that compulsory licensing and parallel importing were permissible under TRIPS and acknowledged the difficulty faced by countries without domestic pharmaceutical manufacturing capacity in effectively using compulsory licensing. This prompted further work (eventually leading to the Paragraph 6 flexibility and the Article 31bis amendment) to facilitate exports to such countries.<sup>211</sup> In particular, the paragraph 6 of the Doha Declaration acknowledged that some WTO members may lack sufficient manufacturing capabilities to make effective use of the TRIPS flexibilities under Art. 31 and set out the aim for the TRIPS Council to find a solution for making effective use of compulsory licensing.<sup>212</sup> Moreover, pursuant to the support mechanisms set out in Art. 66 of TRIPS Agreement on technology transfer to least-developed countries as well as the extension of the transition period for least-developed countries for the implementation of the TRIPS Agreement, the Doha Declaration provided for the same derogations in regard to access to pharmaceutical products to combat the public health crises in these countries.<sup>213</sup> Initially the transition period was set to expire in 2016, however, after a request

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<sup>207</sup> *ibid* Art. 31(b)

<sup>208</sup> *ibid* Art. 31(h)

<sup>209</sup> *ibid* Art. 31(f)

<sup>210</sup> Bond, E.W., Saggi, K. (2018), *Compulsory Licensing and Patent Protection: A North-South Perspective*, The Economic Journal, 128(610), pp. 1175-1176, <https://doi.org/10.1111/eoj.12434>

<sup>211</sup> Ooms, *supra* Note 204, p. 2

<sup>212</sup> Doha Declaration, *supra* Note 43, § 6

<sup>213</sup> *ibid* § 7

submitted by Bangladesh on behalf of least-developed members of the TRIPS Agreement in February 2015, citing extreme vulnerability and disproportionate exposition to health risks associated with poverty and the high costs of antiretroviral therapy for HIV medication<sup>214</sup>, the period was extended to 2033 upon the WTO Councils decision of 6<sup>th</sup> November 2015.<sup>215</sup> These derogations successfully addressed the inequalities, limiting the use of compulsory licensing by least-developed countries as they were not capable to effectively implement this mechanism due to insufficient of financial resources, ineffective legal infrastructure and sheer lack of technological advancements.<sup>216</sup>

Another practice to avoid paying exorbitant licensing fees without infringing intellectual property rights is parallel importing. This method entails importing genuine products that have been placed on the market by the patent holder or a license holder in a different country without notifying the patent holder. This allows the importing country to release necessary medicines in the domestic market which, as often is the case in developing countries, would not otherwise be possible due to insufficient monetary resources.<sup>217</sup> However, this practice can also be used as leverage point for negotiating a lower price for needed medicines. This measure is possible due to a small loophole in the TRIPS Agreement that allows WTO member states to establish their own laws for the exhaustion of intellectual property rights.<sup>218</sup> In regard to the negotiations, this practice creates an arbitrage possibility for the least developing countries to export the non-voluntary license product, which has a lower price than the patented product, to markets where the price of the product is higher, thus gaining a competitive advantage and forcing the patent holder to lower the price of the product, creating a type of international trade spillover effect. This is entirely legal and does not breach the TRIPS agreement as Art. 31(f) does not forbid the use of the non-voluntary licensed product being used in other markets, it just states that it should *mainly* be used in the

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<sup>214</sup> Communication from Bangladesh on behalf of the LDC Group (2015), *Request For An Extension Of The Transitional Period Under Article 66.1 Of The Trips Agreement For Least Developed Country Members With Respect To Pharmaceutical Products And For Waivers From The Obligation Of Articles 70.8 And 70.9 Of The Trips Agreement*, 23 February 2015, IP/C/W/605, §§ 1-3

<sup>215</sup> Decision Of The Council For TRIPS Of 6 November 2015, *Extension Of The Transition Period Under Article 66.1 Of The Trips Agreement For Least Developed Country Members For Certain Obligations With Respect To Pharmaceutical Products*, IP/C/73, § 1

<sup>216</sup> McGivern, L. (2023), *Trade-Related Aspects of Intellectual Property Rights Flexibilities and Public Health: Implementation of Compulsory Licensing Provisions into National Patent Legislation*, The Milbank Quarterly, 101(4), p. 1297, <https://doi.org/10.1111/1468-0009.12669>

<sup>217</sup> World Health Organization (2017), *Access to Essential Medicines, TRIPS and the Patent System, Advancing the Right to Health: The Vital Role of Law*, pp. 238-239, ISBN: 978 92 4 151138 4

<sup>218</sup> TRIPS Agreement, *supra* Note 44, Art. 6

domestic market. In fact, this practice has also been adjudicated on the EU level in *GlaxoSmithKline v. Commission* where at the Court of first instance of the European Union held that agreements prohibiting parallel trade must be regarded as preventing and restricting competition as the loss of efficiency and possible loss of profit for the drug manufacturer does not outweigh the pro-competitive nature of parallel trade and its effects on consumer welfare.<sup>219</sup> Another example of parallel trade being permitted under national law is Kenya's intellectual property law, which was amended in 2001 and precludes that patent rights granted in a foreign country and imported into Kenya do not extend to their domestic market,<sup>220</sup> which confirms to the international principle of exhaustion, which allow parallel import of medicines from any country where they are for sale.

Compulsory licensing, even though not too common, is still employed by several developing countries. One of the most prolific users of compulsory licensing in Thailand, which has used this provision to both import generic versions of medicines from countries where they are not patented, as well as to use patented technology to produce pharmaceuticals locally. The first compulsory license announced by the Thai Ministry of Public Health in 2006 concerned the antiretroviral medicine Efavirenz, which pharmaceutical company Merck holds a patent for. In a few months, over 60 thousand items of the generic version of the drug were imported from India. This practice was continued and various different medicines from different countries were imported to Thailand to fight diseases such as cancer. Famously, in one instance, upon being notified about the issuance of a compulsory license for a cancer medication, its patent holder Novartis actually decided to offer the drug to country for free to avoid the granting of compulsory license. On the other hand, Abbot, a notoriously bad-tempered company, decided to completely withdraw their products from the Thai market on the grounds that they had used Abbot's patented technology to manufacture a HIV pharmaceutical and exported it.<sup>221</sup> It is important to mention that under Paragraph 6 of Doha Declaration, compulsory licensing can be done not only by the country that needs certain medicine itself, but also on behalf of it, for example in cases where the importing country lacks the technological capabilities to produce and import the drug itself.. This is precisely

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<sup>219</sup> Case T-168/01, *GlaxoSmithKline Services Unlimited v Commission of the European Communities*, ECLI:EU:T:2006:265 (Ct. First Instance Sept. 27, 2006), §§ 190-192

<sup>220</sup> Industrial Property Act, No. 3 of 2001 (2001), National Council for Law Reporting, Art. 58(2), Available on: [https://www.kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/IndustrialPropertyAct\\_No3of2001.pdf](https://www.kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/IndustrialPropertyAct_No3of2001.pdf)

<sup>221</sup> Stavropoulou, *supra* Note 203, p. 85

what happened in the case of Apo TriAvir import in Rwanda. Initially, in the spring of 2007, the WTO received a notification from Rwanda that it intends to import 260 thousand packs of the HIV medication Apo TriAvir under the Paragraph 6 of the Doha Declaration. On October 7<sup>th</sup>, 2007, Canada submitted an official notification to the WTO regarding a bilateral agreement struck with the Rwandan government aiming to produce generic version of Apo TriAvir via a compulsory license and export it to Rwanda to aid in the fight against the burgeoning HIV/AIDS epidemic. More importantly, this was not just a simple patented drug, but, in fact, consisted of three different patented HIV drugs.<sup>222</sup> This case served as a beacon of hope for multiple least developed countries, no less because it was unanimously supported by all the WTO member states, as well as human rights activists, as it set a precedent for the possibility of using the Paragraph 6 system to its full potential, and significantly reduced the previously perceived limitations of the derogations for developing countries that do not have the technological or financial capabilities to produce or import the drugs themselves.

### 2.3. Commons in Innovation Governance

By now, it is clear that stringent intellectual property rights systems are very duplicitous. From one side, they boost competition and innovation in the market, but, from the other side, their exclusionary nature inhibits the diffusion of much needed technologies and limit access to them, especially in developing countries that are experiencing the most detrimental effects of climate change. According to Boyle, consumers are actually the ones most often disadvantaged by existing intellectual property regimes, even in prosperous states.<sup>223</sup> Even though patenting has facilitated the creation of truly significant knowledge and technologies, it has also made them inaccessible to a large part of the global population. The most awful thing about this is that the majority of population does not suffer from the natural threats to their wellbeing, alas they are directly impacted by the harms imposed on them by the existing systemic injustices that persist in the modern world and often result in even their most basic human needs not being fulfilled.<sup>224</sup> The

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<sup>222</sup> Cotter, C. (2008), *The Implications of Rwanda's Paragraph 6 Agreement with Canada for Other Developing Countries*, Loyola University Chicago International Law Review, 5(2), p. 177, <https://lawcommons.luc.edu/lucilr/vol5/iss2/5>

<sup>223</sup> Boyle, J. (2008), *The Public Domain: Enclosing the Commons of the Mind*, Yale University Press, p. 68, ISBN: 978-0-300-13740-8

<sup>224</sup> Pogge, T. (2006), *World Poverty and Human Rights*, Ethics & International Affairs, 19(1), p. 3, <https://doi.org/10.1111/j.1747-7093.2005.tb00484.x>

globally enforced intellectual property regimes are essentially built on powerful actors trying to impose their interests and existing Western regimes against the less powerful nations, often in conflict by the global priorities and cannons they have subscribed themselves to adhere to, for example incentivising the diffusion of sustainable technologies in developing countries. This power play has systematically and for too long of a time excluded the much-needed opposing parties from ever difficult climate policy negotiations.<sup>225</sup> For these exact reasons, in the following passages, I will try, humbly and to the best of my ability, to convince you that if we looked at intellectual property and knowledge as a shared good and common heritage, we could, possibly, attain all of our intended sustainability goals much faster and without compromising the fiduciary duties of us as applied policy researchers.

### **2.3.1. Open Licensing**

According to Chesbrough, open innovation describes a process of innovation process via management of knowledge flows across organisations boundaries. This can include inflowing knowledge, outflowing knowledge or a combination of both.<sup>226</sup> The efficiencies of open innovation have been widely researched, specifically looking at whether external knowledge sources can be combined with internal knowledge and later commercialised by creating new technologies or products.<sup>227</sup> This approach has also been used in form of open licensing where technology patents and R&D processes have been provided in an open access format, without requesting a licensing fee. There usually are terms and conditions for using the patented knowledge, for example, limitations in application for commercial use as well as requirement to provide acknowledgment for the patent owner.<sup>228</sup> Another important characteristic is that they operate on a voluntary basis and usually are initiated by companies in the same industry who are willing to collectively share their patented technology. Open licensing can also be looked at from a strategic point of view, namely, if there is a company that is either not able or willing to patent an invention. They can then

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<sup>225</sup> Lever, *supra* Note 88, p. 220

<sup>226</sup> Chesbrough, H., Bogers, M. (2014), *Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation*, In Henry Chesbrough, Wim Vanhaverbeke, and Joel West (eds), *New Frontiers in Open Innovation*, Oxford, Oxford University Press, p. 17, <https://doi.org/10.1093/acprof:oso/9780199682461.003.0001>

<sup>227</sup> Aliasghar, O., Un, C.A., et al. (2025), *Foreign and Domestic University Collaboration for Outbound Open Innovation*, *Journal of International Management*, 31(2), p. 3, <https://doi.org/10.1016/j.intman.2025.101232>

<sup>228</sup> Jaspars, M., Brown, A. E. L. (2021), *"Chapter 6 Benefit Sharing: Combining Intellectual Property, Trade Secrets, Science and an Ecosystem-Focused Approach"*, In *Marine Biodiversity of Areas beyond National Jurisdiction*, Brill, p. 221, [https://doi.org/10.1163/9789004422438\\_007](https://doi.org/10.1163/9789004422438_007)

use strategic disclosure to publish the invention, thus allowing free access to it. Naturally, competitors will be able to use this non-patented invention, however, that does not preclude the inventor to use it as well.<sup>229</sup> This could be especially important where a company has carried out an extensive R&D project and found many new technologies, however, some of them are non-utilisable in their business processes. Instead of carrying out exclusionary strategies, such as creating sleeping patents or blocking patents, they could establish an open licensing platform where these technologies could be used by other companies and boost the technological progress in their entire industry, thus, potentially, finding ways in which the non-patented technology could actually be used. Clearly, this would be a very hard pitch to give to companies taking into account their profit centred logics, however, with intellectual property legislations becoming increasingly lenient and the increasing consumer preference for commercially responsible and sustainability focused companies, this might prove to be an effective promotional campaign. In fact, open licensing can be looked at as a slightly socialist form of patent pools. The similarities are clear – (i) bundling of different technologies by different companies, (ii) on a common platform, (iii) to increase the possibility of creating new technologies and (iv) minimise the risk of encountering a patent thicket. Of course, the biggest caveat would be that these companies would not receive any licensing/royalty fee. If we return to the social responsibility aspect of this concept, currently, especially in the high-tech and biotechnology sectors, there are major barriers of entry that very often discourage any new innovators or entrepreneurs to give their contribution to the industry.<sup>230</sup> This, in turn, has a very real chance of impacting the welfare of consumers and society at large by making them rely on incumbent technology giants to exercise a very high level of self-control in regard to pricing their products and carrying out sustainable technology research and development. One example of industry where incumbents are acting in a predatory manner is the smartphone market. Due to the large number of patented technologies involved in making a smartphone, several industry players have considered joining in a patent pool to allow all participants relatively cheap and easy access to the technologies. However, this pool cashes in on exorbitant fees from everyone else who is not a member, creating a barrier to entry in this market and incumbents enjoy

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<sup>229</sup> Capelli, *supra* Note 113, p. 5

<sup>230</sup> Shapiro, *supra* Note 99, p. 144

a non-rivalled market domination, which, together with charging a higher price for the end-products, causes various concerns of anti-competitive practices.<sup>231</sup>

A famous example of open licensing in the biotechnology sector is the CAMBIA project established by Dr. Richard Jefferson in 1991. CAMBIA is a non-profit organisation whose aim is to democratise innovation in scientific and technology sector through various initiatives and patent transparency. One of the first initiatives within the CAMBIA social enterprise was freely available research and innovation tools provided under open-source licenses.<sup>232</sup> The biggest focus of the project was to enable more efficient scientific progress in the biotechnology sector, especially, taking into account the climate crisis that its founder was awfully aware of, even then. The three-fold structure had the aims to (i) provide transparency in the intellectual property sector, (ii) develop open-access technology accessible to all and (iii) reforming the existing intellectual property system by providing BiOS licenses. One of the pillars of CAMBIA - The Lens, an open-source global scholarly and patent knowledge database - aggregates metadata and text from academic sources, patents and biological sequences, to provide management tools for knowledge sharing and diffusion.<sup>233</sup> As for the open-source licenses part of CAMBIA, to gain access to the BiOS technologies you need to sign a licensing agreement. BiOS licenses have specific terms and conditions that make the practice of open, royalty-free and worldwide licenses sustainable. All participants in the technology sharing under the BiOS license has to adhere to the rules including the following: (i) all licensing agreements are non-exclusive<sup>234</sup>, (ii) the owner of the technology under BiOS patent cannot assert intellectual property rights over the technology or its future improvements against the user of the technology under the BiOS agreement<sup>235</sup>, (iii) all BiOS licensees agree to share any improvements made to the technology and provide them free for use even if patented, to all other BiOS licensees<sup>236</sup>, (iv) participants share data and information about the technology to ensure compliance with requirements imposed on commercial products.<sup>237</sup> The BiOS licensing project served as an open-access and technology sharing mechanism disregarding whether they were patented or not. This was a landmark initiative that showed that commons-

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<sup>231</sup> Shabalala, *supra* Note 91, p. 23

<sup>232</sup> [www.bios.net](http://www.bios.net), Accessed on: 8<sup>th</sup> of January, 2026

<sup>233</sup> [www.about.lens.org](http://www.about.lens.org), Accessed on 8th of January 2026

<sup>234</sup> Section 3.1. of the CAMBIA BiOS Licensing Agreement, Available on: [https://cambia.org/wp-content/uploads/2017/10/BiOS-License-and-Tech-Support-Agreement-version-1\\_5.pdf](https://cambia.org/wp-content/uploads/2017/10/BiOS-License-and-Tech-Support-Agreement-version-1_5.pdf)

<sup>235</sup> *ibid* Section 7.1

<sup>236</sup> *ibid* Section 3.2.

<sup>237</sup> *ibid* Section 5.2.

based approaches can in fact work in favour of innovative practices. These commons allowed for a non-public disclosure among BiOS participants, without any detriment to possible patenting activities of the technology or misappropriation of information by external agents on the basis of confidentiality clauses. The participation in the project did not only mean access to technology but also enabled access to a community of support for all matters concerning the technology under the BiOS license, as well as material transfer agreements covering all components for commercializing the technology acquired through licensed technology.<sup>238</sup>

Even though so far there are no direct international open-licensing systems, the United Nations and the World Intellectual Property Organisation have established various mechanisms to facilitate and provide access to knowledge resources and patent information to developing countries. For example, the Access to Specialized Patent Information (ASPI) program, a public-private partnership between WIPO and patent information providers, academic and research institutions in developing countries can access aggregated data on all patent and licensing information including but not limited to patent information on traditional medicines and generic patent databases.<sup>239</sup> The ASPI programme is supported by the Access to Research for Development and Innovation (ARDI) programme, which provides free access to published scientific and technological works that usually are behind a paywall to local non-profit institutions in least-developed countries.<sup>240</sup> Even though these might be considered miniscule efforts in evening out the inherent imbalance in technological and innovation capabilities, especially on behalf of such stronghold as WIPO, these initiatives do provide much needed access to knowledge almost exclusively to least developed countries, thus helping in bridging the existing knowledge gap and incentivising developing nations to participate more ardently in the development of new sustainable technologies, either unilaterally or in collaboration with their regional partners. Moreover, international initiatives such as WIPO GREEN are a great stepping stone for easing the access to sustainable and green technologies. WIPO GREEN, established in 2013, is an institutional mechanism for incentivising and facilitating technology transactions in the green

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<sup>238</sup> Berthels, N. (2009), *Case 8. CAMBIA's Biological Open Source Initiative (BiOS)*, In G. van Overwalle (Ed.), *Gene Patents and Collaborative Licensing Models: Patent Pools, Clearinghouses, Open Source Models and Liability Regimes*, Cambridge Intellectual Property and Information Law, Cambridge University Press, p. 199, <https://doi.org/10.1017/CBO9780511581182.015>

<sup>239</sup> World Intellectual Property Organization, *ASPI – Specialized Patent Information*, Available on: <https://www.wipo.int/en/web/aspi>

<sup>240</sup> World Intellectual Property Organization, *ARDI – Research for Innovation*, Available on: <https://www.wipo.int/en/web/ardi>

technology sector. Even though it is not an open-license platform, a lot of the technologies within the system are licensed by patent owners or established states on a voluntary basis to less developed countries that lack the technological capabilities to carry out research and development or contain public domain technologies. The platform operates as facilitator and intermediary between patent holders and potential licensees by helping to match technological needs with appropriate patented technologies.<sup>241</sup> According to the director general of the World Intellectual Property Organisation, Daren Tang, in 10 years of activity the platform has covered 130 thousand green technologies from over 140 countries, thus becoming the biggest green technology exchange platform under the UN regime, directly increasing the technological capabilities of developing nations.<sup>242</sup>

### **2.3.2. 'Tis the time to strike: Open Knowledge Commons**

Strong post-colonial intellectual property regime can prove to be detrimental to scientific knowledge and to already small opportunities for intra-industry collaboration in developing countries. The negative effect these regimes have on much needed technology and knowledge transfer between public and private sector in emerging economies cannot be undermined.<sup>243</sup> These inequalities directly correlate with the intergenerational injustices and in combination with the persistent urgency of the climate crisis pose significant doubts about the existing intellectual property rights regimes that, due to their exclusionary nature, often inhibit the innovation and diffusion of green, sustainable technologies in developing and developed countries alike. We simply do not have the time to mess about with theorising on the economic inefficiencies and market effects from more lenient patent protection, as it is of utmost importance to provide and make widely accessible the potentially lifesaving climate change mitigation technologies.<sup>244</sup> Maybe it is time for us to embrace the idea of commons-based approach to knowledge and technology diffusion to ensure that we reach the climate and environmental commitments so many

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<sup>241</sup> Rimmer, M. (2025), *17 Promethean Dreams: Intellectual Property and Climate Change in the Anthropocene*, In L. Reins & A. Zahar (Ed.), *Climate Technology and Law in the Anthropocene*, Bristol University Press, pp. 400-401, <https://doi.org/10.56687/9781529232912-019>

<sup>242</sup> Cullinan, K., *As Climate Crises Loom, WTO Head Urges Developing Countries to Prepare to Use TRIPS Flexibilities*, Health Policy Watch, 15<sup>th</sup> November, 2023, Available on: <https://healthpolicy-watch.news/as-climate-crises-loom-wto-head-urges-developing-countries-to-prepare-to-use-trips-flexibilities/>

<sup>243</sup> Athreye, S., Batsakis, G., Singh, S. (2016), *Local, Global and Internal Knowledge Sourcing: The Trilemma of Foreign-Based R&D Subsidiaries*, Journal of Business Research, 69(12), p. 5697, <https://doi.org/10.1016/j.jbusres.2016.02.043>

<sup>244</sup> Lever, *supra* Note 88, p. 222

countries have agreed to under international treaties such as Paris Agreement, CBD and the Nagoya Protocol. This notion is further supported by influential figures, such as the secretary-general of the United Nations Antonio Guterres, who, in his remarks on the World Meteorological Organization's State of the Global Climate 2021 Report, emphasised that: “*Renewable energy technologies, such as battery storage, must be treated as essential and freely- available global public goods. Removing obstacles to knowledge sharing and technological transfer – including intellectual property constraints – is crucial for a rapid and fair renewable energy transition*”<sup>245</sup>

If done correctly and governed prudently, global knowledge commons, similarly as imagined by Mr. Guterres, will ensure that the possible risks as well as immeasurable benefits from sustainability technology and knowledge sharing are distributed proportionally between all commons participants (read - everyone in the World).<sup>246</sup> If we have managed to reach the point of realising that climate change poses an existential threat to virtually every country in the World, in my humble opinion, it most definitely is the time to go all out and pivot to, initially seemingly extreme, measures such as global open knowledge commons. The co-founder of the Creative Commons movement Dr. J. Boyle, goes even further by stating that trying to solve the issue of access to technologies and ensure a truly just sustainable transition with inherently restrictive mechanisms, including open licensing, increases the dangers of the “anti-commons effects”. He compares these attempts at democratising existing intellectual property regimes to “*attempting to deal with privacy issues by using the idea of personal property rights over data.*” and maintains that licensing, by default, is a manifestly unfit tool for tackling the inequity and disproportionate access to technologies, similarly like trying to substitute a screwdriver with a hammer. The biggest risk, in his opinion, is that by focusing solely on more inclusive and just licensing practices, the efficiency of the whole intellectual property and technology sharing system will be negatively affected and we will end up encountering unintended detrimental consequences.<sup>247</sup>

These presumably extreme opinions are supported by various case studies, specifically ones focusing on the efficiencies of university-private sector partnerships. Studies have found that research and development collaborations between universities and private companies have a

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<sup>245</sup> UNFCCC, “António Guterres: Time to Jump-Start the Renewable Energy Transition”, 18<sup>th</sup> May 2022, Available on: <https://unfccc.int/news/antonio-guterres-time-to-jump-start-the-renewable-energy-transition>

<sup>246</sup> Geary, J., Reay, T., Bubela, T. (2019), *The Impact of Heterogeneity in a Global Knowledge Commons: Implications for Governance of the DNA Barcode Commons*, International Journal of the Commons, 13(2), p. 923, <https://doi.org/10.5334/ijc.861>

<sup>247</sup> Interview with J. Boyle, 20<sup>th</sup> December 2025

positively impact enterprise innovation capabilities and can streamline processes. In fact, collaboration with universities, in comparison to collaboration with competitors, is more likely to result in manufacturing of new products as universities provide a relatively easily accessible and in-depth knowledge due to research focused environment as well as technology and knowledge transfer mechanisms prevalent in academic setting.<sup>248</sup> Moreover, collaborating with universities and research institutions can enhance the public reputation and credibility of a company, especially in times where customers are increasingly interested in whether firm has a responsible conduct, by establishing it as an innovation powerhouse. These collaborations serve as flares to potential investors, shareholders and consumers alike that a firm is to be perceived as an active innovator committed to finding and developing novel technologies and products.<sup>249</sup> This form of out-bound open innovation has been employed by various major companies, including Siemens and Boeing. In fact, the collaboration between the University of Cambridge and Boeing to use research in novel aerospace technologies for developing hybrid-electric aircraft proved to be immensely lucrative. By collaborating with Cambridge researchers, Boeing was able to benefit from access to cutting-edge research on emerging technologies that they later used to further the intra-company research on fuel efficiencies and renewable energy technologies that can subsequently be licensed to competitors and other industry players to develop new products that adequately address the ever increasing market demand for energy efficient aircrafts.<sup>250</sup> The concept of knowledge commons has also been explored in the biotechnology sector, most notably, in the single-nucleotide polymorphism (SNP) mapping, which aims to establish identification mechanisms to determine which genes are associated with chronic diseases such as diabetes, cancer and even depression. By analysing the variations in human genes, it could be possible to enhance diagnostic capabilities and improve treatment plans for cancer patients.<sup>251</sup> Most notably, the International HapMap Project was established as a consortium of academics, non-profit research groups and private sector representatives, to develop a haplotype map of the human genome describing the common patterns of genetic variation in humans. Upon the initiation in October 2002, the project carried out extraordinarily intensive research to find DNA sequences that cause diseases that are one of the

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<sup>248</sup> Un, C.A., Cuervo-Cazurra, A., Asakawa, K. (2010), *R&D Collaborations and Product Innovation*, Journal of Product Innovation Management, 27(5), p. 686, <https://doi.org/10.1111/j.1540-5885.2010.00744.x>

<sup>249</sup> Alisghar, *supra* Note 227, p. 4

<sup>250</sup> *ibid* p. 3

<sup>251</sup> Armillotta, *supra* Note 106, p. 147

leading causes of illness related death in the developed world. The haplotype map was completed in around three years and was immediately uploaded to public databases to be accessed by researchers and medics around the world.<sup>252</sup> The idea of mapping the human genome was very conducive to the establishment of open-access human genome database developed within a long-established collaboration between biotechnology giant Merck and the University of Washington. Due to synthesising the highly advanced research capabilities of the university and the extensive resources and industry knowledge of Merck, including sales and marketing, this collaboration resulted in boosted technological advancement within the biotechnology sector as competitors were highly incentivised to catch up with Merck's technological prowess and subsequent financial gains, resulting in the development of new diagnostic technologies and proving that the exclusivity of patents is not the only way to ensure technological and economic advancement.<sup>253</sup>

To wrap up, clearly, there is an economically viable and sustainable way to make the transition to the more just regime of commons based open knowledge lead technology development mechanism. However, it is up to us to make it work. It is very important to bear in mind that, due to knowledge commons typically being made up of non-rivalrous resources, we cannot lose focus from ensuring that there is adequate incentivisation of proper use, re-contribution of value-added information, as well as proportionally and geographically inclusive distribution of both the costs and benefits of this transition.<sup>254</sup> To cite the former CEO of the Creative Commons Cathrine Stihler: *“the importance of open data and open science in providing the evidence base and action required to achieve net zero and mitigate the impact of climate change is clear.”*, *“if [the world’s leaders] truly want to tackle this emergency, they will recognise the importance of open access to climate research and data so that we can all share the knowledge to take action to save our planet.”*<sup>255</sup>

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<sup>252</sup> National Human Genome Research Institute, *About the International HapMap Project*, Available on: <https://www.genome.gov/11511175/about-the-international-hapmap-project-fact-sheet>

<sup>253</sup> Wild, C., Sehic, O., et al. (2025), *Public Contributions to R&D of Medical Innovations: A Framework for Analysis*, Health Policy, 152, p. 7, <https://doi.org/10.1016/j.healthpol.2024.105235>

<sup>254</sup> Geary, *supra* Note 246, p. 913

<sup>255</sup> Stihler, C. (2021), *Climate Change: “Glasgow Agreement” Can Save the Planet but Locking Scientific Research Behind Paywalls Is Holding Us Back* - Catherine Stihler, The Scotsman, 24 August, 2021, Available on: <https://www.scotsman.com/news/opinion/columnists/how-open-data-is-vital-to-the-fight-against-climate-change-catherine-stihler-3357616>

### 3. Reorienting IP Governance for a Just Sustainable Transition: Empirical Insights and Policy Pathways

The current governance mechanisms of climate policy are intrinsically linked to the capitalist worldview that has dominated global processes since the dawn of time. This prerogative is directly responsible for the continued exploitation of marginalised communities in developing countries by regarding them as expendable resources havens that can be proverbially milked to the fullest extent and, subsequently, abandoned and expected to recover independently. The never-ending greed for profit of the Northern actors, fuelled by political instability in developing countries has enabled the constant exploitation of cheap labour and over-extraction of natural resources for sustaining the Western consumerist nations. The sheer fact that the Western knowledge of how ecosystems work and their understanding of interactions with the natural world is subpar at best, exemplifies the embedded unfairness and systemic discrimination that market-based governance mechanisms facilitate.<sup>256</sup> There is a critical need to de-link the governance and policy of climate change from the capitalist *modus operandi* and finally make effort to establish an epistemically and socially just sustainable transition.<sup>257</sup>

#### 3.1. IP Governance in Practice: Empirical Insights

Intellectual property rights have always been one of the most debated regulatory mechanisms besides trade. Starting from the United Kingdom's Statute of Anne in 1710 establishing copyright protection for literary works and now the trade heavy TRIPS regime as well as the morphed climate/intellectual property system under the UNFCCC. Virtually the only common understanding on climate related intellectual property is that it should be cost effective, address distributional impacts and incentivise investments in low carbon technologies<sup>258</sup>; however, as can probably be deduced, it is not as straightforward as it seems. To get to the bottom of what should be and possibly already are the necessary priorities in sustainability intellectual property regulation

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<sup>256</sup> Wilson, M. (2019), *The Green Economy: The Dangerous Path of Nature Commoditization*, Consilience, 21, p. 89, <https://doi.org/10.7916/consilience.v0i10.3934>

<sup>257</sup> Baker, L., Newell, P., Phillips, J. (2014), *The political economy of energy transitions: The case of South Africa*, New Political Economy, 19(6), p. 813, <https://doi.org/10.1080/13563467.2013.849674>

<sup>258</sup> Monast, J. J. (2020), *THE ENDS AND MEANS OF DECARBONIZATION: THE GREEN NEW DEAL IN CONTEXT*, Environmental Law, 50(1), p. 23, <http://dx.doi.org/10.2139/ssrn.3519360>

I decided to conduct semi-structured interviews with experts from different sides of the debate: institutional, academic and private sectors.

- To understand the theoretical basis of the current intellectual property regime and elucidate the epistemic injustices therein I interviewed Dr. G. Dutfield (University of Leeds) - one of the pioneers in the debate of indigenous peoples' rights for protection of traditional knowledge via intellectual property rights.
- To elucidate the socio-economic implications of climate technology development and regulation I spoke with Dr. O. Wooley (Durham University) - esteemed academic focusing on law's role in facilitating transition to ecological sustainability.
- To recognise the institutional view of what is just sustainable transition and how it manifests from development law perspective I interviewed Mr. B. Kuemlangan (Chief of the Development Law Service in the Food and Agriculture Organization (FAO)) who has facilitated numerous negotiations and establishment of multiple intellectual property, traditional knowledge and community practice legislations in the developing world.
- To scope the emerging trends and existing practices for the implementation of the intellectual property rights regime in the developing world I interviewed Dr. B. Amorim-Borher (Senior Director, Department for Development Cooperation in World Intellectual Property Organisation (WIPO)) who has spent most of her life achieving fair and just representation of indigenous peoples and marginalised communities in the developed world by leading development and capacity-building initiatives all over the world.
- To give me practical insights from the private sector and how the notion of democratisation of knowledge and technology can be transposed to the business world, I interviewed Dr. R.A. Jefferson (molecular biologist, founder of hologenome theory of evolution, pioneer of Biological Open Source movement and creator of Cambia and the Lens) - who has dedicated his life to fight for just distribution of knowledge and broad accessibility of science-based innovation for marginalised actors.

The primary goal of conducting interviews was to understand the underlying notions of intellectual property law in sustainable technologies and elucidate possible policy pathways and governance reorientations needed to make intellectual property system serve just sustainable development and environmental transition, not vice versa.

Across all interviews, intellectual property rights emerge less as independent innovation mechanism and more as a historically inherited governance system that does not align with the current realities of ecosystems and distributive justice. Dutfield challenges the prevailing innovation narrative, arguing that *“intellectual property has never had a single purpose, and innovation is often a retrospective justification rather than a design principle.”* He notes that intellectual property mechanisms such as geographical indications are *“explicitly designed to preserve the opposite of innovation,”* elucidating the tension between the logics behind intellectual property regime and sustainability-oriented transition.<sup>259</sup> Woolley adds to this critique from an environmental and energy law perspective, stressing that intellectual property regimes are structurally incompatible with ecosystem centred challenges. She states that proprietary rights over renewable technologies *“can obstruct progress towards more sustainable ways of being”* because rights holders are able to restrict access to technologies that would benefit actors, particularly in the developing world, in terms of facilitating sustainability. She contextualises this problem within climate governance debates, noting that intellectual property constraints consistently emerge in discussions on technology transfer under climate treaties.<sup>260</sup> From an institutional perspective, Amorim-Borher similarly identifies fragmentation and rigidity in global intellectual property governance, particularly in cases where sustainability technologies are compounding, interdependent, and infrastructure-based rather than discrete inventions.<sup>261</sup> Kuemlangan provides a parallel viewpoint from fisheries governance, noting that centralized legal regimes often fail due to *“lack of legitimacy and social embeddedness rather than lack of regulation.”*<sup>262</sup> Jefferson offers the sharpest opinion on existing climate and intellectual property governance institutions stating that *“institutions are the ones that need to change, but they don't want to. - they are what makes the world go round.”*<sup>263</sup>

Technology transfer is consistently described as highly regulated but lacking in operational ability. Dutfield is quite critical, describing technology transfer commitments as *“promises written into treaties with no intention of being honoured.”* He refers to the COVID-19 vaccine experience as evidence that know-how and tacit knowledge remain systematically withheld despite formal

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<sup>259</sup> Interview with Dr. G. Dutfield, 22nd December, 2025

<sup>260</sup> Interview with Dr. O. Wooley, 5th January, 2026

<sup>261</sup> Interview with Dr. B. Amorim-Borher, 29<sup>th</sup> January, 2026

<sup>262</sup> Interview with Mr. B. Kuemlangan, 17<sup>th</sup> December, 2025

<sup>263</sup> Interview with Dr. R. A. Jefferson, 30<sup>th</sup> January 2026

intellectual property flexibilities.<sup>264</sup> Woolley supports this narrative from the renewable energy sector perspective, emphasising that technology transfer is often misunderstood as the delivery of hardware rather than the transfer of epistemic capacity. She elucidates a sharp distinction between *“being given a bit of kit”* and *“having the knowledge and capabilities to make it your own and take it forwards on your own terms.”* She warns that without sustained capacity-building, technology transfer risks becoming *“short-term and not long-lasting improvement.”*<sup>265</sup> Amorim-Borher also emphasises that effective transfer requires institutional matchmaking, trust-building, and absorptive capacity, rather than relying only on licensing.<sup>266</sup> Access and Benefit Sharing mechanisms are met with considerable scepticism. Dutfield argues that *“benefit-sharing has become a fairness narrative attached to systems that generate very little benefit to share,”* particularly in high-risk bioprospecting contexts.<sup>267</sup> Woolley furthers this critique, noting that benefit-sharing often is carried out within deep systemic inequalities and may amount to little more than *“throwing some pennies”* at developing countries without enabling meaningful long-term development. She accents that, unless benefit-sharing enables epistemic autonomy, the ability to develop, adapt, and innovate independently, it risks entrenching dependency rather than advancing justice.<sup>268</sup> Kuemlanguan’s experience supports this concern, observing that benefit-sharing mechanisms frequently fail in countries where communities lack political organisation or legal recognition, existing as *“rights on paper rather than rights in practice.”*<sup>269</sup> On TRIPS and licensing, Dutfield holds that states possess more regulatory flexibility than they factually use, observing that *“TRIPS compliance is treated as sacred, while trade law violations by powerful states are routine.”*<sup>270</sup> Woolley attributes this reluctance to use regulatory space to a broader failure of global economic governance. She notes that trade and intellectual property frameworks are among the main international legislations *“that obstruct movement towards low-carbon transitions,”* while climate finance and technology mechanisms remain aspirational and are weakly enforced. She stresses that countries encounter these barriers less often because of direct legal prohibition and more because *“the money simply is not there anyway.”*<sup>271</sup> Amorim-Borher confirms that institutional caution and

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<sup>264</sup> Dutfield, *supra* Note 259

<sup>265</sup> Wooley, *supra* Note 260

<sup>266</sup> Amorim-Borher, *supra* Note 261

<sup>267</sup> Dutfield, *supra* Note 259

<sup>268</sup> Wooley, *supra* Note 260

<sup>269</sup> Kuemlanguan, *supra* Note 262

<sup>270</sup> Dutfield, *supra* Note 259

<sup>271</sup> Wooley, *supra* Note 260

geopolitical pressure frequently outweigh legal viability in sustainability contexts.<sup>272</sup> All interviewees agree on the structural marginalisation of traditional and indigenous knowledge. Dutfield is clear: “*If we wanted to recognise collective knowledge legally, we would find a way. The obstacle is not law, it is power.*”<sup>273</sup> Woolley considers this exclusion as a climate governance failure, arguing that sidelining local and traditional knowledge undermines adaptive capacity in systems that require long-term stewardship and understanding of historical and cultural contexts.<sup>274</sup>

Community-based governance and epistemic recognition emerge as necessities rather than philosophical preferences. Kuemlangan provides strong empirical grounding, demonstrating that sustainable fisheries governance succeeds in countries where communities retain meaningful authority, knowledge recognition, and stewardship incentives. He emphasises that these systems are not anti-state but legally pluralistic, combining community governance with formal legal recognition.<sup>275</sup> Dutfield applies this thought to intellectual property governance, critiquing its basis in “*possessive individualism*” and its innate exclusion of cultural and ecological knowledge systems.<sup>276</sup> Woolley explicitly links commons-oriented approaches to renewable energy governance, arguing that sustainability challenges demand “*holistic, overarching legal approaches*” rather than fragmented proprietary regimes. She questions whether private sector centred intellectual property mechanisms are actually compatible with “*the world’s dire ecological condition and massive threats from climate change.*”<sup>277</sup> Amorim-Borher views commons and collaborative platforms such as WIPO GREEN as holistic governance tools, particularly in sustainability sectors where diffusion, adaptation, as well as capacity and knowledge-building are more detrimental than exclusivity.<sup>278</sup> Jefferson offers a much more sceptical view on commons regimes – he states that there is a lack of understanding of innovation system dynamics and that the “open” concept is fatuous as it “*never answers the questions of What is open for? Open for what? Open to what?*” He proposes that institutions need to find a way to fit commons characteristics into existing solutions as opposed to using them as a solution itself. Fundamentally,

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<sup>272</sup> Amorim-Borher, *supra* Note 261

<sup>273</sup> Dutfield, *supra* Note 259

<sup>274</sup> Wooley, *supra* Note 260

<sup>275</sup> Kuemlangan, *supra* Note 262

<sup>276</sup> Dutfield, *supra* Note 259

<sup>277</sup> Wooley, *supra* Note 260

<sup>278</sup> Amorim-Borher, *supra* Note 261

he is adamant that open-science and open access “*is a meaningless thing that is virtue signalling, unfortunately*”<sup>279</sup>

None of the interviewees advocates a single global solution. Instead, they unilaterally agree that pluralistic governance, experimentation, epistemic diversity, and institutional interconnectedness is needed. Dutfield calls for “*menus of governance tools*” rather than universal intellectual property mechanisms, enabling context/country specific institutional models.<sup>280</sup> Woolley emphasises the limits of market-based solutions, warning that mechanisms such as emissions trading can only function where oversight, administrative capacity, and political commitment are robust and highly supervised, preconditions that are often absent even in the EU.<sup>281</sup> Amorim-Borher highlights capacity-building, matchmaking platforms, and reduced transaction costs as primary tools for a just sustainable transition, particularly for less developed countries.<sup>282</sup> Kuemlangan provides an enlightening perspective that “*law-making that excludes those governed by it is already a failure,*” showing that participation and legitimacy are at the core criteria of good governance.<sup>283</sup> To sum up, the interviews give the notion that global climate governance system is under strain: innovation is accelerating, ecological limits are consistently being tested, and intellectual property regimes remain entrenched in economic and legal assumptions that more often fail to connect with sustainability and justice imperatives.

### **3.2. Two-Edged Sword: Insufficiencies in Contemporary IP Governance**

Even though at first glance it might seem that we have managed to establish a robust, interconnected intellectual property law system – TRIPS Agreement linking intellectual property with trade, TTBER facilitating technology transfer agreements, Nagoya Protocol acknowledging the rights of indigenous knowledge holders and non-formal intellectual property and so on, there clearly are missing links that prevent this system to operate in a just and fair way. As outlined before, the persistent struggle of not engaging marginalised stakeholders in this process enough lies at the crux of this inefficiency. The unprecedented scale and intensity of climate change have

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<sup>279</sup> Jefferson, *supra* Note 263

<sup>280</sup> Dutfield, *supra* Note 259

<sup>281</sup> Wooley, *supra* Note 260

<sup>282</sup> Amorim-Borher, *supra* Note 261

<sup>283</sup> Kuemlangan, *supra* Note 262

finally made policymakers realise that, by not pursuing a holistic, interdisciplinary approach for tackling the environmental crisis, there will be no point for beneficial trade deals and ambiguous investments for research and development. The people who are the main driving force behind the success of lucrative manufacturing activities in developing countries, i.e., local communities, are exactly the ones suffering the most from the crisis. If they really want to pursue broader national development and long-term sustainability, there is an inherent need to acknowledge that these are exactly the people who need to participate in debates and decisions on policymaking.<sup>284</sup> Currently, there still is no multilateral consensus among stakeholders on how to exactly address the injustices in climate policy. At one end of the spectrum, there are environmental justice advocates, NGOs and community leaders who strongly oppose the market-based intellectual property system. However, at the other end of the spectrum, the private sector and economists are wary of the potential impact climate policies have on prices of the sustainable end-product at the detriment of the general consumer in already marginalised communities and regions that cannot necessarily afford the “green products/energy” that we, predominantly the North, consider a basic commodity.<sup>285</sup> Certainly, there have been moderately successful attempts by the United Nations to facilitate capacity building and innovation in the developing world, for example, the Climate Technology Centre and Network (CTC&N). CTC&N essentially operates as a coordination mechanism for a global network of organisations. They provide developing countries with technical assistance for innovation, research and development, and technology transfer. The issue, though, as with virtually all climate policy and facilitation mechanisms, is that there is no direct financing of the programme; they are left to rely on contributions from members, donor countries and, to a lesser extent, UNFCCC financing, which substantially limits their capacity and restricts their ability to prioritise support projects.<sup>286</sup>

Right off the bat, the TRIPS Agreement ruled that the market-based intellectual property system exhibited systemic inequalities. At the TRIPS negotiations, developed countries were very

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<sup>284</sup> Nzimande, B., Khambule, H. (2022), *From climate change to a just energy transition*. In N. Xaba, S. Fakir (Eds.), *A Just Transition to a Low Carbon Future in South Africa*, Mapungubwe Institute for Strategic Reflection (MISTRA), p. 46, <https://doi.org/10.2307/j.ctv2z6qdv5.8>

<sup>285</sup> Monast, J. J., Murray, B. C., Wiener, J. B. (2017), *ON MORALS, MARKETS, AND CLIMATE CHANGE: EXPLORING POPE FRANCIS' CHALLENGE*, *Law and Contemporary Problems*, 80(1), p. 136, <https://ssrn.com/abstract=2955940>

<sup>286</sup> Ahmad, Z. (2021), *Rules and Facts on Low-Carbon Technology Diffusion*, In *WTO Law and Trade Policy Reform for Low-Carbon Technology Diffusion: Common Concern of Humankind, Carbon Pricing, and Export Credit Support*, Brill, p. 64, [https://doi.org/10.1163/9789004446090\\_004](https://doi.org/10.1163/9789004446090_004)

savvy and leveraged their expertise in intellectual property rights to skew the rules in their favour. In essence, these negotiations exemplified the post-colonial world order, as prosperous countries used their power to influence, at that time, virtually non-existent national intellectual property systems in the emerging world by imposing the transposition of Western legal systems.<sup>287</sup> The main factors influencing this dynamic were that (i) there was a huge information asymmetry between developed and developing countries, (ii) emerging economy countries (BRICS) were adamant to align themselves with the developed world, thus taking negotiating strength away from the developing countries, and (iii) at the time there were severe political and financial instabilities in the developing world.<sup>288</sup> This, of course, resulted in the existing *modus operandi* including disproportionate fees for technology transfer, exploitative licensing terms and, finally, utilization of patent rights to prevent wide diffusion and use of novel technologies, which, if not mitigated, surely, will not assist in achieving a just sustainable transition.<sup>289</sup> Moreover, intellectual property rights are often regarded as a significant barrier to technology transfer, even though there is proof that patent holders would be willing to sacrifice some of their patent rights if investment return in a foreign country would outweigh the potential loss of competitive advantage in their technology market.<sup>290</sup> The possibility of such a trade-off supported the emergence of green capitalism, which addresses some of the existing concerns by promoting the establishment of limits on property rights for the use of global commons – atmosphere, bodies of water and biotopes. Although this model still views earth's resources as commodity, it also takes into account the social responsibility concerns in the energy transition by not merely measuring the economic progress of markets based on GDP, but also welfare of the nations, thus promoting a more holistic approach to tackling environmental crisis, which, if supported by robust supra-national legislative mechanisms, could ensure just sustainable transition.<sup>291</sup> Moreover, the private sector holds a generally positive opinion

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<sup>287</sup> Deere-Birkbeck, C. (2008), *The Implementation Game: The TRIPS Agreement and the Global Politics of Intellectual Property Reform in Developing Countries*, Oxford University Press, p. 19, ISBN: 978-0-19-955061-6

<sup>288</sup> Yu, P. K. (2025), *TRIPS and Its Futures*, In G. J. Reynolds, A. Mogyoros, T. W. Dagne (Eds.), *Intellectual Property Futures: Exploring the Global Landscape of IP Law and Policy*, University of Ottawa Press, pp. 59 – 65, <https://doi.org/10.2307/jj.35989995.9>

<sup>289</sup> Zhuang, W. (2017), *Intellectual Property Rights and Climate Change: Interpreting the TRIPS Agreement for Environmentally Sound Technologies*, Cambridge University Press, pp. 47-59, ISBN: 9781316662892

<sup>290</sup> Holzer, K., Yamineva, Y. (2025), *Climate Technologies and International Trade Law: Tensions and Opportunities*, In L. Reins, A. Zahar (Eds.), *Climate Technology and Law in the Anthropocene*, Bristol University Press, p. 444, <https://doi.org/10.2307/jj.18323828.22>

<sup>291</sup> Chichilnisky, G. (2019), *GREEN CAPITALISM*, *Journal of International Affairs*, 73(1), p. 161, <https://doi.org/10.1002/9781118786352.wbieg0488>

of green investments and is receptive to climate policies, which is a significant shift from the previously existing notion that there is no use to invest in green innovations as there will be only public, not private, benefits, i.e. double externality. This clearly elucidates the opportunity to close the technology gap between the non-green and green innovation industries. Policies such as research and development subsidies, tax breaks for green investments, and streamlined technology transfer are quite effective in facilitating the evolution of the sustainable technology industry, thereby increasing global intellectual capital in sustainable technologies, which is the primary driver of technology diffusion and sustainable transition.<sup>292</sup>

### **3.2.1. Limits of Market-Centred Approaches: Technology Transfer Beyond Contracts**

As already established, the proprietary nature of intellectual property rights in itself are not a detrimental factor in inhibiting just sustainable transition. There are various mechanisms for retaining competitive advantage from patents whilst facilitating collaborative research and development activities or technology transfer. However, existing market mechanisms continually counteract these efforts by keeping private companies and nations in a constant race for profit and market position, thereby curbing overall technological progress. The prevalence of ulterior political agendas and general distrust among stakeholders, particularly in trade regulation, precisely exacerbates the existing market inefficiencies in the dissemination of green technologies. This political power play impacts not only trade relationships but also the establishment of robust climate change regimes, as countries are not negotiating solely about climate policies and environmental crisis mitigation but, more often than not, have underlying national trade ambitions they seek to fulfil by pushing for favourable environmental policies.<sup>293</sup> Take the US-China relationship as an example - both are the largest technology patent holders and innovation powerhouses holding 3.5 million and 5.7 million patents respectively, significantly surpassing the closest competitors Japan and the Republic of South Korea, which have not been able to surpass the 2.1 million mark as of yet.<sup>294</sup> It would seem that, due to this oligopolistic climate, both countries could peacefully coexist and relish their shared dominance in the technology market; alas, it is the

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<sup>292</sup> Stucki, T., Woerter, M. (2017), *Green Inventions: Is Wait-and-see a Reasonable Option?*, The Energy Journal, 38(4), p. 65, <https://doi.org/10.5547/01956574.38.4.tstu>

<sup>293</sup> Monast (2017), *supra* Note 285, p. 114

<sup>294</sup> World Intellectual Property Organisation, *World Intellectual Property Indicators 2025*, WIPO, p. 7, <https://doi.org/10.34667/tind.58959>

direct opposite. You see, in the past 10 years China has been consistently growing their share of global patent applications rising from 34.6% in 2014 to 49.1% in 2024, whilst the United States experienced the sharpest drop to date with 5.4% decrease in global share of patent applications in 2024.<sup>295</sup> This statistic is direct proof of the prevailing trade rivalry between the nations, also known as the "bilateral tech war", which entails mutually destructive retaliatory trade practices, such as US raising tariffs on China's imports and China employing "forced technology transfer" by enacting discriminatory and restrictive policies for foreign investment in Chinese technology market; all for the common goal of pursuing innovation-driven economic development.<sup>296</sup> The main consequence of this never-ending competition is the fact that technology transfer can never achieve its true potential for the diffusion of sustainable climate technologies, if it is perpetually used as a leverage in trade negotiations instead of being looked at as an efficient intellectual property mechanism. Therefore, there is an urgent need for near-term action to reevaluate the existing business-as-usual mechanisms under the TRIPS regime and find a multilateral regulatory tool that would delink technology transfer and knowledge sharing from trade relations to avoid the weaponisation of technology patents to the detriment of developing countries and climate change mitigation in general.

Supranational organizations have been quite proactive in moderating the impact of trade externalities on technology transfer, for example, by establishing mechanisms such as WIPO GREEN and the CTC&N; however, these institutions, like most institutional bodies, constantly face the challenge of funding. Acquiring financing from international institutions is persistently sluggish, especially in the current geopolitical situation, where the majority of attention is focused on securing defence funding, and the private sector has yet to be sufficiently incentivized to participate in these schemes. Although favourable regulatory and market environments are crucial, they do not have the capitalist gravitas to mobilize desperately needed private-sector foreign investment, as companies do not see investment in technology development in the developing world as a lucrative business opportunity, instead considering it a high-risk, low-return activity. This is precisely the reason why intellectual property regimes are imperative in climate policy negotiations. Policymakers should capitalize on the opportunity to propose commercially

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<sup>295</sup> *ibid* p. 1

<sup>296</sup> Zhou, W. and Jiang, H. and Kong, Q. (2020), *Technology Transfer under China's Foreign Investment Regime: Does the WTO Provide a Solution?*, Journal of World Trade, 54(3), p. 479, <http://dx.doi.org/10.2139/ssrn.3436484>

attractive yet holistic mechanisms for intellectual property monetization to secure private-sector funding for climate change mitigation in the developing world.<sup>297</sup> It is clear that due to the slow pace of financing of green technologies (on the international level), relying on market-based technology transfer is simply not enough for tackling the fundamental systemic changes that are needed to curb climate change processes. By now, this should be a common understanding, as the Paris Agreement clearly stipulates that technology development and transfer should be carried out in a cooperative manner, with emphasis on collaboration in research and development and on facilitating access to technology for developing countries.<sup>298</sup> This notion is further elucidated by the Intergovernmental Panel on Climate Change, which emphasises that, rapid and transformative change in climate mitigation and adaptation technologies is a necessity, not a suggestion and that technology transfer and access are the primary enablers for accelerating climate action. They also highlight the much-needed efforts to enable access to clean technologies for developing countries, not only to mitigate the effects of climate change but also to ensure societal well-being in communities, as so far the majority of developing countries simply lack the resources to pursue any kind of transition to sustainable technologies.<sup>299</sup> The delay in clean technology adoption in developing countries is directly related to the lack of local capabilities that cannot be resolved by straightforward technology deployment or arbitrary investments. Companies and nations that intend to pursue technology transfer need to assume a managerial role to implement an integrated, multifaceted process, including ensuring that the recipient country has the absorptive capacity to implement these technologies long-term and to ensure true technological change. This includes facilitating local research and development activities, training personnel, building infrastructure, and collaborating with the local government.<sup>300</sup> Most importantly, it is pivotal to shift away from the view that technology transfer is equitable to a licensing agreement, as the underlying principles are much more intricate and cannot be approached with the mindset of it being a business deal. If

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<sup>297</sup> Shabalala, *supra* Note 91, p. 8

<sup>298</sup> Paris Agreement, *supra* Note 72, Art. 10(4)

<sup>299</sup> IPCC, *supra* Note 1, pp. 31-33

<sup>300</sup> Blanco, G., H. de Coninck, L. Agbemabiese, E. H. Mbaye Diagne, L. Diaz Anadon, Y. S. Lim, W.A. Pengue, A.D. Sagar, T. Sugiyama, K. Tanaka, E. Verdolini, J. Witajewski-Baltvilks (2022), *Innovation, technology development and transfer*. In IPCC, (2022), *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, p. 1685, <https://doi.org/10.1017/9781009157926.018>

stakeholders do not view technology transfer as a complex, integrated, long-term mechanism, there is no chance that it will play the integral role in climate policy as intended by the United Nations.

It is undeniable that global intellectual property governance has taken on the appearance of a trade forum, yet this is only beneficial for high-income economies, as developing countries lack the institutional capabilities or established industries to benefit from the strong intellectual property protection pushed by Western countries. This alone is an important enough factor to understand the systemic power imbalance in climate and intellectual property regulation negotiations, which results in trade concessions, even though they should be serving the local population.<sup>301</sup> Of course, developed countries can share their expertise in technology transfer to developing nations, however this does not necessarily mean that the transfer will be successful. To ensure a truly just transfer, the recipient countries should be analysed on a case-by-case basis, taking into account factors such as policy uncertainty, knowledge gaps, and regulatory barriers.<sup>302</sup> One way to limit these inefficiencies is to employ the theory of geography of transitions in decision-making. This theory provides insights into the characteristics of the recipient country, including institutional settings, social networks, specific infrastructures, and other local factors, thus giving context for the conditions that could inhibit or constrain the sustainable transition.<sup>303</sup> This would not only serve as a sort of “risk assessment” for technology transferors, but it would also further the notion of just sustainable transitions, as it directly accounts for and acknowledges the rights and well-being of the local population. At the end of the day, the decision whether to pursue technology transfer or not lies in the hands of the investor, so taking into account a broader set of factors would just be a prudent business decision. These considerations directly impact the success of technology transfer projects, as without proper training and understanding of the recipient country's social, economic, and environmental needs, the transfer will significantly reduce both the financial returns and the project's efficiency.<sup>304</sup> For example, in the agricultural sector, the adoption of advanced technologies is especially cumbersome as farmers simply do not

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<sup>301</sup> Cartwright, *supra* Note 167, p. 204

<sup>302</sup> Minas, S., Kennedy, M., Krause, K. (2020), *Navigating a Just Transition through the Climate Emergency: What Role for Finance and Technology*, Irish Studies in International Affairs, 31, p. 135, <https://doi.org/10.3318/isia.2020.31.2>

<sup>303</sup> Kohler, J., Geels, F.W., Kern, F. et.al (2019), *An agenda for sustainability transitions research: State of the art and future directions*, Environmental Innovation and Societal Transitions, 31(1), p. 14, <https://doi.org/10.1016/j.eist.2019.01.004>

<sup>304</sup> Homen, *supra* Note 165, p. 7

have the expertise to use the transferred technologies, which is further exacerbated by the mismatch with the importance of local culture, primarily the long-used traditional agricultural practices, making recipients resistant to adopting any new technologies.<sup>305</sup> A great case study by Olawuyi outlines the detrimental effects of not accounting for the capability gap in technology transfer processes to developing countries. For decades, there have been various attempts by foreign stakeholders to carry out technology transfer in Africa under the existing technology transfer regime of the UNFCCC; alas, most of them have been unsuccessful. It was found that the biggest detriments were a lack of information and knowledge about transferred technologies, a weak regulatory environment, and a lack of capacity to utilise and maintain the transferred technologies; all factors that technology companies could consider and mitigate if they applied a holistic approach to technology transfer. All of these pitfalls could have been avoided if transferors had worked in close collaboration with local governments to focus on community-level capacity building, ensuring long-term technology transition and just sustainable development on a national level.<sup>306</sup> Moreover, to achieve a full-fledged sustainable transition, it is vital to participate in transformative adaptation by collaborating with local communities to reach common understanding within the specific context of developing country in question instead of solely employing arbitrary top-down transfer mechanisms.<sup>307</sup> According to Stern, to improve adaptive capacities, it is pivotal to reduce the overall vulnerability of developing countries by rapidly increasing national economic growth in an equitable and sustainable manner. By pursuing holistic technology transfer, whose scope is not limited to a contractual agreement for deployment of technologies, it is very much possible to bridge the existing knowledge and skills gap, facilitating the establishment of local, possibly, independent industries, new infrastructure, thus ensuring just and long-term improvements in the general welfare of the local people and their transition to sustainable technologies.<sup>308</sup> These practices, which to private companies and Western nations probably seem unnecessary and irrelevant, are exactly the way in which we not only enhance green technology diffusion and climate change mitigation, but also substantially decrease the systemic

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<sup>305</sup> Marin-Garcia, *supra* Note 137, p, 11

<sup>306</sup> Olawuyi, D. S. (2018), *From technology transfer to technology absorption: addressing climate technology gaps in Africa*, Journal of Energy & Natural Resources Law, 36(1), p. 64, <https://doi.org/10.1080/02646811.2017.1379667>

<sup>307</sup> Ziervogel, G., Enqvist, J., Metelerkamp, L., van Breda, J. (2022), *Supporting transformative climate adaptation: community-level capacity building and knowledge co-creation in South Africa*, Climate Policy, 22(5), p. 609, <https://doi.org/10.1080/14693062.2020.1863180>

<sup>308</sup> Stern, N. (2017), *Part VI: International Collective Action*, In: *The Economics of Climate Change: The Stern Review*, Cambridge University Press, p. 562, <https://doi.org/10.1017/CBO9780511817434.035>

welfare inequality gap between the Global North and South in terms of socio-economic conditions: a core element for attaining just sustainable transition. Interestingly, the market inefficiencies of the TRIPS regime technology transfer mechanisms have induced regional cooperation in technology transfer of environmental and sustainable technologies, circumventing the usual trade-heavy negotiations. For example, New Zealand has been a trailblazer in entering into free trade agreements with friendly states. Under the agreements, all tariffs on environmental goods have been eliminated, ensuring accelerated diffusion of green technologies between New Zealand and Taiwan and New Zealand and the United Kingdom.<sup>309</sup> Furthermore, a very similar voluntary deal has been struck between the 21 member states of the Asia-Pacific Economic Cooperation (APEC), which in 2012 agreed to gradually lower all tariffs to 5% or less on 54 environmental goods, including renewable energy technologies.<sup>310</sup> These examples are crystal clear indicators that in cases where the WTO regime is not favourable for specific governments and coalitions, it can be easily bypassed, thus elucidating the persistent inefficiencies of the current intellectual property system under the market-centred TRIPS Agreement system.

Clearly, the technology to achieve the climate goals set out in the Paris Agreement is already in place, particularly in the energy, mobility and agriculture sectors. Therefore, it is of utmost importance to create policies that enable the scale-up of manufacturing and the rapid deployment of these technologies.<sup>311</sup> The thing is, though, the existing mechanisms and institutions for such initiatives have severely limited reach and inefficient functionalities that do not correspond to modern business environments. Under the UNFCCC Technology Mechanism, there are various programmes aimed at facilitating finance for the research and development of climate technologies by building capacity and knowledge for developing countries, especially for commercializing and deploying novel early-stage innovations.<sup>312</sup> Let's take CTC&N as an example, it was created by the United Nations to implement climate technology projects in developing countries through providing information to find relevant technologies, strengthening knowledge exchange and facilitating international collaboration – essentially a speed dating

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<sup>309</sup> Holzer, *supra* Note 290, p. 453

<sup>310</sup> Asia-Pacific Economic Cooperation (2012), *2012 Leaders' Declaration: Annex C – APEC List of Environmental Goods*, Available on: [https://www.apec.org/meeting-papers/leaders-declarations/2012/2012\\_aelm/2012\\_aelm\\_annexc](https://www.apec.org/meeting-papers/leaders-declarations/2012/2012_aelm/2012_aelm_annexc)

<sup>311</sup> Gross, G., et al. (2018), *How long does innovation and commercialisation in the energy sectors take? Historical case studies of the timescale from invention to widespread commercialisation in energy supply and end use technology*, Energy Policy, 123, p. 692, <https://doi.org/10.1016/j.enpol.2018.08.061>

<sup>312</sup> Blanco, *supra* Note 300, p. 1685

platform for eager developing nations and frigid technology companies. What it does not provide, though, is actual hands-on assistance in concluding notoriously complex technology licensing agreements or in implementing those technologies in the local community; therefore, it has essentially become a zero-sum mechanism. It is a common understanding that even though CTC&N was an honourable effort, its unpredictable and ambiguous financing model severely impacted its ability to deliver the intended services at the expected level.<sup>313</sup> However, it is important to note that the database of available technologies and know-how is still operative and functions as a real-life example of open innovation in practice, which undoubtedly has the potential to facilitate the establishment of similar organisations and even shift the incumbent narrative in innovation from patents and technology needing to be exclusionary to benefiting from open innovation and licensing.<sup>314</sup> Moreover, there have been proposals for resolving the consistent funding issues of the CTC&N, for example, by linking the CTC&N with the Green Climate Fund, which would be an interesting addition to the latter's plan of establishing a programme/platform for facilitating the establishment of regional innovation hubs, climate accelerators and supporting early-stage innovators.<sup>315</sup> Additional proposals have been made in terms of the intellectual property rights context under the TRIPS regime. Those include adopting a case-by-case approach for developing countries regarding their national intellectual property systems, allowing them to customize TRIPS regulations to local conditions, or providing direct assistance in brokering the establishment or participation in patent pools.<sup>316</sup> In fact, according to IPCC, there has been a noticeable shift from direct technology transfers to other, more cooperative mechanisms, establishing a sort of donor-recipient relationship. This is where the UNFCCC Technology Mechanism could step in and assist local capability developers in establishing locality-based,

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<sup>313</sup> Technology Executive Committee (2017), *Enhancing financing for the research, development and demonstration of climate technologies*, UNFCCC, p. 18, [https://unfccc.int/ttclear/docs/TEC\\_RDD%20finance\\_FINAL.pdf](https://unfccc.int/ttclear/docs/TEC_RDD%20finance_FINAL.pdf)

<sup>314</sup> Lee, W. J., & Mwebaza, R. (2020), *The Role of the Climate Technology Centre and Network as a Climate Technology and Innovation Matchmaker for Developing Countries*, Sustainability, 12(19), p. 7956, <https://doi.org/10.3390/su12197956>

<sup>315</sup> Oh, C. (2020), *Contestations over the financial linkages between the UNFCCC's Technology and Financial Mechanism: using the lens of institutional interaction*, International Environmental Agreements: Politics, Law and Economics, 20, p. 561, <https://doi.org/10.1007/s10784-020-09474-8>

<sup>316</sup> Dussaux, D. & Dechezleprêtre, A., Glachant, M. (2018), *Intellectual property rights protection and the international transfer of low-carbon technologies*, Centre for Climate Change Economics and Policy Working Paper, 323, p. 23, ISSN: 2515-5709

customized technological and climate change development strategies.<sup>317</sup> These “hubs” could also be based in local higher education institutions, similarly to the role of a technology transfer office, where academics could work on specifying the national development plans (NDCs) and bring forward policy proposals for implementing capacity building measures on a community level.<sup>318</sup> The importance of cooperation in achieving climate goals is also very apparent to governments across the globe. Indeed, in 2021, the governments of South Africa, France, Germany, the UK, the US and the EU entered into the Just Energy Transition Partnership (JETP) with the aim of boosting South Africa's carbon transition over a period of 5 years. Member countries have pledged to allocate South Africa 8.5 billion USD over the duration of the programme, and it is projected that, as a result of the JETP programme, up to 1-1.5 gigatons of emissions will be prevented/offset over the next 20 years.<sup>319</sup> By now, I think we can all agree that there is no need to overcomplicate and contort the existing intellectual property mechanisms. Priority should be given to straightforward, near-term interventions that establish clear rules for the private sector to facilitate responsible and sustainable technology transfer and development. This approach avoids imposing additional burdens on developing countries to create advanced regulatory frameworks and climate policy regimes and prevents developed nations from exploiting ambiguities in international legislation by raising tariffs on green technologies or pursuing indirect financial transfers.

### **3.2.2. Knowledge Justice and the Visibility of Non-formal Innovation**

It is very easy to get lost in the technicalities and pragmatism when seeking viable solutions to the sustainability transition. So far, there has been myriads of discussions on how to address the practical aspects of technology transfer and access to technologies in developing countries; however, these considerations are most frequently limited to discussing financing and the deployment of green technologies from the North. Similar to the need for capacity building and adaptation mechanisms, it is equally important to consider the impacts of these processes on the

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<sup>317</sup> Ockwell, D., Byrne, R., et. al (2018), *The uptake and diffusion of solar power in Africa: Socio-cultural and political insights on a rapidly emerging socio-technical transition*, Energy Research & Social Science, 44, p. 127, <https://doi.org/10.1016/j.erss.2018.04.033>

<sup>318</sup> Khan, M., Mfitumukiza, D., Huq, S. (2020), *Capacity building for implementation of nationally determined contributions under the Paris Agreement*, Climate Policy, 20(4), p. 507, <https://doi.org/10.1080/14693062.2019.1675577>

<sup>319</sup> Othogile, M., Shirley, R. (2023), *The evolving just transition: definitions, context, and practical insights for Africa*, Environmental Research: Infrastructure and Sustainability, 3(1), p. 9, <https://doi.org/10.1088/2634-4505/ac9a69>

traditional and historical practices of communities and to pay close attention to whether these seemingly virtuous actions do not end up harming the cultural heritage and societal well-being of already marginalized indigenous communities. We need to remember that the issue of climate change is, by default, a moral one. These considerations, including either the persistence of generational inequities between the Global South and the Global North or the complex opinions on intergenerational epistemic justice, are at the heart of the just sustainable transition.<sup>320</sup> It is widely regarded that the inability of the UNFCCC regime to impose and reiterate the need for actively applying principles of justice whilst engaging in sustainable development is precisely the biggest hindrance to the effectiveness of the regime, as well as one of the reasons why its provisions cannot be successfully applied in practice. It is crucial that policymakers understand historical contexts by acknowledging the fundamental power asymmetries and inequalities between countries and regions; otherwise, any new climate regulation or policy will inevitably run into the same issues we experienced under the Kyoto Protocol.<sup>321</sup> The epistemology of carrying out sustainability transitions in the South requires shifting away from the ever-popular process of transferring Northern technologies to the developing world to instead focusing on the empowerment and well-being of local communities. We, as researchers, need to actively seek out alternative pathways for transforming socio-technical systems, decolonise these transitions by giving voice to local communities, ensuring diverse participatory representation, embracing local transition activities and, finally, pursuing sustainability transitions that are rooted in self-determination and epistemic emancipation of marginalised people, as opposed to shamelessly advancing Western worldviews.<sup>322</sup> Moreover, the current changes in developing countries are found to be driven by locally based, sustainable experimentation within communities, showing that more just and sustainable technological development routes are indeed possible. If we were to contribute, instead of imposing on, to these already existing processes by allowing access to advanced technologies or sharing research/knowledge capabilities, this could broaden the impacts of innovation by not only focusing on technological transition, but also advancing the sustainable

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<sup>320</sup> Okereke, C. (2010), *Climate justice and the international regime*, WIREs Climate Change, 1(3), p. 471, <https://doi.org/10.1002/wcc.52>

<sup>321</sup> Thakur, S. (2021), *From Kyoto to Paris and Beyond: The Emerging Politics of Climate Change*, India Quarterly, 77(3), p. 379, <https://doi.org/10.1177/09749284211027252>

<sup>322</sup> Ghosh, B., Ramos-Mejia, M., et. al (2021), *Decolonising transitions in the Global South: Towards more epistemic diversity in transitions research*, Environmental Innovation and Societal Transitions, 41, p. 108, <https://doi.org/10.1016/j.eist.2021.10.029>

socio-economic transition of less developed countries, directly contributing to application of the epistemic justice in sustainable transition as intended under the UN SDGs.<sup>323</sup>

We are very fortunate to live in an age when society is more interconnected than ever and has the capacity to constantly evolve and develop limitlessly across virtually all industries. The sheer amount of knowledge and resources that we have collectively acquired over the last two industrial revolutions begs to be used and shared to the fullest extent to ensure rapid, all-inclusive, non-discriminatory progress in the sustainability transition. In fact, one of the main reasons we have made such rapid advances in innovation, specifically in the renewable energy technology sector, is precisely the active involvement of different stakeholders, be it users, traditional knowledge holders or interest groups. Active engagement of these stakeholders is of the utmost importance; thus, at this point, the notion of sharing knowledge and technologies, as well as accepting non-traditional epistemic sources, should be viewed not only as democratic but also as an efficiency factor, as it clearly increases the pace and success in transitioning to a sustainable economic system.<sup>324</sup> Even more so, Van Welie has found that specifically in low-income communities, the undermining and exclusion of local stakeholders in decision-making processes decrease the success rate of sustainability transitions.<sup>325</sup> Therefore, instead of facilitating the existing underrepresentation of local stakeholders, possibly, we could pivot to epistemically just mechanisms that embrace traditional practices and indigenous knowledge, also known as epistemic communities. As put forward by Haas in 1992, the establishment of epistemic communities requires the following characteristics: (i) shared values and reasons for pursuing community activities, (ii) shared knowledge base, (iii) understanding of synergies between stakeholders, and (iv) common institutional organisms.<sup>326</sup> To further this notion, it is exactly the differences between various stakeholder groups— academics, governments, non-governmental organisations and local communities – that could help determine how to approach the complex, interdisciplinary issue of climate change policy. Despite the different backgrounds, which

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<sup>323</sup> Kohler, *supra* Note 303, p. 15

<sup>324</sup> Fagerberg, J. (2018), *Mobilizing innovation for sustainability transitions: A comment on transformative innovation policy*, Research Policy, 47(9), p. 1574, <https://doi.org/10.1016/j.respol.2018.08.012>

<sup>325</sup> van Welie, M.J., Romijn, H.A. (2018), *NGOs fostering transitions towards sustainable urban sanitation in low-income countries: Insights from Transition Management and Development Studies*, Environmental Science & Policy, 84, p. 254, <https://doi.org/10.1016/j.envsci.2017.08.011>

<sup>326</sup> Haas, P.M. (1992), *Introduction: epistemic communities and international policy coordination*, International Organization, 46(1), p. 3, <https://doi.org/10.1017/S0020818300001442>

ironically are the reason for the existing global inequalities and power imbalances, pooling such knowledge and expertise together would surely amount to a more efficient approach to the environmental crisis, with the added benefit of alleviating the epistemic injustice perpetually experienced by marginalised communities and indigenous peoples.<sup>327</sup> For tackling an issue as dynamic and complex as climate change, it makes absolute sense to consider differing viewpoints and alternative knowledge to collaboratively develop a semblance of the necessary measures to address the crisis. The existing climate policies do not ensure and successfully facilitate such multi-dimensional approaches. Moreover, the lack of a commonly agreed-upon framework for developing such mechanisms significantly undermines the legitimacy and transferability of community-based initiatives and reinforces the existing non-recognition of local capabilities in these contexts.<sup>328</sup> In practice, the preconditions for the successful establishment and implementation of just community-based mechanisms are quite straightforward. Primarily, policymakers need to ensure access to necessary equipment and create engaging, participatory dialogue between them and the local community, paying special attention to respecting the traditional cultural practices and habits in indigenous communities to avoid negative impacts from technological transition.<sup>329</sup> For example, in many regions of the World, forests are considered not only as a commodity but often embody spirituality and identity of the local community. This is a cultural context that Western companies frequently overlook, seeing it as an opportunity to scale up the manufacturing/developing of climate technologies. According to the theory of epistemic justice, particularly in cases involving potential access restrictions, developers should engage with communities regarding the non-economic aspects of the transition. This obviously is very hard in cases where the indigenous peoples/communities have not mobilised in an organised group, for example, an association, as there is no representative to participate in any discourse. A great example of an organised community can be found in Colombia. There, a third of the country's territory is managed under a collective ownership agreement of indigenous and Afro-Colombian communities, which gives them the capability to be involved in any decision-making processes on

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<sup>327</sup> Goyal, N., Howlett, M. (2020), *Who learns what in sustainability transitions?*, Environmental Innovation and Societal Transitions, 34, p. 314, <https://doi.org/10.1016/j.eist.2019.09.002>

<sup>328</sup> Kligyte, G., Melvold, J., Pratt, S., Bowdler, B. (2025), *Educating for sustainable and equitable futures: A transdisciplinary future-making capability framework*, Futures, 173, p. 2, <https://doi.org/10.1016/j.futures.2025.103665>

<sup>329</sup> Ruiz-Campillo, X. (2025), *Just transitions in climate and sustainable governance: a perspective from the South*, In E. Domorenok, P. Graziano, & K. Zimmermann (Eds.), *The Eco-Social Polity?: Theoretical, Conceptual and Empirical Issues*, Bristol University Press, p. 277, <https://doi.org/10.2307/jj.18323757.28>

deforestation or land-use. This is one of many examples around the world where communities have mobilised to gain recognition and ensure representation in decision-making on wider processes impacting their lives.<sup>330</sup> In practice, though, as of yet, there are no concrete legislations or frameworks that would facilitate the establishment of such community organisations; as a result, a lot of indigenous people and groups are either not capable or even aware of the possibility of pursuing such a process. This is where the developed nations could finally assume their favoured “big-brother” role in a just and equitable way by actively working on educating and informing marginalised communities of all available resources to form such groups, instead of exploiting their lack of administrative capabilities and knowledge gaps to, in the best-case scenario, pursue sustainable development and transition goals. By now it should be clear that the acknowledgement of differing worldviews and values, including the ones of indigenous peoples and local knowledge holders is key for achieving successful global environmental governance and it would be very unwise to overlook the pandoras box of potentially groundbreaking discoveries just because the North is not keen to simply engage in a constructive dialogue without patronising marginalised groups and countries.

Given that natural resources and biotopes are global commons, the aforementioned sustainable transitions are inherently connected with the required polycentric, multi-stakeholder approach as set out in Art. 11(2) of the Paris Agreement and, according to Ostrom, are the only ways to ensure the success of managing common-pool resources, which are often related to indigenous communities and their traditional knowledge.<sup>331</sup> As a matter of fact, there have been proposals to create a new *sui generis* model for protecting traditional knowledge, as it does not fit into the existing intellectual property system. This is quite a hard task to achieve, as legally protecting such traditional knowledge requires ensuring that, for example, cultural norms are protected in perpetuity, which counters the existing intellectual property regime. The need to establish a *sui generis* system has been widely discussed within international institutions such as WIPO, UNEP, and the Conference of the Parties to the Convention on Biological Diversity. It

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<sup>330</sup> Atteridge, A. S. et al. (2022), *Exploring Just Transition in the Global South*, Climate Strategies, p. 14, Available on: [https://climatestrategies.org/wp-content/uploads/2022/05/Exploring-Just-Transition-in-the-Global-South\\_FINAL.pdf](https://climatestrategies.org/wp-content/uploads/2022/05/Exploring-Just-Transition-in-the-Global-South_FINAL.pdf)

<sup>331</sup> Kern, F., Rogge, K.S. (2016), *The pace of governed energy transitions: Agency, international dynamics and the global Paris agreement accelerating decarbonisation processes?*, Energy Research & Social Science, 22, p. 15, <https://doi.org/10.1016/j.erss.2016.08.016>

clearly sets out the precondition that the existing regime should be amended to include protections for customary laws and recognition of communal rights over that knowledge, which are pivotal for the acknowledgement of needs and expectations of indigenous and local communities and preserving the integrity of traditional knowledge, whilst practices that might offend or harm the marginalised communities and the use of these common resources by a third party should be avoided.<sup>332</sup> Naturally, the governments of developed nations are not capable of consistently managing and coordinating these non-formal innovation practices, thus, there is a need to assign an intermediary. Such intermediaries are appointed to formalize local communities and facilitate cooperation among stakeholders to uncover new ways to pursue and apply non-traditional innovation to meet societal demands for technological innovation.<sup>333</sup> The intermediaries are of immense help to formalise the cooperation between stakeholders and propose solutions that, instead of using already established practices, analyse the mechanism to provide institutional infrastructure, build local capacities, as well as monitor knowledge flows and ensure equitable partnerships with developed and developing countries' actors.<sup>334</sup> An example of the great advantage of having intermediaries can be seen in Finland's HINKU project, where several carbon-neutral municipalities have been established to ensure a just energy transition. It was launched in 2008 by a social responsibility group, involving an intermediary (the Finnish Environmental Institute), with the aim of creating “change laboratories” in small municipalities to facilitate innovation in renewable energy development. This project involved organizing conferences and meetings for community residents, energy audits and development of new organisational forms for decentralised renewable energy systems.<sup>335</sup> In the case of HINKU, the intermediary served as a facilitator for involving scientists and industry experts in the project to perform the quantitative analysis and “science” part, as well as provide seminars for local residents to build understanding on energy transitions. Moreover, the intermediary used their knowledge base and connections to

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<sup>332</sup> Stoianoff, N. P. (2017), *A Governance Framework for Indigenous Ecological Knowledge Protection and Use*, In R. LEVY, M. O'BRIEN, S. RICE, P. RIDGE, & M. THORNTON (Eds.), *New Directions for Law in Australia: Essays in Contemporary Law Reform*, ANU Press, p. 236, <https://doi.org/10.22459/ndla.09.2017.20>

<sup>333</sup> Matschoss, K., Heiskanen, E. (2017), *Making it experimental in several ways: The work of intermediaries in raising the ambition level in local climate initiatives*, *Journal of Cleaner Production*, 169, p. 86, <https://doi.org/10.1016/j.jclepro.2017.03.037>

<sup>334</sup> Stewart, J.K., Sampsa, H. (2008), *Intermediaries, Users and Social Learning in Technological Innovation*, *International Journal of Innovation Management*, 12(3), p. 312, <https://doi.org/10.1142/S1363919608002035>

<sup>335</sup> Saikku, L., Tainio, P., Hilden, M. et al. (2017), *Diffusion of solar electricity in the network of private actors as a strategic experiment to mitigate climate change*, *Journal of Cleaner Production*, 142(4), p. 2731, <https://doi.org/10.1016/j.jclepro.2016.11.003>

create a bottom-up, experimental environment for finding solutions to the transition to renewable energy in collaboration with local citizens, small businesses and municipal representatives.<sup>336</sup> The importance of applying varied information and knowledge is efficient even if looked at from a basic probability perspective – the more distributed your variables are, the more chances you have to find the one you are looking for. In sustainability transitions, this is especially important as the simple process of exchanging ideas can not only help find innovative solutions, but also positively influence the opinions and attitudes of local stakeholders to mitigate the possibility to encounter scenarios like the “Not in my backyard” movement.<sup>337</sup>

One of the greatest things about community initiatives like HINKU is the fact that lessons learned can be shared and transferred to other communities and even regions, aiming for a holistic approach to sustainable transition. This process – the aggregation of lessons – was promoted by Raven as a way to create global networks that facilitate the diffusion of acquired knowledge and the sharing of experiences with other groups on a similar transition trajectory. In practice, it involves more formal measures, such as standardisation and modelling, as well as informal knowledge exchange through site visits and the establishment of stakeholder discussion groups. This allows us to share not only the technical aspects of implementing a project but also reduces the institutional and capability barriers that are often the biggest hang-ups in the successful creation of local community initiatives.<sup>338</sup> These networking activities and diversity of knowledge sources are key to ensuring a successful and sustainable adoption of technologies and transitions.<sup>339</sup> Developing countries and small island developing states face the biggest challenges in food security and climate change; consequently, they are in dire need of assistance to sustainably manage their natural resources, preserve biodiversity and increase their resilience to environmental catastrophes. It is a clear prerogative of the United Nations to facilitate such aid; however, it often materialises in the developed nations applying Western worldview-based measures. As an

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<sup>336</sup> Heiskanen, E., Jalas, M., Rinkinen, J. Tainio, R. (2015), *The local community as a “low-carbon lab”: Promises and perils*, Environmental Innovation and Societal Transitions, 14, p. 162, <https://doi.org/10.1016/j.eist.2014.08.001>

<sup>337</sup> Geels, F., Raven, R. (2006), *Non-linearity and Expectations in Niche-Development Trajectories: Ups and Downs in Dutch Biogas Development (1973–2003)*, Technology Analysis & Strategic Management, 18(3–4), p. 376, <https://doi.org/10.1080/09537320600777143>

<sup>338</sup> Raven, R.P.J.M., Geels, F.W. (2010), *Socio-cognitive evolution in niche development: Comparative analysis of biogas development in Denmark and the Netherlands (1973–2004)*, Technovation, 30(2), p. 89, <https://doi.org/10.1016/j.technovation.2009.08.006>

<sup>339</sup> Colombelli, A., Quatraro, F. (2019), *Green start-ups and local knowledge spillovers from clean and dirty technologies*, Small Business Economics, 52(4), p. 776, <https://doi.org/10.1007/s11187-017-9934-y>

alternative, it has been proposed to apply agroecological practices that entail integration of technologies and measures within a specific socio-economic and ecological environment, adapting them to the local resources and cultural capital of indigenous/traditional communities to avoid technological dependency and preserve cultural *status quo*.<sup>340</sup> In the agriculture sector, the contributions of indigenous people, through the sharing of their heritage agriculture and traditional knowledge, have proven to be an excellent addition to the development of technological innovations that are not solely dependent on foreign, high-tech agricultural technologies. Moreover, it has been proven that non-formal innovation, which integrates traditional practices with new technologies, especially when tailored to the local environment, is effective. For example, the restoration of the Sahel' in Niger by using old and almost forgotten traditional method of assisted natural regeneration of trees in cultivated fields was imperative in reforestation and conservation of the forest. The use of traditional practices was facilitated by the fact that the state transferred the property rights over trees to farmers, which allowed them to pursue non-traditional innovation without the pressure to conform to constantly advancing technological developments.<sup>341</sup> Another example of the benefits of diffusion and aggregation of lessons is the Earth Charter in Guatemala initiative spearheaded by the Maya-Q'eqchi' Indigenous communities. The Charter elucidated the Mayan principles and values, which preclude viewing the Earth, the Cosmos and people as inherently mutually dependent. Subsequently, this Charter was translated and provided to various stakeholders to facilitate understanding of the holistic worldview of the Mayan peoples, which encouraged the establishment of numerous other initiatives rooted in traditional practices, such as community reforestation training, recycling campaigns and educational centres.<sup>342</sup> We need to acknowledge that the broader the inclusion and integration of traditional practices and local community knowledge, the more it will serve not only for achieving an epistemically just transition but also for providing much-needed legitimacy to otherwise narrowly interpreted and often discounted environmental and climate policies.

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<sup>340</sup> Brat, P. (2019), *The agroecological transition of agricultural systems in the Global South*, Agricultures et défis du monde collection, AFD, CIRAD, Éditions Quæ, p. 18, <https://doi.org/10.35690/978-2-7592-3057-0>

<sup>341</sup> Sendzimir, J., Reij, C.P., Magnuszewski, P. (2011), *Rebuilding resilience in the Sahel: Regreening in the Maradi and Zinder regions of Niger*, Ecology and Society 16(3), pp. 5-6, <http://dx.doi.org/10.5751/ES-04198-160301>

<sup>342</sup> Coscieme, L., da Silva Hyldmo, H., Fernández-Llamazares, A., Palomo, I., Mwampamba, T., Valle, M. (2020), *Multiple conceptualizations of nature are key to inclusivity and legitimacy in global environmental governance*, Environmental Science & Policy, 104, p. 40, <https://doi.org/10.1016/j.envsci.2019.10.018>

### 3.3. Finding the North Star: Reorienting Governance

Collaboration is an integral aspect of any sustainable, long-term governance mechanism, but it is particularly significant in the context of climate policy. As outlined before, multilateralism is not a novel concept and has been employed since the establishment of the WTO; however, there has now been a pivot to a hybrid multilateralism approach. This concept garnered increased attention in the 2015 COP21 in Paris, where non-state observers, i.e. NGOs, community representatives and academia came out in huge numbers to lobby for just climate governance and pushed for the adoption of a new outlook on climate governance making sure that governmental actors understand that non-governmental actors can and should play a significant part in climate policy negotiations.<sup>343</sup> This civil action further cemented the need for UNFCCC to actively engage, facilitate and organise international climate action involving non-governmental stakeholders. One of the projects that can serve as an example of hybrid multilateralism is the Non-state Action Zone for Climate Action (NAZCA) platform, which, as of 2026, has brought together 47369 actors from various segments of society including private companies, investors and local organisations to collaborate on closing the emissions gap, ensuring just environmental transition and scaling-up on common climate actions.<sup>344</sup> The persistence and legitimacy of hybrid multilateralism have shown that non-state actors serve an essential role in resolving international environmental issues. Even though it is widely regarded as the most effective form of global commons governance, the issues of the North-South divide and power imbalances between state and non-state actors persist due to widely differing, and often conflicting, interests and priorities.<sup>345</sup> It is imperative to establish a holistic approach to innovation governance, taking into account not only the selected few but all the factors that might influence its effectiveness, regardless of how convenient they are for specific stakeholders. The traditional supply-and-demand mechanism that governs research and innovation policies is entirely deficient and needs to be reformed by linking instruments across a broader

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<sup>343</sup> Bäckstrand, K., Kuyper, J. W., Linnér, B. O., Lövbrand, E. (2017), *Non-state actors in global climate governance: from Copenhagen to Paris and beyond*, *Environmental Politics*, 26(4), p. 562, <https://doi.org/10.1080/09644016.2017.1327485>

<sup>344</sup> United Nations Climate Change (2026), *Non-State Actor Zone for Climate Action*, Available on: <https://unfccc.int/ccj>

<sup>345</sup> Nasiritousi, N., Hjerpe, M., Linnér, B.O. (2016), *The roles of non-state actors in climate change governance: understanding agency through governance profiles*, *International Environmental Agreements: Politics, Law and Economics*, 16(1), p. 114, <https://doi.org/10.1007/s10784-014-9243-8>

scope.<sup>346</sup> Sustainability is not merely a doctrine of science with the ultimate goal of wealth accumulation, but a living organism constantly striving to find balance between ecological and social systems, ultimately aiming to understand the preconditions for ensuring common global longevity, requiring inclusive and multidisciplinary governance mechanisms.<sup>347</sup>

### 3.3.1. Shift from Nature as a Commodity to Environmental Stewardship

The prevailing notion in sustainable transition that ecosystem services are the foundation of our conservation strategies inherently implies that only the resources or ecosystems that can be profited from deserve such protection. We are consistently devaluing nature by commodifying its resources and leaving it at the mercy of market conditions.<sup>348</sup> By focusing on economic growth, the sustainable development movement loses the focus on who they are doing all this for, who will the “good” economy really serve? All the goals of sustainable transition are admirable – the reduction of pollution, switching from fossil fuels to renewable energy and conserving nature, to name a few, yet these processes inadvertently put a price on the environment and that is where it all gets slightly concerning: who are we to put a price on, for example, river streams that power our generators or ancient prints of the Mayan communities?<sup>349</sup> So far it has been more than clear that market-based approaches, the EU ETS, Carbon Border Adjustment Mechanism and TRIPS regime, have taken the forefront in climate change policy; however it can be reasonably argued that this business-as-usual thinking might fall short in achieving the intended goals, so there is a clear necessity for a swift and determined shift towards a more multi-faceted approach to ensure *collective* achievement of (not only) the Paris Agreement targets, whilst also adhering to the internationally accepted principles of fair and equitable development.<sup>350</sup> The typically Eurocentric approach that all climate solutions are and should be made profitable can be highly detrimental to less protected society members, especially in the Global South. Making transition economically feasible might make it sustainable and appealing, alas it does not make it just. If Western countries building their sustainable transitions and achieving their climate goals at the expense of the labour and resources

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<sup>346</sup> Boon, W., Edler, J. (2018), *Demand, challenges, and innovation. Making sense of new trends in innovation policy*, Science and Public Policy, 45(4), p. 440, <https://doi.org/10.1093/scipol/scy014>

<sup>347</sup> Zhang, Y. (2020), *The map is not the territory: coevolution of technology and institution for a sustainable future*, Current Opinion in Environmental Sustainability, 45, p. 61, <https://doi.org/10.1016/j.cosust.2020.08.017>

<sup>348</sup> McCauley, D. (2006), *Selling out on nature*, Nature, 443, p. 27, <https://doi.org/10.1038/443027a>

<sup>349</sup> Wilson, *supra* Note 256, p. 95

<sup>350</sup> Thakur, *supra* Note 321, p. 378

of the people in the Global South is just perceived as “outsourcing” capabilities and increasing the social welfare of the local communities, the systemic inequalities are bound to persist. Is the profit really worth it?<sup>351</sup> Moreover, the valuation of environmental resources is completely subjective. By focusing climate policy on financial incentives, the basic rules of macroeconomics, which predominantly rule the Western policies as such, come into play, adding the dimensions of competition and individualism that are foreign to nations and societies that historically have been valuing community and reciprocity instead. This, in turn, will inevitably change the people's perception of nature and each other, effectively harming the existing ethical obligations and communal regulations and consequently severely diminishing the prevalence of environmental stewardship in traditional communities.<sup>352</sup> Understandably, the discussion on environmental policy is not only about economic efficiency but also the ethical challenges in ensuring a just sustainable transition for all. If the usefulness of nature to humans is valued higher than its innate value, the conventions of, for example, rural communities in developing countries run the risk of being critically undermined. For the Global North this might just be a prickly moral consideration, but for marginalised communities in the developing world it presents an existential threat to their self-determination and cultural legacy.<sup>353</sup> International institutions should be focusing on capacity-building and boosting adoption-capabilities in the developing countries because: (i) it will make their sustainable development projects more efficient and (ii) it will empower local communities to understand and actively engage in the transition process. At the end of the day, what initially might seem like a socially just process (for example, investment for building renewable energy infrastructure) can turn into total destruction of the indigenous peoples as was seen in Isthmus of Tehuantepec, Mexico, when wind farms forcibly displaced local communities raising serious

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<sup>351</sup> Zografos, C., Robbins, P. (2020), *Green Sacrifice Zones, or Why a Green New Deal Cannot Ignore the Cost Shifts of Just Transitions*, One Earth, 3(5), p. 543, <https://doi.org/10.1016/j.oneear.2020.10.012>

<sup>352</sup> Gomez – Baggethun, E., de Groot, R., et al. (2010), *The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes*, Ecological Economics, 69(6), p.1216, <https://doi.org/10.1016/j.ecolecon.2009.11.007>

<sup>353</sup> Corbera, E. (2012), *Problematizing REDD+ as an experiment in payments for ecosystem services*, Current Opinion in Environmental Sustainability, 4(6), p. 614, <https://doi.org/10.1016/j.cosust.2012.09.010>

procedural justice concerns,<sup>354</sup> and in India where solar energy parks lead to effective exclusion and land expropriation of lower caste farmers highlighting recognition injustice.<sup>355</sup>

In its scope, art. 11 of the Paris agreement states very clearly that climate policy should focus on individual, needs-based capacity building, encouraging local ownership, applying local practices as well as fostering participation of communities in the transition processes. In fact, capacity building is such a pivotal concern that the Paris Committee on Capacity Building was established in 2015 to facilitate identification of existing and emerging knowledge and adoption capability gaps, giving guidance on how to address them.<sup>356</sup> The community led grassroots perspective on innovation was put forward by Sefyang and Smith who proposed focusing on social innovations in the local context by deriving from the principles of strategic niche management theory and multi-stakeholder structures.<sup>357</sup> In general, bottom-up innovation and transitions are considered to be much more just and sustainable than the usual regulation imposing global order transition practices. If there is no real cooperation between the "traditional governance" under UNFCCC regime and local governments and communities in the Global South, the old-world countries risk losing their influence in overseeing sustainable transition consequently having virtually no control on how and if at all the global climate objectives will be met. Already, in comparison to the start of the century, there has been a significant increase in South-South trade and national bottom-up mechanisms for sustainable development placing huge leverage in the hands of developing country actors. On one hand it is a great outcome from the justice and self-determination perspective; however, on the other hand, if developing state governments enact national environmental legislation, for example, voluntary and mandatory standards and certification procedures which circumvent the international governance models, it will inevitably lead to fragmentation of international climate policy, which directly counters what international

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<sup>354</sup> Velasco Herrejon, P., Savaresi, A. (2020), *Wind Energy, Benefit-Sharing and Indigenous Peoples: Lessons from the Isthmus of Tehuantepec, Southern Mexico*, Oil, Gas and Energy Law Journal, 18(1), p. 14, <http://dx.doi.org/10.2139/ssrn.3337142>

<sup>355</sup> Yenneti, K., Day, R., Golubchikov, O. (2016), *Spatial justice and the land politics of renewables: Dispossessing vulnerable communities through solar energy mega-projects*, Geoforum, 76, p. 97, <https://doi.org/10.1016/j.geoforum.2016.09.004>

<sup>356</sup> d'Auvergne, Crispin, and Matti Nummelin, (2017), Capacity-building (Article 11), In: Daniel Klein, and others (eds), *The Paris Agreement on Climate Change: Analysis and Commentary*, Oxford Law Pro, p. 285, <https://doi.org/10.1093/law/9780198789338.003.0016>

<sup>357</sup> Sefyang, G., Haxeltine, A. (2012), *Growing grassroots innovations: exploring the role of community-based initiatives in governing sustainable energy transitions*, Environment and Planning C: Government and Policy, 30(3), p. 382, <https://doi.org/10.1068/c10222>

organisations and treaties have intended to achieve.<sup>358</sup> That is not to say that decentralisation of climate policy is necessarily a bad thing per se, it just creates uncertainties and makes the World less likely to respond to climate crises in a mobilised and unified manner. However, if looking specifically at intellectual property regime, decentralisation and focus on establishing customised national systems as long as they do not blatantly infringe or significantly undermine the global intellectual property regime as a whole, would for sure decrease the exploitation of developing countries and signal a clear shift towards more just and representative transition. That being the case, it is apparent that hybrid intellectual property and climate governance models are the way to go. The decentralisation of regulation will significantly reduce the international (North-South) tensions rising from the Western rule over the developing world by ensuring that customary institutions and community agency of local peoples is not undermined consequently strengthening often fragile trust between Global South and North and ensuring a long-term just sustainable development across the board.<sup>359</sup> An interesting approach is the Just Rural Transition initiative proposed by Meridian Institute in the United States. In essence, the notion precludes building low-carbon transition and land use transformations around rural and indigenous groups. It starts with fostering resilient livelihoods and jobs in agriculture centred communities via facilitation of sustainable food production, stewardship over nature commons, ensuring land rights and securing adequate compensation for local residents who protect and restore ecosystems and carbon sinks to offset the environmental impacts of energy transition.<sup>360</sup> Even though the institute was forced to cease its activities in July 2025 due to significant cuts of funding by the Trump administration, their legacy lives on through the communities all over the world and, hopefully, their methods for regulating sustainability transitions and climate initiatives will be used as an example by international policymakers. A great example of Just Rural Transition in action can be found in Guatemala where in 1995 rights to 350 thousand hectares of the Maya Biosphere Reserve was granted to the indigenous Mayan communities via community concession contracts. Managed by the Association of Forestry Communities of Peten (*Asociación de Comunidades Forestales de Petén*) the indigenous Mayan people actively participate in conservation activities, sustainable

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<sup>358</sup> van der Ven, H., Sun, Y., Cashore, B. (2021), *Sustainable commodity governance and the global south*, Ecological Economics, 186, p. 3, <https://doi.org/10.1016/j.ecolecon.2021.107062>

<sup>359</sup> Rakatama, A., Pandit, R. (2020), *Reviewing social forestry schemes in Indonesia: Opportunities and challenges*, Forest Policy and Economics, 111, p. 6, <https://doi.org/10.1016/j.forpol.2019.102052>

<sup>360</sup> Meridian Institute, *Just Rural Transition*, Available on: <https://merid.org/case-studies/just-rural-transition/>

forestry management and tourism services. It was calculated that between 2014 and 2019, the Association has generated 50 million USD in revenue and created over 7000 jobs. The territory, as of 2023, has been expanded to 500 thousand hectares making it one of the largest community managed forests in the World. As for the quantitative environmental impacts, (i) less than 1% of forest fires in the Reserve occurred in the areas managed by the community and (ii) they have managed to consistently limit the annual deforestation rate under 1% showing that community stewardship indeed is a very viable and realistic way to ensure sustainable energy transition by managing and sustaining carbon sinks. This model has not only shown tangible economic benefits but also managed to simultaneously improve the welfare of local communities and conservation of nature ecosystems.<sup>361</sup> This example directly contradicts the Western narrative that developing countries are incapable of independently managing sustainable transition as it is entirely possible, provided that international organisations under the UN regime provide capacity-building administrative support, whilst allowing the application of traditional knowledge and practices and, avoiding the erasure of local cultural conventions. Of course, this cannot reverse the injustices and systemic inequalities from the exploitative extraction regimes under post-colonialist regime, however, it is a realistic application of procedural, distributive and recognition justice tenets in governance of natural commons so, hopefully, going forward the grievances will slowly subside and we will have achieved just sustainable world order.<sup>362</sup>

Currently, transnational private governance organisations are challenged by the limited proliferation in developing countries, lack of representation of local producers in decision making processes and the fact that compliance costs are primarily levied on the local enterprises due to absence of adequate support from the developed countries. Staorbin found that it is exactly the costs of compliance that push sustainable producers from the Global South to opt out of Western sustainability standards and instead choose regional or national mechanisms.<sup>363</sup> It is clear that if the Northern countries do not figure out a way to make the international climate and intellectual property regime feasible and suitable for the developing countries, more and more regional or

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<sup>361</sup> Otlhogile, *supra* Note 319, p. 5

<sup>362</sup> Mboringong, F.A., Riggs, R.A., Langston, J.D. et al. (2025), *Anticipatory governance for responsible investment in energy transition minerals in the Western Congo Basin*, The Extractive Industries and Society, 24, p. 2, <https://doi.org/10.1016/j.exis.2025.101749>

<sup>363</sup> Staorbin, S. M. (2021), *Credibility beyond compliance: Uncertified smallholders in sustainable food systems*, Ecological Economics, 180, p. 10, <https://doi.org/10.1016/j.ecolecon.2020.106767>

national agreements and systems will be established, undoubtedly undermining the global regulatory framework and making the creation of robust harmonised sustainable development mechanism impossible. There have been laudable efforts under the UNFCCC regime to avoid this fragmentation by establishing advisory bodies and financing mechanisms in hopes that it will incentivise developing countries to participate in the international regime in a bigger capacity. The linking of operation mechanisms, namely the UN CTC&N, Green Climate Fund and Global Environmental Facility, strengthened the UNFCCC regimes capabilities to (i) facilitate climate technology transfer, (ii) develop investment and private finance incentivising policy frameworks and (iii) improve the existing infrastructure to increase support for technology diffusion. By providing advice on technology transfer policy, frameworks and financing through technical assistance, as well as “boots on the ground” capacity and knowledge development activities, the UN tries to increase the absorptive and development capacities of developing countries, whilst making sure that they remain in the global climate and technology development system.<sup>364</sup> Hybrid multilateralism movement is still persistent as various climate justice movements such as Friends of the Earth International, 350.org, Climate Justice Now and others are directly involved in providing climate leadership under the UNFCCC regime whilst maintaining their *status quo* outside of the system campaigning and raising awareness independently.<sup>365</sup> Climate stewardship is being pursued also outside of the UN system by C40 Cities Climate Leadership Group (C40) consisting of 97 cities all over the world accounting for 23% of the global economy covering approximately 920 million people. Their mission is to eradicate reliance on fossil fuels (halving the fossil fuel use in cities by 2030) whilst addressing the impacts and injustices of the climate crisis, focusing on increasing equity and resilience in member cities. It is currently chaired by the Mayor of London Sadiq Khan and Mayor of Freetown Yvonne Aki-Sawyerr, representing the Global North and Global South respectively with members including cities across the whole World.<sup>366</sup> Furthermore, more locally, the Transition Towns civil society movement under the Transition Network has been making waves in just sustainable transition within communities for around 20 years and is an active participant in COP. Their focus lies on addressing climate change

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<sup>364</sup> Minas, *supra* Note 302, p. 149

<sup>365</sup> Guerrero, D. (2011), *The Global Climate Justice Movement*, In: Anheier, H., Glasius, M., Kaldor, M., Park, GS., Sengupta, C. (eds) *Global Civil Society 2011. Global Civil Society Yearbook*, Palgrave Macmillan, p. 123, [https://doi.org/10.1057/9780230303805\\_10](https://doi.org/10.1057/9780230303805_10)

<sup>366</sup> Climate40 Cities, *C40 Cities Annual Report 2024*, pp. 4-5, Available on: [https://www.c40.org/wp-content/uploads/2025/06/C40\\_annual\\_report\\_2024\\_Final.pdf](https://www.c40.org/wp-content/uploads/2025/06/C40_annual_report_2024_Final.pdf)

and peak oil on a community level by local resident-based action. The movement was established in the United Kingdom and Ireland in 2005 and has grown into an international network of local communities spanning over 60 countries. Community-engagement is at the core of the movement as they find that political processes without the backing of local communities and their grassroots initiatives will not be able to catalyse the changes needed for just sustainable transition. Their activities include but are not limited to: creating renewable energy projects, re-greening of cities and fostering of local food production, all carried out by 989 citizen groups (434 active in the last year).<sup>367</sup> These climate justice movements are a direct civil response to the modernisation of ecological processes and trade impact on sustainability, which has dominated the climate policy since the enactment of the Kyoto Protocol. Having foresight in climate policymaking is crucial to be able to pursue anticipatory governance. Rooting governance in local contexts and plural values is the perfect way to ensure not only sustainable but also just transition. Environmental stewardship has immeasurable impact on the resilience of ecological systems and wellbeing of communities in the everchanging conditions of climate crisis. We need to embrace and consider all knowledge systems as equal and recognise the complex polycentric governance mechanisms prevalent in the Global South, that might be unfamiliar for us in the North yet can serve as a great lesson or even just inspiration for international sustainability frameworks as expecting the success of “one-size fits all” approach would be bordering on delusional.

### **3.3.2. Designing Just IP and Technology Transfer Mechanisms**

It is clear that, currently, the sustainability transition and development as such is driven by increasingly capitalistic measures facilitated by extraction-based industries and exploitative processes, which consequently has brought us, as a society, to a point of virtually no return and the future trajectory appears even more bleak. We should start looking at the goal of achieving just sustainable transition not strictly as a challenge, but as an opportunity to address wider societal injustices. We have been presented with the chance to reconstruct the existing systemically discriminatory systems to be holistically sustainable and redistribute the prevailing power imbalances between the Global North and the Global South. This is a prime time to gain a comprehensive understanding on the injustice realities in the incumbent systems and completely

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<sup>367</sup> Transition Network, *Impact*, Available on: <https://transitionnetwork.org/impact/>

rethink how nations and international institutions approach economic and social development.<sup>368</sup> There is a clear disconnect between how developing and developed countries conceive intellectual property regime – the former view them from their experience during public health crises, thus hold that easing of stringent intellectual property rights will increase their access to sustainable technology; however, the latter maintain that the exclusionary nature of intellectual property rights boost innovation as they incentivise research and development.<sup>369</sup> This implicit greed for profit from the side of developed countries is the main driver of innovation, and might in fact create more efficient climate technologies; however, it often results in what economists call the “rebound effect” - the frequency of technology usage is directly correlated to its efficiency – which in practice means that even though there might be efficiency gains from “better” technologies, there will usually also be an increase in the extraction and use of natural resources.<sup>370</sup> The point is that for policymakers to ensure a just sustainable transition through intellectual property rights, they need to evaluate not only the efficiency and increase in innovation but also take account for the indirect externalities of innovation and development on a broader spectrum of climate and society as a whole.<sup>371</sup> To quote Jefferson: *“The end game should be improving very poor voices in the economy and society, not just intellectual play around theoretical regimes.”*<sup>372</sup>

By default, the diffusion of climate technologies requires technology transfer (including reproduction rights) from countries that own these technologies, but more importantly significant investments in increasing the adoptive capacity in the countries receiving such technology via resilient infrastructures.<sup>373</sup> As a matter of fact, South-South flows of technology have been increasing as developing countries have adopted environmental policies that increase the demand for such technologies. This is where the TRIPS Agreement regime comes into play, as currently the most-favoured nation obligation (requiring any privileges granted to a member country to be applied to all others) under the WTO regime, hinders the advancement of technology transfer processes between least developed and developing countries as they cannot apply lower tariffs for

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<sup>368</sup> Nzimande, *supra* Note 284, p. 52

<sup>369</sup> Abbott, F. M. (2009), *Innovation and Technology Transfer to Address Climate Change: Lessons from the Global Debate on Intellectual Property and Public Health*, ICTSD’s Programme on IPRs and Sustainable Development, 24, p. 13, <http://dx.doi.org/10.2139/ssrn.1433579>

<sup>370</sup> Polimeni, J.M., Polimeni, R.I. (2006), *Jevons’ Paradox and the myth of technological liberation*, Ecological Complexity, 3(4), p. 345, <https://doi.org/10.1016/j.ecocom.2007.02.008>

<sup>371</sup> Arnold, E., Astrom, T., Glass, C., de Scalzi, M. (2018), *How should we evaluate complex programmes for innovation and socio-technical transitions?*, Technopolis Group, p. 48, <https://doi.org/10.13140/RG.2.2.24624.25605>

<sup>372</sup> Jefferson, *supra* Note 263

<sup>373</sup> Holzer, *supra* Note 290, p. 443

transactions, including climate technology transfer, between each other.<sup>374</sup> This is not the only reason for proposing the renegotiation of TRIPS Agreement, which, could prove beneficial not only to developing countries but also large economies. Reasons include, but are not limited to: (i) constant development of new intellectual property standards on all levels (including bilateral trade), thus to conserve regulatory robustness there is a need to consolidate all the TRIPS Plus agreements; (ii) TRIPS Agreement is the only one in history of WTO that has already been amended implying that it could be done again; (iii) emerging economies and developed countries have developed coalitions and frequently marginalise least and less developing countries due to market facts, but are willing to compromise via allowing slightly differential treatment to facilitate new TRIPS standards (view duration of derogation as more important than the exemption as such) to ultimately acquire new markets in least developed countries, and (iv) the increasingly frequent global issues in AI, digital trade, international data flows, as well as global health issues, has forced members to deliberate on what “trade related aspects” of intellectual property really are.<sup>375</sup> One of possible amendments could be the inclusion of often overlooked concept of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC)<sup>376</sup> established under the UNFCCC, providing specific responsibilities for developed countries. Under the UNFCCC regime the interpretation of this concept widely differs between the countries of Global South and Global North – former sticking to the literal interpretation of Art. 3(1) of UNFCCC, whereas the latter prefer a dynamic self-differentiation based on economic realities. Another glossed over provision of the TRIPS Agreement is the Art. 68 establishing the TRIPS council,<sup>377</sup> which currently functions in an ad hoc format typically in times of crisis and to address detrimental disagreements or fundamental acute issues but does not carry out regular review or revisions of the TRIPS Agreement itself. There have been proposals to enforce Art. 68 of TRIPS Agreement by establishing a supervisory authority in form of committee/s of industry professionals elected by WTO member countries, similarly, as it has been done with establishment of expert committees at WIPO.<sup>378</sup> The establishment of such committee will undoubtedly help comprehensively evaluate whether there is a need for updating the TRIPS Agreement and, if there is (and there is), take on

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<sup>374</sup> Shabalala, *supra* Note 91, p. 12

<sup>375</sup> Yu (2025), *supra* Note 288, pp. 66-71

<sup>376</sup> UNFCCC, *supra* Note 148, Art. 3.1

<sup>377</sup> TRIPS Agreement, *supra* Note 44, Art. 68

<sup>378</sup> Deere Birbeck, C. (2016), *The World Intellectual Property Organisation: A Reference Guide*, Edward Elgar Press, pp. 76-80, ISBN: 9781785364778

the role of facilitating and governing the negotiations between the member states.<sup>379</sup> This committee will also facilitate the enforcement of the members cooperation requirement under TRIPS Agreement as well as increase the regulatory coordination with other intellectual property rights protection instruments and institutions, which are under direct threat due to the current geopolitical issues, such as, US-China trade war and the war in Ukraine.<sup>380</sup> This is admittedly quite a morbid catalyst for change, nevertheless it gives a great opportunity to limit the rampant multiplication of often discriminatory and notorious TRIPS Plus deals and focus on developing broader, more efficient regional intellectual property agreements that focus on international collaboration, which has been proven to increase the efficiency of legislative instruments.<sup>381</sup> Finally, for TRIPS Agreement to remain relevant, it is necessary to broaden its general scope to include innovation strategies and development in general as (i) innovation is most often out of scope of the eight intellectual property rights protected under TRIPS Agreement, (ii) there has been a significant increase in the use of alternative national incentivisation mechanisms including grants and subsidies, (iii) there is a trend in developing countries to establish novel forms of innovation, for example, “frugal”, “reverse” and “trickle-up” innovation.<sup>382</sup>

The shift is already happening. In the past little attention was paid to how intellectual property regime and climate policy affects traditional communities and indigenous people, but as policymakers are running out of ideas on how to efficiently fight climate change, they have understood that there are valuable lessons in sustainability to be learned from the knowledge systems of indigenous communities, which consequently made them prioritise the representation of these communities in environmental policymaking and put increased focus on conserving their culture, traditional practices and ecosystems.<sup>383</sup> Moreover, the burden of historical responsibility that lies on the shoulders of developed countries for being the primary reason for climate change has already been informally acknowledged, supported by the CBDR-RC provision in UNFCCC, and developed countries have formally accepted their obligation to take the lead and help

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<sup>379</sup> Yu (2025), *supra* Note 288, p. 73

<sup>380</sup> Yu, P. K. (2024), *War and IP*, Boston University Law Review, 49(3), p. 868, Available on: <https://digitalcommons.law.byu.edu/lawreview/vol49/iss3/9>

<sup>381</sup> Yu, P.K. (2023), *Vaccine Development, the China Dilemma, and International Regulatory Challenges*, New York University Journal of International Law & Politics, 55, p. 780, Available on: <https://ssrn.com/abstract=4289910>

<sup>382</sup> Yu (2025), *supra* Note 288, pp. 74-75

<sup>383</sup> Reyes-Garcia, V., Fernandez-Llamazares, A. (2019), *The contributions of Indigenous Peoples and local communities to ecological restoration*, Restoration Ecology, 27(1), p. 3-4, <https://doi.org/10.1111/rec.12894>

developing countries in mitigation and adaptation to climate change.<sup>384</sup> The only caveat though, as I have frequently reiterated, is that there is no common understanding on what qualifies as environmentally sustainable and what just sustainable transition actually entails. To this day there are glorified labour camps referred to as cobalt mines in Democratic Republic of Congo where local people work under abhorrent conditions to extract minerals that are later used for producing mobile phones for the consumers of the Global North.<sup>385</sup> Because of this persistent exploitation and, frankly, human rights abuses, the International Labour Organization (ILO), in collaboration with labour unions, governments and employer's organisations, has produced a framework for just transition: Guidelines for a just transition towards environmentally sustainable economies and societies for all, establishing concrete principles and quantitative goals that facilitate and popularise the concept and practical implications of just sustainable transition.<sup>386</sup> To ensure a sustainable transition, as also was echoed in the conducted interviews, there is an innate need for a pluralistic, multi-faceted policies that are interconnected and cover all aspects of the concept of sustainability. This, however, is a very complicated process to carry out in practice as such policy “packages” (i) go beyond single field of policy, (ii) need to be flexible due to everchanging global political, economic, technical climates, (iii) need to address and accommodate to not only technology but also infrastructure, social and market transitions.<sup>387</sup> The case study on peatland governance in Indonesia is a prime example on how lack of complementarity between technical capabilities, political conditions and cultural practices between policy and local traditions only increases the environmental damages and reinforce the systemic inequalities of indigenous communities.<sup>388</sup> In fact, to ensure compatibility Western policymakers need to be extremely informed on traditional practices and historical and cultural contexts of indigenous local communities, be it in developing countries or on their own turf. As previously mentioned, and already established, one of the preconditions for just sustainable transition and development are rapid advancement in capacity building and closing the knowledge gap. If this step is missed, any new technology transfer facilitation programmes are bound to experience the same faith as the

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<sup>384</sup> Minas, *supra* Note 302, p. 133

<sup>385</sup> Ruiz-Campillo, *supra* Note 329, p. 273

<sup>386</sup> Smith, S. (2017), *Just transition: A report for the OECD*, Just Transition Centre, p. 3, Available on: <https://policycommons.net/artifacts/3857054/may-2017/4663009/>

<sup>387</sup> Kern, *supra* Note 331, p. 2

<sup>388</sup> Tias, P.A., McDermott, C.L., Mulyani, M.E. (2026), *Navigating the nexus between customary norms and state laws in shaping rural forest governance: A case study in Aceh Province, Indonesia*, Forest Policy and Economics, 182, p. 2, <https://doi.org/10.1016/j.forpol.2025.103672>

CTC&N mechanism, which was not inherently faulty, it just lacked specific qualities. Shabalala has elucidated some of the changes that could be made to ensure the proper functioning of mechanisms like CTC&N in his “modest proposal”: (i) industrialised countries shall either retain the intellectual property right or the full non-exclusive rights to license publicly funded technologies, (ii) developed countries shall commit to license or sub-license publicly funded technologies to firms and institutions in developing countries, CTC&N and related collaborative platforms on non-exclusive grant or *pro bono* basis. As an alleviation, similar export prohibitions as for compulsory licensing and public-interest mandates could be applied, limiting the use of licensed technologies within domestic markets or for export to developing countries only.<sup>389</sup> Around 15 years ago, similarly intentioned platform called GreenXchange was launched by Nike, Best Buy and Creative commons to enable companies to freely share their technologies and patents with the goal of boosting innovation and just sustainable development. It ended up being unsuccessful as there were too few patents and licensees became a bit greedy and wanted to get access to know-how, which is a tad more sensitive area for big corporations. Ultimately, as all open-source initiatives it failed as there was no financial incentive from the private sector to participate in open innovation and at the time corporate responsibility and sustainability was of much lesser concern. In the current conditions, this might actually work, particularly if combined with institutionally embedded mechanism such as CTC&N, supported by patent database to make it global and made attractive by offering financial incentives for private companies under the UN Technology Mechanism. This could function as a sort of Business-to-Business platform for commercial transactions under CTC&N with prioritised projects being eligible for funding under the Technology Mechanism to facilitate access to technology in developing countries in collaboration with UN governed intermediaries (NGOs, Climate Justice movements, environmental stewards) that would actively carry out knowledge and expertise sharing activities and capacity-building initiatives to support the global implementation of just sustainable transition. In fact, regulators could involve private investors like Green Power fund whose primary business model is based on investing in renewable energy projects and sustainable development. International Energy Agency has estimated that this partnership could significantly accelerate the renovation of approximately 50 trillion USD worth of power plant infrastructure worldwide.<sup>390</sup>

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<sup>389</sup> Shabalala, *supra* Note 91, p. 26

<sup>390</sup> Chichilnisky, *supra* Note 291, p. 164

What I am proposing, along with other more esteemed representatives of academia, is to create a global, non-exclusivity based, open licensing platform for sharing technology and patent information – essentially an updated version of the CCT&N. This possibly radical approach, in my humble opinion, is exactly what is needed to at least slow down, if not completely avoid, a total climate catastrophe which at this point feels more like impending doom than just a transient geopolitical issue.

## Conclusion

In the words of Oscar Wilde: *“the cynic knows the price of everything, but the value of nothing”*<sup>391</sup> and this is precisely what international intellectual property regime and, frankly, global climate policy embodies. Due to the ever-increasing geopolitical uncertainties and environmental catastrophes, there is a dire need for international institutions to mobilise and collaborate to carry out swift and decisive measures that ensure the equal and indiscriminate protection of the whole society, detaching from the systemically embedded marginalisation of developing countries and local communities. It is imperative to understand that the exploitation of the resource rich countries and citizens of the Global South for facilitating the “sustainability transition” of the Global North by definition cannot be sustainable.

For achieving truly sustainable transition, policymakers need to take focus off from advancing market-based intellectual property rights regimes and incentivising technology transfer to developing countries, that is currently predominantly utilised for expanding business practices to less-regulated countries to gain access to cheap workforce (bordering on modern slavery) and more lenient environmental regulations. Instead, they should work to improve the existing policies by including concrete provisions that require capacity-building, protection of local communities and conservation of their traditional knowledge, practices and nature commons. Moreover, it has been proven that closing the knowledge gap and recognising the importance of traditional knowledge can be a significant driver for improving the socio-ecological resilience of countries, both in the developed and the developing World. Establishing resilient systems both locally and globally, will ensure that the World does not exhaust its capacity which is pivotal for provision of essential services we are deeply reliant on. To quote T. Forsyth: *“‘Justice’ is not simply a quick reference to acting ethically, but rather a source of reasoning for what is considered legitimate. At worse it can become ‘a mere cover for self-interested bargaining’*”<sup>392</sup>

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<sup>391</sup> Wilde, O. (1948), *Lady Windermere’s Fan*, The Wyman-Fogg Company, p. 134

<sup>392</sup> Forsyth, T. (2014), *Climate justice is not just ice*, *Geoforum*, 54, p. 232, <https://doi.org/10.1016/j.geoforum.2012.12.008>

## Bibliography

### Books:

1. Ahmad, Z. (2021). *WTO law and trade policy reform for low-carbon technology diffusion: Common concern of humankind, carbon pricing, and export credit support*. Brill | Nijhoff. <https://doi.org/10.1163/9789004446090>
2. Armillotta, D. M. (2010). *Technology pooling licensing agreements: Promoting patent access through collaborative IP mechanisms*. Nomos Verlagsgesellschaft mbH & Co. KG. <https://doi.org/10.5771/9783845226316>
3. Arnold, E., Astrom, T., Glass, C., & Scalzi, M. D. (2018). *How should we evaluate complex programmes for innovation and socio-technical transitions?* <https://doi.org/10.13140/RG.2.2.24624.25605>
4. Berthels, N. (2009). Case 8. Cambia's biological open source initiative (BiOS). In G. V. Overwalle (Ed.), *Gene Patents and Collaborative Licensing Models*, Cambridge University Press. <https://doi.org/10.1017/CBO9780511581182.015>
5. Boyle, J. (2018). *Public domain: Enclosing the commons of the mind*. Yale University Press. ISBN: 9780300137408
6. Cartwright, M., Morin, J. (2025). 18. Global Intellectual Property Governance: An Assessment of Its Terms, In A. Berger, C. Brandi & E. Kollar (Ed.), *Justice in Global Economic Governance: Normative and Empirical Perspectives on Promoting Fairer Globalisation*, Edinburgh University Press, <https://doi.org/10.1515/9781399530156-022>
7. Chesbrough, H., Bogers, M. (2014). Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation, In Henry Chesbrough, Wim Vanhaverbeke, and Joel West (eds), *New Frontiers in Open Innovation*, Oxford University Press, <https://doi.org/10.1093/acprof:oso/9780199682461.003.0001>
8. Côte, F.-X., Poirier-Magona, E., Perret, S., Roudier, P., Rapidel, B., & Thirion, M.-C. (Eds). (2019). *The agroecological transition of agricultural systems in the Global South*. éditions Quae. <https://doi.org/10.35690/978-2-7592-3057-0>
9. d'Auvergne, C., & Nummelin, M. (2017). Capacity-building (Article 11). In D. Klein, M. P. Carazo, M. Doelle, J. Bulmer, & A. Higham (Eds), *The Paris Agreement on*

- Climate Change*. Oxford University Press.  
<https://doi.org/10.1093/law/9780198789338.003.0016>
10. Deere-Birkbeck, C. (2009). *The implementation game: The TRIPS agreement and the global politics of intellectual property reform in developing countries*. Oxford University Press. ISBN: 9780199550616
  11. Deere-Birkbeck, C. (2016). *The world intellectual property organization (WIPO): A reference guide*. Edward Elgar Publishing. ISBN: 9781785364778
  12. Drexler, J. (Ed.). (2008). *Research handbook on intellectual property and competition law*. Edward Elgar Publishing, ISBN: 9781845420475
  13. Fricker, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.<https://doi.org/10.1093/acprof:oso/9780198237907.001.0001>
  14. Guerrero, D. (2011). The global climate justice movement. In H. Anheier, M. Glasius, M. Kaldor, G.-S. Park, & C. Sengupta (Eds), *Global Civil Society Yearbook 2011*. Palgrave Macmillan UK. [https://doi.org/10.1057/9780230303805\\_10](https://doi.org/10.1057/9780230303805_10)
  15. Holzer, K., Yamineva, Y. (2025). Climate Technologies and International Trade Law: Tensions and Opportunities, In Reins, L., & Zahar, A. (Eds). (2025). *Climate technology and law in the Anthropocene*. Bristol University Press. <https://doi.org/10.2307/jj.18323828>
  16. Hovenkamp, E., & Hovenkamp, H. (2017). Patent pools and related technology sharing. In R. D. Blair & D. D. Sokol (Eds), *The Cambridge Handbook of Antitrust, Intellectual Property, and High Tech*. Cambridge University Press. <https://doi.org/10.1017/9781316671313.019>
  17. Intergovernmental Panel On Climate Change (IPCC) (Ed.). (2023). Innovation, technology development and transfer. In *Climate Change 2022—Mitigation of Climate Change*. Cambridge University Press. <https://doi.org/10.1017/9781009157926.018>
  18. Kur, A., Dreier, T., & Luginbühl, S. (2019). *European intellectual property law: Text, cases and materials*. Edward Elgar Publishing. ISBN: 9781785361548
  19. Lavelle, J.-J. (2023). 6. Towards Pro-poor or Pro-profit? The governance framework for harvesting and trade of devil's claw (*Harpagophytum* spp.) in the Zambezi Region, Namibia. In M. Bollig, A. W. Mosimane, R. V. Nghitevelekwa, S. M. Lendelvo, L. Lacan, L. Kalvelage, C. Greiner, J. Revilla-Diez, C. Hulke, S. Ndwandwe, J.-J. Lavelle,

- E. M. Kioko, H.-P. Vehrs, R. Wynberg, L. J. Hewitson, ... M. M. Kinyanjui (Eds), *Conservation, Markets & the Environment in Southern and Eastern Africa*. Boydell and Brewer. <https://doi.org/10.1515/9781800106642-010>
20. Lever, A., & Timmermann, C. (2025). 19. Justice in global intellectual property governance. In A. Berger, C. Brandi, & E. Kollar (Eds), *Justice in Global Economic Governance*. Edinburgh University Press. <https://doi.org/10.1515/9781399530156-023>
  21. Marcus Aurelius. (2023). *Meditations* (A. S. L. Farquharson, Trans.). Chiltern. ISBN: 9781914602139
  22. Morgera, E., Tsiumani, E., & Buck, M. (2014). *Unravelling the Nagoya protocol: A commentary on the Nagoya protocol on access and benefit-sharing to the convention on biological diversity*. Brill | Nijhoff. <https://doi.org/10.1163/9789004217188>
  23. Ostrom, E. (2009). *Understanding institutional diversity*. Princeton University Press. <https://doi.org/10.2307/j.ctt7s7wm>
  24. Reynolds, G. J., Mogyoros, A., & Dagne, T. W. (Eds). (2025). *Intellectual property futures: Exploring the global landscape of IP law and policy*. University of Ottawa Press. <https://doi.org/10.2307/jj.35989995>
  25. Ruiz-Campillo, X. (2025). Just transitions in climate and sustainable governance: a perspective from the South, In E. Domorenok, P. Graziano, & K. Zimmermann (Eds.), *The Eco-Social Polity?: Theoretical, Conceptual and Empirical Issues*, Bristol University Press, <https://doi.org/10.2307/jj.18323757.28>
  26. Stern, N. (2007). *The economics of climate change: The Stern review*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511817434>
  27. Wilde, O. (2009). *Lady Windermere's fan*, A & C Black
  28. Wynberg, R. (2019). 4. 6 bioprospecting: Moving beyond benefit sharing. In D. Hodgson & J. Byfield (Eds), *Global Africa*. University of California Press. <https://doi.org/10.1525/9780520962514-032>
  29. Wynberg, R. (2023). 4. Benefit sharing and biodiversity commodification in Southern Africa: A failed approach for social justice, equity, and conservation? In M. Bollig, A. W. Mosimane, R. V. Nghitevelekwa, S. M. Lendelvo, L. Lacan, L. Kalvelage, C. Greiner, J. Revilla-Diez, C. Hulke, S. Ndwandwe, J.-J. Lavelle, E. M. Kioko, H.-P. Vehrs, R. Wynberg, L. J. Hewitson, ... M. M. Kinyanjui (Eds), *Conservation, Markets*

- & the Environment in Southern and Eastern Africa. Boydell and Brewer.  
<https://doi.org/10.1515/9781800106642-008>
30. Xaba, N., & Fakir, S. (Eds). (2022). *A just transition to a low carbon future in South Africa*. Mapungubwe Institute for Strategic Reflection (MISTRA).  
<https://doi.org/10.2307/j.ctv2z6qdv5>
31. Zhuang, W. (2017). *Intellectual property rights and climate change: Interpreting the TRIPS Agreement for environmentally sound technologies*. Cambridge University Press. ISBN: 9781107158085a

#### **Journal articles:**

1. Abbott, F. M. (2009). Innovation and technology transfer to address climate change: Lessons from the global debate on intellectual property and public health. *ICTSD's Programme on IPRs and Sustainable Development, Issue Paper, 24*.  
<https://doi.org/10.2139/ssrn.1433579>
2. Abraham, J. (2017). Just transitions for the miners: Labor environmentalism in the Ruhr and Appalachian coal fields. *New Political Science, 39*(2), 218–240.  
<https://doi.org/10.1080/07393148.2017.1301313>
3. Adams, S.H. (2009). Intellectual property rights, political risk and economic growth in developing countries, *Journal of Economics and International Finance, 1*(6),  
<https://doi.org/10.5897/JEIF.9000068>
4. Agyeman, J. (2014). Global environmental justice or Le droit au monde? *Geoforum, 54*, 236–238. <https://doi.org/10.1016/j.geoforum.2012.12.021>
5. Alberio, M., & Moralli, M. (2021). Social innovation in alternative food networks. The role of co-producers in Campi Aperti. *Journal of Rural Studies, 82*, 447–457.  
<https://doi.org/10.1016/j.jrurstud.2020.10.007>
6. AlGhamdi, M. S., & Durugbo, C. M. (2021). Strategies for managing intellectual property value: A systematic review. *World Patent Information, 67*,  
<https://doi.org/10.1016/j.wpi.2021.102080>
7. Aliasghar, O., Un, C. A., Asakawa, K., Haar, J., & Wu, S. (2025). Foreign and domestic university collaboration for outbound open innovation. *Journal of International Management, 31*(2), <https://doi.org/10.1016/j.intman.2025.101232>

8. Anderson, E. (2012). Epistemic justice as a virtue of social institutions. *Social Epistemology*, 26(2), 163–173. <https://doi.org/10.1080/02691728.2011.652211>
9. Anokye, K., & Mohammed, A. S. (2024). Indigenous traditional knowledge for cleaner waste systems and sustainable waste management system in Ghana. *Cleaner Waste Systems*, 9, 100165. <https://doi.org/10.1016/j.clwas.2024.100165>
10. Arjjumend, H. (2018). Nagoya protocol and participation of indigenous people and local communities in policy making process and benefit sharing. *Journal of Politics and Governance*, 7(1), 39. <https://doi.org/10.5958/2456-8023.2018.00005.0>
11. Arora, S., Ghosh, B., & Stirling, A. (2026). Decolonising innovation in sustainability transitions for pluriversal justice and wellbeing. *Environmental Innovation and Societal Transitions*, 58, <https://doi.org/10.1016/j.eist.2025.101064>
12. Athreye, S., Batsakis, G., & Singh, S. (2016). Local, global, and internal knowledge sourcing: The trilemma of foreign-based R&D subsidiaries. *Journal of Business Research*, 69(12), 5694–5702. <https://doi.org/10.1016/j.jbusres.2016.02.043>
13. Bäckstrand, K., Kuyper, J. W., Linnér, B.-O., & Lövbrand, E. (2017). Non-state actors in global climate governance: From Copenhagen to Paris and beyond. *Environmental Politics*, 26(4), 561–579. <https://doi.org/10.1080/09644016.2017.1327485>
14. Baker, L., Newell, P., & Phillips, J. (2014). The political economy of energy transitions: The case of South Africa. *New Political Economy*, 19(6), 791–818. <https://doi.org/10.1080/13563467.2013.849674>
15. Baker, S., & Constant, N. L. (2020). Epistemic justice and the integration of local ecological knowledge for marine conservation: Lessons from the Seychelles. *Marine Policy*, 117, 103921. <https://doi.org/10.1016/j.marpol.2020.103921>
16. Barazza, S. (2014). The technology transfer block exemption regulation and related guidelines: Competition law and IP licensing in the EU. *Journal of Intellectual Property Law & Practice*, 9(3), 186–207. <https://doi.org/10.1093/jiplp/jpt235>
17. Barpujari, I., & Sarma, U. K. (2017). Traditional knowledge in the time of neo-liberalism: Access and benefit-sharing regimes in India and Bhutan. *International Indigenous Policy Journal*, 8(1). <https://doi.org/10.18584/iipj.2017.8.1.3>

18. Beaudoin, S., Chaloux, A., Fequino, L., Dauvergne, P., & Desmarais, R. (2026). Promising governance approaches for reversing biodiversity loss. *Biological Conservation*, 313, <https://doi.org/10.1016/j.biocon.2025.111607>
19. Ben Hassen, T., El Bilali, H., Allahyari, M. S., & Baya Chatti, C. (2025). Traditional irrigation knowledge for sustainable water resource management in arid Environments: Insights from the MENA region. *Journal of Arid Environments*, 231, <https://doi.org/10.1016/j.jaridenv.2025.105466>
20. Benkler, Y. (2002). Coase's penguin, or, Linux and 'the nature of the firm'. *The Yale Law Journal*, 112(3), <https://doi.org/10.2307/1562247>
21. Benkler, Y. (2013). Commons and Growth: The Essential Role of Open Commons in Market Economies, *The University of Chicago Law Review*, 80(3), 1499-1555, Available on: <https://chicagounbound.uchicago.edu/uclrev/vol80/iss3/12>
22. Berger, M. (2024). Bioethanol sacrifice zones and environmental/ epistemic injustice. A case study in Argentina. *Environmental Science & Policy*, 157, <https://doi.org/10.1016/j.envsci.2024.103782>
23. Boisvert, V., & Caron, A. (2002). The convention on biological diversity: An institutionalist perspective of the debates. *Journal of Economic Issues*, 36(1), 151–166. <https://doi.org/10.1080/00213624.2002.11506447>
24. Bond, E. W., & Saggi, K. (2018). Compulsory licensing and patent protection: A North-South perspective. *The Economic Journal*, 128(610), 1157–1179. <https://doi.org/10.1111/eoj.12434>
25. Boon, W., & Edler, J. (2018). Demand, challenges, and innovation. Making sense of new trends in innovation policy. *Science and Public Policy*, 45(4), 435–447. <https://doi.org/10.1093/scipol/scy014>
26. Bozeman, B., & Gaughan, M. (2007). Impacts of grants and contracts on academic researchers' interactions with industry. *Research Policy*, 36(5), 694–707. <https://doi.org/10.1016/j.respol.2007.01.007>
27. Brewer, J. F. (2012). Revisiting Maine's lobster commons: Rescaling political subjects. *International Journal of the Commons*, 6(2), 319. <https://doi.org/10.18352/ijc.336>

28. Buitenhuis, A. J., & Pearce, J. M. (2012). Open-source development of solar photovoltaic technology. *Energy for Sustainable Development*, 16(3), 379–388. <https://doi.org/10.1016/j.esd.2012.06.006>
29. Burci, G. L., Gostin, L. O., Krech, R., Magnusson, R. S., & Patterson, D. (2017). Advancing the right to health: The vital role of law. *American Journal of Public Health*, 107, <https://doi.org/10.2105/AJPH.2017.304077>
30. Caffentzis, G., & Federici, S. (2014). Commons against and beyond capitalism. *Community Development Journal*, 49(1), i92–i105. <https://doi.org/10.1093/cdj/bsu006>
31. Caldeira, M., Sekinairai, A. T., & Vierros, M. (2025). Weaving science and traditional knowledge: Toward sustainable solutions for ocean management. *Marine Policy*, 174, <https://doi.org/10.1016/j.marpol.2025.106591>
32. Capelli, R., Corsino, M., et al. (2023). Technological Competition and Patent Strategy: Protecting Innovation, Preempting Rivals and Defending the Freedom to Operate, *Research Policy*, 52(6), <https://doi.org/10.1016/j.respol.2023.104785>
33. Castellaneli, C.A., Parra, C., da Rosa Pires, A. (2025). The Politics of Possibility in Just Transitions: A Foucauldian Reading, *Energy Research & Social Science*, 129, <https://doi.org/10.1016/j.erss.2025.104375>
34. Chichilnisky, G. (2019). GREEN CAPITALISM, *Journal of International Affairs*, 73(1), <https://doi.org/10.1002/9781118786352.wbieg0488>
35. Colombelli, A., & Quatraro, F. (2019). Green start-ups and local knowledge spillovers from clean and dirty technologies. *Small Business Economics*, 52(4), 773–792. <https://doi.org/10.1007/s11187-017-9934-y>
36. Corbera, E. (2012). Problematizing REDD+ as an experiment in payments for ecosystem services. *Current Opinion in Environmental Sustainability*, 4(6), 612–619. <https://doi.org/10.1016/j.cosust.2012.09.010>
37. Coscieme, L., Da Silva Hyldmo, H., Fernández-Llamazares, Á., Palomo, I., Mwampamba, T. H., Selomane, O., Sitas, N., Jaureguiberry, P., Takahashi, Y., Lim, M., Barral, M. P., Farinaci, J. S., Diaz-José, J., Ghosh, S., Ojino, J., Alassaf, A., Baatuuwie, B. N., Balint, L., Basher, Z., ... Valle, M. (2020). Multiple conceptualizations of nature are key to inclusivity and legitimacy in global environmental governance. *Environmental Science & Policy*, 104, 36–42. <https://doi.org/10.1016/j.envsci.2019.10.018>

38. Côte, F.-X., Poirier-Magona, E., Perret, S., Roudier, P., Rapidel, B., & Thirion, M.-C. (Eds). (2019). *The agroecological transition of agricultural systems in the Global South*. éditions Quae. <https://doi.org/10.35690/978-2-7592-3057-0>
39. Cotter, C. (2008). The implications of Rwanda's paragraph 6 agreement with Canada for other developing countries. *Loyola University Chicago International Law Review*, 5(2), <https://lawecommons.luc.edu/lucilr/vol5/iss2/5>
40. Deaudoin, S., Chaloux, A., et al. (2026), Promising Governance Approaches for Reversing Biodiversity Loss, Biological Conservation, 313, <https://doi.org/10.1016/j.biocon.2025.111607>
41. Dequiedt, V., & Versaevel, B. (2013). Patent pools and dynamic R&D incentives. *International Review of Law and Economics*, 36, 59–69. <https://doi.org/10.1016/j.irl.2013.04.009>
42. Dussaux, D., Dechezleprêtre, A., Glachant, M. (2018). Intellectual property rights protection and the international transfer of low-carbon technologies, *Centre for Climate Change Economics and Policy Working Paper*, 323, ISSN: 25155709
43. Drexl, J. (2024). Responses of intellectual property and competition law to the challenges of climate change. *GRUR International*, 73(8), 715–716. <https://doi.org/10.1093/grurint/ikae085>
44. Euler, J. (2018). Conceptualizing the commons: Moving beyond the goods-based definition by introducing the social practices of commoning as vital determinant. *Ecological Economics*, 143, 10–16. <https://doi.org/10.1016/j.ecolecon.2017.06.020>
45. Fagerberg, J. (2018). Mobilizing innovation for sustainability transitions: A comment on transformative innovation policy. *Research Policy*, 47(9), 1568–1576. <https://doi.org/10.1016/j.respol.2018.08.012>
46. Failler, P., Hachim El Ayoubi, & Bragante, D. (2020). *Seychelles Blue Economy Action Plan*. <https://doi.org/10.13140/RG.2.2.32242.82887>
47. Felin, T., & Zenger, T. R. (2014). Closed or open innovation? Problem solving and the governance choice. *Research Policy*, 43(5), 914–925. <https://doi.org/10.1016/j.respol.2013.09.006>
48. Ferreira, J. J. M., Fernandes, C. I., & Ferreira, F. A. F. (2020). Technology transfer, climate change mitigation, and environmental patent impact on sustainability and economic

- growth: A comparison of European countries. *Technological Forecasting and Social Change*, 150, <https://doi.org/10.1016/j.techfore.2019.119770>
49. Forsyth, T. (2014). Climate justice is not just ice. *Geoforum*, 54, 230–232. <https://doi.org/10.1016/j.geoforum.2012.12.008>
  50. Foyer, J., Martinez Mauri, M., Filoche, G., & Castillo, G. (2024). The institutionalisation of bioculturalism through community protocols: The case of Guna Yala. *The International Indigenous Policy Journal*, 15(1). <https://doi.org/10.18584/iipj.2024.15.1.15872>
  51. Geary, J., Reay, T., & Bubela, T. (2019). The impact of heterogeneity in a global knowledge commons: Implications for governance of the DNA barcode commons. *International Journal of the Commons*, 13(2), 909–930. <https://doi.org/10.5334/ijc.861>
  52. Gebara, M. F., Ramcilovic-Suominen, S., & Schmidlehner, M. F. (2023). Indigenous knowledge in the amazon's bioeconomy: Unveiling bioepistemicide through the case of Kambo medicine. *Forest Policy and Economics*, 154, <https://doi.org/10.1016/j.forpol.2023.103012>
  53. Geels, F., & Raven, R. (2006). Non-linearity and expectations in niche-development trajectories: Ups and downs in Dutch biogas development (1973–2003). *Technology Analysis & Strategic Management*, 18(3–4), 375–392. <https://doi.org/10.1080/09537320600777143>
  54. Ghosh, B., Ramos-Mejía, M., Machado, R. C., Yuana, S. L., & Schiller, K. (2021). Decolonising transitions in the Global South: Towards more epistemic diversity in transitions research. *Environmental Innovation and Societal Transitions*, 41, 106–109. <https://doi.org/10.1016/j.eist.2021.10.029>
  55. Giuri, P., Torrisi, S. (2010). Cross-licensing, Cumulative Inventions and Strategic Patenting, *European Policy on Intellectual Property*, [https://www.researchgate.net/publication/267257874\\_Cross-licensing\\_Cumulative\\_Inventions\\_and\\_Strategic\\_Patenting](https://www.researchgate.net/publication/267257874_Cross-licensing_Cumulative_Inventions_and_Strategic_Patenting)
  56. Gómez-Baggethun, E., De Groot, R., Lomas, P. L., & Montes, C. (2010). The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes. *Ecological Economics*, 69(6), 1209–1218. <https://doi.org/10.1016/j.ecolecon.2009.11.007>

57. Gómez-Baggethun, E., Reyes-García, V., Olsson, P., & Montes, C. (2012). Traditional ecological knowledge and community resilience to environmental extremes: A case study in Doñana, SW Spain. *Global Environmental Change*, 22(3), 640–650. <https://doi.org/10.1016/j.gloenvcha.2012.02.005>
58. Goyal, N., & Howlett, M. (2020). Who learns what in sustainability transitions? *Environmental Innovation and Societal Transitions*, 34, 311–321. <https://doi.org/10.1016/j.eist.2019.09.002>
59. Gross, R., Hanna, R., Gambhir, A., Heptonstall, P., & Speirs, J. (2018). How long does innovation and commercialisation in the energy sectors take? Historical case studies of the timescale from invention to widespread commercialisation in energy supply and end use technology. *Energy Policy*, 123, 682–699. <https://doi.org/10.1016/j.enpol.2018.08.061>
60. Grzegorzczuk, T. (2020). Managing intellectual property: Strategies for patent holders. *The Journal of High Technology Management Research*, 31(1), <https://doi.org/10.1016/j.hitech.2020.100374>
61. Gupta, M. (2020). Right of indigenous communities to prior informed consent under article 7 of the Nagoya protocol and a comparative analysis of its implementation by India and Bhutan. *International Journal on Minority and Group Rights*, 28(1), 36–63. <https://doi.org/10.1163/15718115-bja10003>
62. Haas, P. M. (1992). Introduction: Epistemic communities and international policy coordination. *International Organization*, 46(1), 1–35. <https://doi.org/10.1017/S0020818300001442>
63. Hall, J., Matos, S., & Bachor, V. (2019). From green technology development to green innovation: Inducing regulatory adoption of pathogen detection technology for sustainable forestry. *Small Business Economics*, 52(4), 877–889. <https://doi.org/10.1007/s11187-017-9940-0>
64. Heiskanen, E., Jalas, M., Rinkinen, J., & Tainio, P. (2015). The local community as a “low-carbon lab”: Promises and perils. *Environmental Innovation and Societal Transitions*, 14, 149–164. <https://doi.org/10.1016/j.eist.2014.08.001>
65. Heller, M. A. (1998). The tragedy of the anticommons: Property in the transition from Marx to markets. *Harvard Law Review*, 111(3), 621. <https://doi.org/10.2307/1342203>

66. Hess, C., Ostrom, E. (2003). Artifacts, Facilities, and Content: Information as a Common-pool Resource, *Law and Contemporary Problems*, 66(1), <https://scholarship.law.duke.edu/lcp/vol66/iss1/5>
67. Holgersson, M., & Aaboen, L. (2019). A literature review of intellectual property management in technology transfer offices: From appropriation to utilization. *Technology in Society*, 59, <https://doi.org/10.1016/j.techsoc.2019.04.008>
68. Holmén, M., Sanchez-Preciado, D. J., & Ljungberg, D. (2025). How does technology transfer evolve in rural regions? Transferors, recipients, and the role of absorptive capacity in developing economies. *Journal of Rural Studies*, 118, <https://doi.org/10.1016/j.jrurstud.2025.103688>
69. Ishihara, A., & Yanagawa, N. (2018). Dark sides of patent pools with independent licensing. *International Journal of Industrial Organization*, 57, 1–34. <https://doi.org/10.1016/j.ijindorg.2017.12.005>
70. Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science*, 11, 174–182. <https://doi.org/10.1016/j.erss.2015.10.004>
71. Jenkins, K., Sovacool, B. K., & McCauley, D. (2018). Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change. *Energy Policy*, 117, 66–74. <https://doi.org/10.1016/j.enpol.2018.02.036>
72. Kapczynski, A. (2008). The access to knowledge mobilization and the new politics of intellectual property. *The Yale Law Journal*, 117(5), <https://doi.org/10.2307/20455812>
73. Kato, A. (2004). Patent pool enhances market competition. *International Review of Law and Economics*, 24(2), 255–268. <https://doi.org/10.1016/j.irl.2004.08.010>
74. Kern, F., & Rogge, K. S. (2016). The pace of governed energy transitions: Agency, international dynamics and the global Paris agreement accelerating decarbonisation processes? *Energy Research & Social Science*, 22, 13–17. <https://doi.org/10.1016/j.erss.2016.08.016>
75. Khan, M., Mfitumukiza, D., & Huq, S. (2020). Capacity building for implementation of nationally determined contributions under the Paris Agreement. *Climate Policy*, 20(4), 499–510. <https://doi.org/10.1080/14693062.2019.1675577>

76. Kligyte, G., Melvold, J., Pratt, S., & Bowdler, B. (2025). Educating for sustainable and equitable futures: A transdisciplinary future-making capability framework. *Futures*, 173, <https://doi.org/10.1016/j.futures.2025.103665>
77. Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S., ... Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1–32. <https://doi.org/10.1016/j.eist.2019.01.004>
78. Koutouki, K., & Von Bieberstein, K. R. (2012). The Nagoya protocol: Sustainable access and benefits-sharing for indigenous and local communities. *Vermont Journal of Environmental Law*, 13(3), <https://doi.org/10.2307/vermjenvilaw.13.3.513>
79. Layne-Farrar, A., & Lerner, J. (2011). To join or not to join: Examining patent pool participation and rent sharing rules. *International Journal of Industrial Organization*, 29(2), 294–303. <https://doi.org/10.1016/j.ijindorg.2010.08.006>
80. Lee, W. J., & Mwebaza, R. (2020). The role of the climate technology centre and network as a climate technology and innovation matchmaker for developing countries. *Sustainability*, 12(19), <https://doi.org/10.3390/su12197956>
81. Li, X., & Li, J. (2026). From lab to market: A hybrid model for closing the knowledge gap in technology transfer. *Technovation*, 150, <https://doi.org/10.1016/j.technovation.2025.103437>
82. Mabon, L., Barkved, L., De Bruin, K., & Shih, W.-Y. (2022). Whose knowledge counts in nature-based solutions? Understanding epistemic justice for nature-based solutions through a multi-city comparison across Europe and Asia. *Environmental Science & Policy*, 136, 652–664. <https://doi.org/10.1016/j.envsci.2022.07.025>
83. Marín-García, E. J., Ocampo-López, C., & Bejarano, J. B. P. (2025). Impact of technology transfer on food security in developing territories: A bibliometric analysis and systematic literature review. *Sustainable Futures*, 10, <https://doi.org/10.1016/j.sftr.2025.100770>
84. Matschoss, K., & Heiskanen, E. (2017). Making it experimental in several ways: The work of intermediaries in raising the ambition level in local climate initiatives. *Journal of Cleaner Production*, 169, 85–93. <https://doi.org/10.1016/j.jclepro.2017.03.037>

85. Mboringong, F. A., Riggs, R. A., Langston, J. D., Boedhihartono, A. K., Endamana, D., Ge, Y., Innes, J. L., Lu, J., Meyfroidt, P., Weng, L., & Sayer, J. (2025). Anticipatory governance for responsible investment in energy transition minerals in the Western Congo Basin. *The Extractive Industries and Society*, 24, <https://doi.org/10.1016/j.exis.2025.101749>
86. McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1–7. <https://doi.org/10.1016/j.enpol.2018.04.014>
87. McCauley, D. J. (2006). Selling out on nature. *Nature*, 443(7107), 27–28. <https://doi.org/10.1038/443027a>
88. McGivern, L. (2023). Trade-related aspects of intellectual property rights flexibilities and public health: Implementation of compulsory licensing provisions into national patent legislation. *The Milbank Quarterly*, 101(4), 1280–1303. <https://doi.org/10.1111/1468-0009.12669>
89. Mehta, C., Shankar, U., & Bandopadhyay, T. K. (2016). Low carbon technologies for our cities of future: Examining mechanisms for successful transfer and diffusion. *India Quarterly: A Journal of International Affairs*, 72(4), 410–422. <https://doi.org/10.1177/0974928416671590>
90. Mekonnen, Z., Kidemu, M., Abebe, H., Semere, M., Gebreyesus, M., Worku, A., Tesfaye, M., & Chernet, A. (2021). Traditional knowledge and institutions for sustainable climate change adaptation in Ethiopia. *Current Research in Environmental Sustainability*, 3, <https://doi.org/10.1016/j.crsust.2021.100080>
91. Minas, Kennedy, & Krause. (2020). Navigating a just transition through the climate emergency: What role for finance and technology. *Irish Studies in International Affairs*, 31, <https://doi.org/10.3318/isia.2020.31.2>
92. Mohtat, N., & Khirfan, L. (2023). Epistemic justice in flood-adaptive green infrastructure planning: The recognition of local experiential knowledge in Thorncliffe Park, Toronto. *Landscape and Urban Planning*, 238, <https://doi.org/10.1016/j.landurbplan.2023.104834>
93. Molnár, Z., Fernández-Llamazares, Á., Schunko, C., Teixidor-Toneu, I., Jarić, I., Díaz-Reviriego, I., Ivascu, C., Babai, D., Sáfián, L., Karlsen, P., Dai, H., & Hill, R. (2023). Social

- justice for traditional knowledge holders will help conserve Europe's nature. *Biological Conservation*, 285, <https://doi.org/10.1016/j.biocon.2023.110190>
94. Monast, J. J. (2020). The ends and means of decarbonization: The Green New Deal in context. *Environmental Law*, 50(1), 21-43. <https://doi.org/10.2139/ssrn.3519360>
  95. Monast, J. J., Murray, B. C., Wiener, J. B. (2017). ON MORALS, MARKETS, AND CLIMATE CHANGE: EXPLORING POPE FRANCIS' CHALLENGE, *Law and Contemporary Problems*, 80(1), <https://ssrn.com/abstract=2955940>
  96. Muzan, M. A. (2017). Some insights on the legal measures for access and benefit sharing of genetic resources in Nigeria. *Verfassung in Recht Und Übersee*, 50(1), 30–53. <https://doi.org/10.5771/0506-7286-2017-1-30>
  97. Nasiritousi, N., Hjerpe, M., & Linnér, B.-O. (2016). The roles of non-state actors in climate change governance: Understanding agency through governance profiles. *International Environmental Agreements: Politics, Law and Economics*, 16(1), 109–126. <https://doi.org/10.1007/s10784-014-9243-8>
  98. Negishi, Y. (2025). Multi-level legal protection of traditional knowledge of Arctic indigenous peoples: Decolonizing knowledge production for sustainable development. *Polar Science*, 44, <https://doi.org/10.1016/j.polar.2024.101135>
  99. Nikolic, I., & Galli, N. (2022). Patent pools in 5G: The principles for facilitating pool licensing. *Telecommunications Policy*, 46(4), <https://doi.org/10.1016/j.telpol.2021.102287>
  100. Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Balvanera, P., Bednarek, A. T., Bennett, E. M., Biggs, R., De Bremond, A., Campbell, B. M., Canadell, J. G., Carpenter, S. R., Folke, C., Fulton, E. A., Gaffney, O., Gelcich, S., Jouffray, J.-B., Leach, M., ... Österblom, H. (2020). Principles for knowledge co-production in sustainability research. *Nature Sustainability*, 3(3), 182–190. <https://doi.org/10.1038/s41893-019-0448-2>
  101. Ockwell, D., Byrne, R., Hansen, U. E., Haselip, J., & Nygaard, I. (2018). The uptake and diffusion of solar power in Africa: Socio-cultural and political insights on a rapidly emerging socio-technical transition. *Energy Research & Social Science*, 44, 122–129. <https://doi.org/10.1016/j.erss.2018.04.033>
  102. Oh, C. (2020). Contestations over the financial linkages between the UNFCCC's Technology and Financial Mechanism: Using the lens of institutional interaction.

- International Environmental Agreements: Politics, Law and Economics*, 20(3), 559–575.  
<https://doi.org/10.1007/s10784-020-09474-8>
103. Okereke, C. (2010). Climate justice and the international regime. *WIREs Climate Change*, 1(3), 462–474. <https://doi.org/10.1002/wcc.52>
  104. Olawuyi, D. S. (2018). From technology transfer to technology absorption: Addressing climate technology gaps in Africa. *Journal of Energy & Natural Resources Law*, 36(1), 61–84. <https://doi.org/10.1080/02646811.2017.1379667>
  105. Ooms, G., & Hanefeld, J. (2019). Threat of compulsory licences could increase access to essential medicines. *BMJ*, 365, <https://doi.org/10.1136/bmj.l2098>
  106. Otlhogile, M. & Shirley, R. (2023). The evolving just transition: definitions, context, and practical insights for Africa, *Environmental Research: Infrastructure and Sustainability*, 3(1), <https://doi.org/10.1088/2634-4505/ac9a69>
  107. Palmer, A. C. (2025). Golden rice: A quarter-century of innovation, challenges, and the promise of better nutrition. *The Journal of Nutrition*, 155(9), 2846–2853. <https://doi.org/10.1016/j.tjnut.2025.06.025>
  108. Pesliak, L. D., & Killin, A. (2025). Environmental justice through epistemic diversification: A critical reflection on One Health for just environmental public health. *Environmental Science & Policy*, 173, <https://doi.org/10.1016/j.envsci.2025.104222>
  109. Peuckert, J., & Kern, F. (2023). How user innovation communities contribute to sustainability transitions. An exploration of three online communities. *Environmental Innovation and Societal Transitions*, 49, <https://doi.org/10.1016/j.eist.2023.100785>
  110. Pogge, T. (2005). World poverty and human rights. *Ethics & International Affairs*, 19(1), 1–7. <https://doi.org/10.1111/j.1747-7093.2005.tb00484.x>
  111. Polimeni, J. M., & Polimeni, R. I. (2006). Jevons' Paradox and the myth of technological liberation. *Ecological Complexity*, 3(4), 344–353. <https://doi.org/10.1016/j.ecocom.2007.02.008>
  112. Qunaj, L., Kaltenboeck, A., & Bach, P. B. (2022). Compulsory licensing of pharmaceuticals in high-income countries: A comparative analysis. *The Milbank Quarterly*, 100(1), 284–313. <https://doi.org/10.1111/1468-0009.12557>

113. Rakatama, A., & Pandit, R. (2020). Reviewing social forestry schemes in Indonesia: Opportunities and challenges. *Forest Policy and Economics*, 111, <https://doi.org/10.1016/j.forpol.2019.102052>
114. Raven, R. P. J. M., & Geels, F. W. (2010). Socio-cognitive evolution in niche development: Comparative analysis of biogas development in Denmark and the Netherlands (1973–2004). *Technovation*, 30(2), 87–99. <https://doi.org/10.1016/j.technovation.2009.08.006>
115. Reyes-García, V., Fernández-Llamazares, Á., McElwee, P., Molnár, Z., Öllerer, K., Wilson, S. J., & Brondizio, E. S. (2019). The contributions of Indigenous Peoples and local communities to ecological restoration. *Restoration Ecology*, 27(1), 3–8. <https://doi.org/10.1111/rec.12894>
116. Robinson, D. K. R., Simone, A., & Mazzonetto, M. (2021). RRI legacies: Co-creation for responsible, equitable and fair innovation in Horizon Europe. *Journal of Responsible Innovation*, 8(2), 209–216. <https://doi.org/10.1080/23299460.2020.1842633>
117. Rolin, K. H. (2025). Resisting epistemic exploitation: From institutional remedies to community-based research. *Studies in History and Philosophy of Science*, 111, 63–71. <https://doi.org/10.1016/j.shpsa.2025.05.005>
118. Routledge, P., Cumbers, A., & Derickson, K. D. (2018). States of just transition: Realising climate justice through and against the state. *Geoforum*, 88, 78–86. <https://doi.org/10.1016/j.geoforum.2017.11.015>
119. Runge, C. F., & Defrancesco, E. (2006). Exclusion, inclusion, and enclosure: Historical commons and modern intellectual property. *World Development*, 34(10), 1713–1727. <https://doi.org/10.1016/j.worlddev.2006.02.002>
120. Saikku, L., Tainio, P., Hildén, M., Antikainen, R., Leskinen, P., & Koskela, S. (2017). Diffusion of solar electricity in the network of private actors as a strategic experiment to mitigate climate change. *Journal of Cleaner Production*, 142, 2730–2740. <https://doi.org/10.1016/j.jclepro.2016.11.003>
121. Sajid, M. J., Zhang, Y., & Janjua, L. R. (2024). Breaking barriers: Assessing technology transfer for climate-resilient development. *Environmental Technology & Innovation*, 33, <https://doi.org/10.1016/j.eti.2023.103471>

122. San Martín, W., & Wood, N. (2022). Pluralising planetary justice beyond the North-South divide: Recentring procedural, epistemic, and recognition-based justice in earth-systems governance. *Environmental Science & Policy*, 128, 256–263. <https://doi.org/10.1016/j.envsci.2021.12.002>
123. Sendzimir, J., Reij, C., & Magnuszewski, P. (2011). Ecology and society: Rebuilding resilience in the Sahel: regreening in the Maradi and Zinder regions of Niger. *Ecology and Society*, 16(3), <https://doi.org/10.5751/ES-04198-160301>
124. Seyfang, G., & Haxeltine, A. (2012). Growing grassroots innovations: Exploring the role of community-based initiatives in governing sustainable energy transitions. *Environment and Planning C: Government and Policy*, 30(3), 381–400. <https://doi.org/10.1068/c10222>
125. Shabalala, D.B. (2020). Climate change, technology transfer, and intellectual property: A ‘modest proposal’ for an IP enforcement moratorium. *Fordham Environmental Law Review*, 31(1), <https://ir.lawnet.fordham.edu/elr/vol31/iss1/5>
126. Shapiro, C. (2001). Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting. *Innovation Policy and Economy*, 1, <http://dx.doi.org/10.2139/ssrn.273550>
127. Shen, Y., Shi, X., Zhao, Z., Grafton, R. Q., Yu, J., & Shan, Y. (2024). Quantifying energy transition vulnerability helps more just and inclusive decarbonization. *PNAS Nexus*, 3(10), <https://doi.org/10.1093/pnasnexus/pgae427>
128. Starobin, S. M. (2021). Credibility beyond compliance: Uncertified smallholders in sustainable food systems. *Ecological Economics*, 180, <https://doi.org/10.1016/j.ecolecon.2020.106767>
129. Stavropoulou, C., & Valletti, T. (2015). Compulsory licensing and access to drugs. *The European Journal of Health Economics*, 16(1), 83–94. <https://doi.org/10.1007/s10198-013-0556-2>
130. Stewart, J., & Hyysalo, S. (2008). Intermediaries, users and social learning in technological innovation. *International Journal of Innovation Management*, 12(3), 295–325. <https://doi.org/10.1142/S1363919608002035>
131. Stucki, T., & Woerter, M. (2017). Green inventions: Is wait-and-see a reasonable option? *The Energy Journal*, 38(4), 43–72. <https://doi.org/10.5547/01956574.38.4.tstu>

132. Temper, L., & Del Bene, D. (2016). Transforming knowledge creation for environmental and epistemic justice. *Current Opinion in Environmental Sustainability*, 20, 41–49. <https://doi.org/10.1016/j.cosust.2016.05.004>
133. Teran, M. Y. (2016). The Nagoya protocol and indigenous peoples. *International Indigenous Policy Journal*, 7(2), <https://doi.org/10.18584/iipj.2016.7.2.6>
134. Thakur, S. (2021). From Kyoto to Paris and beyond: The emerging politics of climate change. *India Quarterly: A Journal of International Affairs*, 77(3), 366–383. <https://doi.org/10.1177/09749284211027252>
135. Tias, P. A., McDermott, C. L., & Mulyani, M. E. (2026). Navigating the nexus between customary norms and state laws in shaping rural forest governance: A case study in Aceh Province, Indonesia. *Forest Policy and Economics*, 182, <https://doi.org/10.1016/j.forpol.2025.103672>
136. Torrisi, S., Gambardella, A., Giuri, P., Harhoff, D., Hoisl, K., & Mariani, M. (2016). Used, blocking and sleeping patents: Empirical evidence from a large-scale inventor survey. *Research Policy*, 45(7), 1374–1385. <https://doi.org/10.1016/j.respol.2016.03.021>
137. Turner, M., & Callaghan, D. (2004). Software licensing under the competition law spotlight – the new technology transfer block exemption. *Computer Law & Security Report*, 20(4), 273–280. [https://doi.org/10.1016/S0267-3649\(04\)00048-2](https://doi.org/10.1016/S0267-3649(04)00048-2)
138. Un, C. A., Cuervo-Cazurra, A., & Asakawa, K. (2010). R&D collaborations and product innovation. *Journal of Product Innovation Management*, 27(5), 673–689. <https://doi.org/10.1111/j.1540-5885.2010.00744.x>
139. Van Der Ven, H., Sun, Y., & Cashore, B. (2021). Sustainable commodity governance and the Global South. *Ecological Economics*, 186, <https://doi.org/10.1016/j.ecolecon.2021.107062>
140. Van Welie, M. J., & Romijn, H. A. (2018). NGOs fostering transitions towards sustainable urban sanitation in low-income countries: Insights from Transition Management and Development Studies. *Environmental Science & Policy*, 84, 250–260. <https://doi.org/10.1016/j.envsci.2017.08.011>
141. Van Zimmeren, E., Vanneste, S., Matthijs, G., Vanhaverbeke, W., & Van Overwalle, G. (2011). Patent pools and clearinghouses in the life sciences. *Trends in Biotechnology*, 29(11), 569–576. <https://doi.org/10.1016/j.tibtech.2011.06.002>

142. Velasco-Herrejon, P., & Savaresi, A. (2019). Wind energy, benefit-sharing and indigenous peoples: Lessons from the Isthmus of Tehuantepec, Southern Mexico. *Oil, Gas & Energy Law*. <https://doi.org/10.2139/ssrn.3337142>
143. Veugelers, R., & Schneider, C. (2018). Which IP strategies do young highly innovative firms choose? *Small Business Economics*, 50(1), 113–129. <https://doi.org/10.1007/s11187-017-9898-y>
144. Wang, J., & Fan, X. (2025). Traditional knowledge of Arctic Indigenous Peoples and the establishment of area-based management tools beyond national jurisdiction. *Marine Policy*, 174, <https://doi.org/10.1016/j.marpol.2025.106604>
145. Wild, C., Sehic, O., Schmidt, L., & Fabian, D. (2025). Public contributions to R&D of medical innovations: A framework for analysis. *Health Policy*, 152, <https://doi.org/10.1016/j.healthpol.2024.105235>
146. Wilson, M. (2019). The green economy: The dangerous path of nature commoditization. *Consilience*, 1(10), <https://doi.org/10.7916/CONSILIENCE.V0I10.3934>
147. Yenneti, K., Day, R., & Golubchikov, O. (2016). Spatial justice and the land politics of renewables: Dispossessing vulnerable communities through solar energy mega-projects. *Geoforum*, 76, 90–99. <https://doi.org/10.1016/j.geoforum.2016.09.004>
148. Yu, P. (2024). War and IP. *BYU Law Review*, 49(3), 823–893. <https://digitalcommons.law.byu.edu/lawreview/vol49/iss3/9>
149. Yu, Peter K. (2023). TRIPS and its futures. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4487863>
150. Yu, P.K. (2023). Vaccine Development, the China Dilemma, and International Regulatory Challenges. *New York University Journal of International Law & Politics*, 55, <https://ssrn.com/abstract=4289910>
151. Zhang, Q., Zhu, X., & Lin, G.-H. (2024). Green technological licensing strategies with fixed-fee among rival firms under emissions trading scheme. *European Journal of Operational Research*, 318(1), <https://doi.org/10.1016/j.ejor.2024.04.036>
152. Zhang, Y. (2020). The map is not the territory: Coevolution of technology and institution for a sustainable future. *Current Opinion in Environmental Sustainability*, 45, 56–68. <https://doi.org/10.1016/j.cosust.2020.08.017>

153. Zhang, Y., Peng, C., & Omonijo, O. (2024). Patent pool and dominant design: An empirical study of patent pool from MPEG-LA. *Journal of Engineering and Technology Management*, 74, <https://doi.org/10.1016/j.jengtecman.2024.101847>
154. Zhao, D. (2017). Choices and impacts of cross-licensing contracts. *International Review of Economics & Finance*, 48, 389–405. <https://doi.org/10.1016/j.iref.2017.01.002>
155. Zhou, R. (Kevin), & Brown, D. (2024). Epistemic justice and critical minerals—Towards a planetary just transition. *The Extractive Industries and Society*, 18, <https://doi.org/10.1016/j.exis.2024.101463>
156. Zhou, W., Jiang, H., & Kong, Q. (2019). Technology transfer under China’s foreign investment regime: Does the WTO provide a solution? *Journal of World Trade*, 54(3), <https://doi.org/10.2139/ssrn.3436484>
157. Ziervogel, G., Enqvist, J., Metelerkamp, L., & Van Breda, J. (2022). Supporting transformative climate adaptation: Community-level capacity building and knowledge co-creation in South Africa. *Climate Policy*, 22(5), 607–622. <https://doi.org/10.1080/14693062.2020.1863180>
158. Zografos, C., & Robbins, P. (2020). Green sacrifice zones, or why a Green New Deal cannot ignore the cost shifts of just transitions. *One Earth*, 3(5), 543–546. <https://doi.org/10.1016/j.oneear.2020.10.012>

#### **Legal Instruments, Documents:**

1. Asia-Pacific Economic Cooperation (2012), *2012 Leaders' Declaration: Annex C – APEC List of Environmental Goods*, 9 September 2012
2. Biodiversity Act of Bhutan, (2022), Bhutan, 15 July 2022
3. Commission Regulation (EU) No 316/2014 of 21 March 2014 *on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of technology transfer agreements (TTBER)*, OJ L93, 28 March 2014
4. European Commission (2012), *Consolidated version of the Treaty on the Functioning of the European Union (TFEU)*, OJ C 326/47, 26 October 2012
5. Committee on Economic, Social and Cultural Rights (2020), *General comment No. 25 (2020) on science and economic, social and cultural rights (article 15 (1) (b), (2), (3)*

- and (4) of the International Covenant on Economic, Social and Cultural Rights), E/C.12/GC/25, 30 April 2020
6. Communication from Bangladesh on behalf of the LDC Group (2015), *Request For An Extension Of The Transitional Period Under Article 66.1 Of The TRIPS Agreement For Least Developed Country Members With Respect To Pharmaceutical Products And For Waivers From The Obligation Of Articles 70.8 And 70.9 Of The Trips Agreement*, IP/C/W/605, 23 February 2015
  7. Decision of the Council for Trade-Related Aspects of Intellectual Property Rights (2016), *Extension of the Transition Period Under Article 66.1 of the TRIPS Agreement for Least Developed Country Members for Certain Obligations with Respect to Pharmaceutical Products*, IP/C/73, 6 November 2015
  8. European Commission (2004), *Commission Notice - Guidelines on the application of Article 81 of the EC Treaty to technology transfer agreements*, OJ C 101, 27 April 2004
  9. European Commission (2012), *Consolidated version of the Treaty on the Functioning of the European Union (TFEU)*, OJ C 326/47, 26 October 2012
  10. European Parliament & Council of the European Union (2012), *Directive 2012/19/EU of 4 July 2012 on waste electrical and electronic equipment (WEEE)*, OJ L 197/38–71, 4 July 2012
  11. Industrial Property Act, No. 3 of 2001 (2001), Kenya, 27 July 2001
  12. Law No. 20 of June 26, 2000, *on Special System for the Collective Intellectual Property Rights of Indigenous Peoples for the Protection and Defence of their Cultural Identity and their Traditional Knowledge*, Panama, 26 June 2000
  13. Parliament of the Republic of South Africa (1965), *Medicines and Related Substances Act No. 101 of 1965*, South Africa, 19 June 1965
  14. Secretariat of the Convention on Biological Diversity, (2011), *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity: text and annex*, Convention on Biological Diversity, C.N.786.2010.TREATIES-1, 29 October 2010
  15. Secretariat of the Pacific Regional Environment Programme (SPREP) (2022), *Annex 3: Key Terms in Access and Benefit-Sharing Arrangements”, Pacific Access and Benefit-Sharing (ABS): Implementation Guidelines*, SPREP

16. The Conference of the Parties (2001), *Decision 4/CP.7: Development and transfer of technologies (decisions 4/CP.4 and 9/CP.5)*, UNFCCC, 29 November 2001
17. The Conference of the Parties (2001), *Decision 5/CP.7: Implementation of Article 4, paragraphs 8 and 9 of the Convention*, UNFCCC, 29 November 2001
18. United Nations Conference on Environment and Development (1992), *Rio Declaration on Environment and Development*, in the *Report of the United Nations Conference on Environment and Development*, UN Doc. A/CONF.151/26 (Vol. 1), 12 August 1992
19. United Nations General Assembly (2007), *United Nations Declaration on the Rights of Indigenous Peoples*, A/RES/61/295, 13 September 2007
20. United Nations (2023), *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement)*, C.N.203.2023.TREATIES-XXI.10, 19 June 2023
21. United Nations (1992), *Convention on Biological Diversity*, UNEP/CBD/94/1, 5 June 1992
22. United Nations (1997), *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 2303 U.N.T.S. 162, 37 I.L.M. 22, 11 December 1997
23. United Nations (2015), *Paris Agreement to the United Nations Framework Convention on Climate Change*, T.I.A.S. No. 16-1104, 12 December 2015
24. United Nations (1992), *United Nations Framework Convention on Climate Change*, 1771 U.N.T.S. 107, 21 March 1994
25. World Health Organisation (2021), *The Public Health Implications of Implementation of the Nagoya Protocol: Report by the Director-General*, EB148/21, 6 January 2021
26. World Trade Organization (2001), *Ministerial Declaration on the TRIPS Agreement and Public Health*, WT/MIN(01)/DEC/2, 14 November 2001

**Case law:**

1. Case C -258/78, *L.C. Nungesser KG and Kurt Eisele v Commission of the European Communities* [1982] ECLI:EU:C:1982:211 (Court of Justice of the European Union June 8, 1982)

2. Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp.* [2015] ECLI:EU:C:2015:477 (Court of Justice of the European Union July 16, 2015)
3. Case C-209/10, *Post Danmark A/S v Konkurrencerådet*, [2012] ECLI:EU:C:2012:172 (Court of Justice of the European Union, March 27, 2012)
4. Case T-168/01, *GlaxoSmithKline Services Unlimited v Commission of the European Communities* [2006] ECLI:EU:T:2006:265 (Court of First Instance September 27, 2006)
5. *InterDigital Technology Corp v Lenovo Group Ltd* [2024] EWCA Civ 743 (UK Court of Appeal July 12, 2024)
6. *Unwired Planet International Ltd and another v Huawei Technologies (UK) Co Ltd and another*, [2020] UKSC 37 (UK Supreme Court, August 26, 2020)
7. *Unwired Planet International Ltd v Huawei Technologies Co. Ltd & Anor*, [2017] EWHC 711 (High Court of Justice of the United Kingdom April 5, 2017)

#### **Online articles, Publications, Reports:**

1. António, G. (2022, May). *Time to Jump-Start the Renewable Energy Transition*. Retrieved from <https://unfccc.int/news/antonio-guterres-time-to-jump-start-the-renewable-energy-transition>
2. Cullinan, K. (2023, November 15). *As climate crises loom, WTO head urges developing countries to prepare to use trips flexibilities*. Health policy watch. Retrieved from <https://healthpolicy-watch.news/as-climate-crises-loom-wto-head-urges-developing-countries-to-prepare-to-use-trips-flexibilities/>
3. CAMBIA BiOS Licensing Agreement. Retrieved from [https://cambia.org/wp-content/uploads/2017/10/BiOS-License-and-Tech-Support-Agreement-version-1\\_5.pdf](https://cambia.org/wp-content/uploads/2017/10/BiOS-License-and-Tech-Support-Agreement-version-1_5.pdf)
4. Climate TRACE. (2025). *Climate trace releases February 2025 emissions data*. Retrieved from <https://climatetrace.org>
5. European Commission. (2023). *Just Transition Platform Case study: Regional Observatory of the Transition Process in Silesia (ROPT)*. Retrieved from [https://ec.europa.eu/regional\\_policy/sources/funding/just-transition-fund/case-study-regional-observatory-transition-process-silesia.pdf](https://ec.europa.eu/regional_policy/sources/funding/just-transition-fund/case-study-regional-observatory-transition-process-silesia.pdf)
6. European Parliamentary Research Service. Madiega, T. (2023). *Briefing, EU Legislation in Progress, Standard Essential Patents Regulation*. COM(2023)232. Retrieved from

[https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754578/EPRS\\_BRI\(2023\)754578\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/754578/EPRS_BRI(2023)754578_EN.pdf)

7. GEF small grants program. (2024, November 22). *Global Environment Facility*. Retrieved from <https://www.thegef.org/what-we-do/topics/gef-small-grants-program>
8. Transition network. (2025, March 18). *Impact*. Retrieved from <https://transitionnetwork.org/impact/>
9. Just rural transition. *Meridian Institute*. Retrieved from <https://merid.org/case-studies/just-rural-transition/>
10. National Human Genome Research Institute. *About the international HapMap project*. Retrieved from <https://www.genome.gov/11511175/about-the-international-hapmap-project-fact-sheet>
11. Royal Society of Arts (Great Britain). (2006). *Promoting innovation and rewarding creativity: A balanced intellectual property framework for the digital age*. RSA
12. Smith, S. (2017). *Just transition: A report for the OECD*. Retrieved from <https://policycommons.net/artifacts/3857054/may-2017/4663009/>
13. Stihler, C. (2021, August 24). *Climate Change: "Glasgow Agreement" Can Save the Planet but Locking Scientific Research Behind Paywalls Is Holding Us Back—Catherine Stihler*. The Scotsman. Retrieved from <https://www.scotsman.com/news/opinion/columnists/how-open-data-is-vital-to-the-fight-against-climate-change-catherine-stihler-3357616>
14. Technology Executive Committee. (2017). *Enhancing financing for the research, development and demonstration of climate technologies*. UNFCCC. Retrieved from [https://unfccc.int/ttclear/docs/TEC\\_RDD%20finance\\_FINAL.pdf](https://unfccc.int/ttclear/docs/TEC_RDD%20finance_FINAL.pdf)
15. The GEF Small Grants Programme. (2020). *NATURE IS CALLING: USING SOUTH-SOUTH COOPERATION TO REPLICATE NATURE-BASED SOLUTIONS*. Retrieved from <https://www.sgp.undp.org/resources-155/our-stories/617-nature-is-calling-using-south-south-cooperation-to-replicate-nature-based-solutions.html>
16. The GEF Small Grants Programme. (2022). *Community-Based Climate Solutions for Sustainable Development*. Retrieved from [https://www.thegef.org/sites/default/files/documents/2022-11/SGP\\_Community\\_Climate\\_Solutions\\_2022\\_11.pdf](https://www.thegef.org/sites/default/files/documents/2022-11/SGP_Community_Climate_Solutions_2022_11.pdf)

17. United Nations Development Programme. (2024). *Beyond access: 1.18 billion in energy poverty despite rising electricity access*. Retrieved from <https://data.undp.org/blog/1-18-billion-around-the-world-in-energy-poverty>
18. United Nations Framework Convention on Climate Change (2026), *Non-State Actor Zone for Climate Action (NAZCA)*, Available on: <https://unfccc.int/ccj>
19. World Intellectual Property Organisation. *Traditional Knowledge*. Retrieved from <https://www.wipo.int/en/web/traditional-knowledge/tk/index>
20. World Intellectual Property Organization. *ARDI – Research for Innovation*. Retrieved <https://www.wipo.int/en/web/ardi>
21. World Intellectual Property Organization. *ASPI – Specialized Patent Information*. Retrieved from <https://www.wipo.int/en/web/aspi>
22. World Intellectual Property Organization. (2004). *Report on the Policy Advisory Commission (PAC) on The Geneva Declaration on the Future of the World Intellectual Property Organization*(WO/GA/31/15). World Intellectual Property Organization. Retrieved from [https://www.wipo.int/edocs/mdocs/govbody/en/wo\\_ga\\_31/wo\\_ga\\_31\\_15.pdf](https://www.wipo.int/edocs/mdocs/govbody/en/wo_ga_31/wo_ga_31_15.pdf)
23. World Intellectual Property Organization. (2025). *World intellectual property indicators 2025*. World Intellectual Property Organization. <https://doi.org/10.34667/TIND.58959>
24. [www.about.lens.org](http://www.about.lens.org)
25. [www.bios.net](http://www.bios.net)

#### **Interviews:**

1. Interview with Mr. B. Kuemlangan, Conducted on 17<sup>th</sup> December, 2025
2. Interview with Dr. B. Amorim-Borher, Conducted on 29<sup>th</sup> January, 2026
3. Interview with Dr. G. Dutfield, Conducted on 22<sup>nd</sup> December, 2025
4. Interview with Dr. J. Boyle, Conducted on 20<sup>th</sup> December 2025
5. Interview with Mr. B. Kuemlangan, Conducted on 17<sup>th</sup> December, 2025
6. Interview with Dr. O. Wooley, Conducted on 5<sup>th</sup> January, 2026
7. Interview with Dr. R. A. Jefferson, Conducted on 30<sup>th</sup> January 2026

## **Annex I – Interview Questions (Dr. R. Jefferson)**

1. Much of innovation policy still assumes that strong exclusivity is the primary driver of technological progress. From your experience with CAMBIA BiOS and the Lens, what does a commons-based approach reveal about how innovation actually occurs, particularly in sustainability-oriented fields?
2. In the context of sustainable development and global challenges such as climate change, agriculture, and health, what advantages do commons-based innovation systems offer compared to conventional proprietary IP models?
3. The BiOS Initiative emerged partly as a response to patent thickets and increasing complexity in life-sciences innovation. To what extent do you see similar structural inefficiencies today in climate-relevant or sustainability-critical technologies?
4. BiOS is often described as “open,” yet it relies on legally enforceable patent commitments. How important is it to understand the commons not as the absence of IP, but as a distinct form of IP governance?
5. Drawing on your work with FAO, UN agencies, and developing-country research networks, how can IP systems support capacity-building and equitable participation in innovation, rather than merely access to finished technologies?
6. Commons-based mechanisms like BiOS have demonstrated viability in specific sectors. What institutional or policy changes would be necessary to scale such approaches across sustainability-critical industries, including energy, agriculture, and environmental technologies?
7. What role should public institutions (universities, international organisations, or public funders) play in fostering and safeguarding innovation, particularly where technologies have clear public-interest dimensions? Do you see it happening by including some of the commons characteristics in existing IP regimes?
8. If you were advising governments or international organisations today, where do you see the greatest untapped opportunities for applying commons-based IP models to advance a just and sustainable transition?

## **Annex II – Interview Questions (Dr. B. Amorim-Borher)**

1. From institutional perspective, what are the most prevalent inefficiencies of the current international IP systems when they are applied to sustainability-critical technologies, particularly in terms of technology diffusion, accessibility, and global equity?
2. WIPO GREEN is a key mechanism for sustainable technology dissemination. What do you see as its current limitations, and are there institutional discussions about evolving it beyond a matchmaking platform, for example through more structured governance, conditional licensing, or capacity-building tools?
3. Many technology transfer initiatives struggle not because of licensing barriers alone, but due to limited absorptive capacity in recipient countries. How does WIPO approach technology transfer as a broader process of capacity-building, particularly for least-developed countries?
4. WIPO collaborates with the UN Climate Technology Centre and Network (CTC&N). In your view, what role should IP institutions play within international technology development mechanisms, and how can such cooperation better support practical technology uptake in developing and least-developed countries?
5. To what extent do existing IP governance frameworks adequately recognise non-formal innovation systems, such as traditional knowledge or community-based sustainability practices and where do you see opportunities to improve epistemic inclusion in IP-related climate initiatives?
6. Looking ahead, which IP management tools or policy reforms, such as patent pools, open or conditional licensing, access-and-benefit-sharing, or public-interest mandates, do you consider most promising for advancing a just and sustainable development, and why?

### **Annex III – Interview Questions (Dr. G. Dutfield)**

1. From your perspective, do you think contemporary IP systems are still primarily designed to incentivise innovation, or have they evolved into broader governance tools that shape who can create, access, and benefit from knowledge?
2. In your work, you often examine IP across law, history, and anthropology. How important is it to understand the cultural and historical assumptions embedded in IP regimes when assessing their role in sustainable development?
3. Much of my research juxtaposes IP as a commodity versus IP as a cultural and ecological legacy. From your experience, do you see this tension reflected in international IP debates, particularly in relation to traditional knowledge and biodiversity?
4. Do you think Western IP frameworks adequately account for knowledge systems that are collective, intergenerational, and embedded in ecological relationships, or do they inherently privilege certain epistemologies over others?
5. You have written extensively on bioprospecting and traditional knowledge. In your view, have mechanisms such as the CBD and the Nagoya Protocol meaningfully addressed historical inequities in the use of indigenous and local knowledge, or do structural injustices persist?
6. There is growing discussion around epistemic justice in IP governance. Do you think current legal mechanisms sufficiently recognise indigenous peoples and local communities as knowledge holders rather than just resource providers?
7. Technology transfer is often framed as essential to achieving sustainable development goals, yet it remains constrained by IP regimes. What are the most significant legal or institutional barriers to equitable technology transfer today?
8. Do you believe existing IP-based technology transfer mechanisms adequately balance innovation incentives with access, particularly for climate, agricultural, and health technologies?
9. Are there examples, where IP governance has successfully supported both innovation and social justice, especially in the Global South?

10. How do you view the existing tension between the TRIPS Agreement and biodiversity-based frameworks such as the CBD and the Nagoya Protocol? Is symbiosis possible or are they fundamentally incompatible?
11. In your experience working with institutions like the World Bank and national courts, do you see meaningful openness to rethinking IP governance considering development and sustainability concerns?
12. If you were advising policymakers designing IP and technology transfer frameworks for a just sustainability transition, what principles would you consider non-negotiable?
13. Do you think hybrid models, combining market-based IP tools with commons-oriented, approaches, offer a viable path forward, or do they risk undermining each other?
14. Finally, what do you think emerging scholars tend to underestimate when studying IP, sustainability, and justice holistically?

## **Annex IV – Interview Questions (Dr. Olivia Wooley)**

1. Your research considers law's role in facilitating socio-economic transitions toward ecological sustainability and ecosystem-focused approaches to innovation governance. How do you see intellectual property regimes interacting with ecological systems in the renewable energy sector, and what tensions arise between proprietary IP logics and shared environmental infrastructure approaches to innovation?
2. Renewable energy technologies such as offshore wind and marine renewables are capital-intensive and technologically complex. From your perspective, which IP-related incentives are most effective in encouraging innovation in these sectors without locking in long-term exclusion or market concentration?
3. What do you see as the main legal or institutional barriers to the diffusion of renewable energy technologies, particularly those linked to IP governance, and how might these be addressed without undermining innovation incentives?
4. From your engagement with renewable energy law and industry practices, are there specific IP strategies or collaborative models being used that you think could serve as models for broader systemic reform and what governance safeguards are important to ensure fairness in energy transition? What makes those models effective or replicable?
5. Do collaborative or semi-open innovation models, such as shared R&D platforms or open licensing, offer a viable pathway for renewable energy innovation, or do they risk under-incentivising private investment? Are there any that could serve as models for systemic reform?
6. Do existing international legal frameworks sufficiently align IP governance with climate and energy transition objectives, or are there significant gaps that need to be addressed to support renewable technology diffusion globally?
7. Looking forward, what legal or policy innovations do you see as most promising for aligning IP governance with a just sustainable transition in the renewable energy sector? Are there specific mechanisms (public-interest licensing mandates, tiered access regimes, global technology commons) you think warrant serious policy attention?

## **Annex V – Interview Questions (Mr. B. Kuemlangan)**

1. In which regions of the world are community-based fisheries most prevalent in? Do you have specific examples in mind where such fisheries have been established, for example like the community fisheries in Fiji or Main lobster “cartel” in the US?
2. Do you find that there are specific characteristics (climate, protection of traditional practices, over-fishing, tourism etc.) of the regions that are more active in establishing community-based fisheries?
3. What is your opinion on community-based agricultural practices? Do you think that the commons approach could be effectively implemented, specifically to tackle the external threats to the local industries? Are there any other practices that could be applied to ensure the conservation of local fisheries, such as protection orders from governments, establishment of protected species/traditional practices register?
4. What would you say are the main preconditions for the establishment of community-based fisheries? Are there any specific strategies that work best?
5. In your experience, are local municipalities/governmental authorities generally willing to participate and support such practices? Are there examples of government incentives that facilitate the establishment of such communities?
6. There is a struggle right now with overfishing in Europe, particularly in the Baltic Sea. The governments are not particularly receptive to the opinions of local fisheries, however, there also is not a robust organised fishing community. What would you say is the best approach for ensuring community representation on a governmental level?
7. Have you found in your practice that such community initiatives facilitate more responsible fishing practices and biodiversity protection? Do they also aid in preserving traditional practices?
8. Are there any other tangible benefits of community-based practices, besides environmental sustainability and biodiversity protection, for example, rise in tourism, increased export levels etc.?

## **Annex VI – Interview Questions (Dr. J. Boyle)**

1. Creative Commons and related open-licensing tools have been extraordinarily successful at lowering barriers to access, but less effective at addressing questions of equity, stewardship, and downstream use. Hypothetically, do you think the next generation of IP management mechanisms will need to move beyond open v closed toward more governance-based models (for example, conditional openness, community veto rights, or benefit-sharing triggers), particularly in sustainability-critical sectors such as climate or agriculture?
2. If policymakers were to take the idea that certain sustainability-relevant knowledge should be governed as a shared infrastructure rather than as a market commodity seriously, what kinds of institutional or legal mechanisms, beyond traditional IP reform, do you think are realistically achievable today? For example, sector-specific commons, public licensing mandates tied to funding, or global governance bodies with rule-making authority over access?