The Legality and Feasibility of the Use of Compulsory Licensing Under the TRIPS Agreement to Facilitate the Transfer of Environmentally Sound Technologies under the UNFCCC Regime

And old windmill and a modern wind turbine on the Dutch countryside symbolizing traditional and modern sustainable technology. Source: UNSPLASH

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Abstract

The primary objective of the United Nations Framework Convention on Climate Change is to attain stability in the concentrations of greenhouse gases in the atmosphere. Considerable potential lies in mitigation technologies to lower the emission of these gases. Additionally, there is a crucial requirement for adaptation technologies to avert the risks posed by ongoing human disruption of the climate system. However, the transfer of environmentally sound technologies between countries, part of the broader concept known as technology transfer, faces challenges related to intellectual property rights. Developing nations argue that intellectual property rights hinder technology transfer, while developed nations consider them crucial for innovation and facilitation thereof. As a consequence of the disagreement on this topic, intellectual property rights were left out of the wording of the Paris Agreement and the scope and obligations of technology transfer under the climate regime remain open to varying interpretations. Resolving this issue requires reaching a consensus among stakeholders and finding a balance between international environmental law and intellectual property rights. One potential solution that is explored in this dissertation is the use of compulsory licensing under the Trade Related Aspects of Intellectual Property Agreement. This dissertation examines the existing legal framework governing the transfer of environmentally sound technologies relevant in the climate change context, analyses the interplay between international environmental law and intellectual property law, explores the Trade Related Aspects of Intellectual Property Agreement and assesses the legal viability and practical feasibility of compulsory licensing for climate purposes. Through this research, a better understanding of technology transfer in the international climate change regime is sought, and an interdisciplinary perspective on trade law and environmental law is provided.

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List of Abbreviations

CBDR	Common But Differentiated Responsibilities
CDM	Clean Development Mechanism
CET	Committee on Environment and Trade
COP	Conference of the Parties
CTCN	Climate Technology Centre and Network
DSU	Understanding on Rules and Procedures for Governing Settlement of Disputes
EST	Environmentally Sound Technology
FDI	Foreign Direct Investment
GATS	General Agreement on Trade and Services
GATT	General Agreement on Trade and Tariffs
GHG	Greenhouse Gas
IEAs	International Environmental Agreements
IPR	Intellectual Property Right
IRENA	International Renewable Energy Agency
ITLOS	International Tribunal for the Law of the Sea
JI	Joint Implementation
LDC	Least Developed Country
NDC	Nationally Determined Contributions
OECD	The Organisation for Economic Cooperation and Development
SDG	Sustainable Development Goal
TEC	Technology Executive Committee
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
VCLT	Vienna Convention on the Law of Treaties
WGTTT	Working Group on Trade and Technology Transfer
WIPO	World Intellectual Property Organisation
WTO	World Trade Organisation

1. Introduction

1.1. Research Context

Understanding and discussing the complexities of climate change and its effects on the environment and human life is a challenging task that cannot be adequately summarized in a few sentences. However, this dissertation is written in the field of international environmental law, and it is therefore important to address the contextual framework of climate change.

The Anthropocene represents the latest era of geosocial time during which human influence predominantly shapes the biosphere.[1] Human activities, specifically the discharge of greenhouse gases (GHGs), have incontrovertibly led to the occurrence of global warming, resulting in the current global surface temperature exceeding 1.1°C above pre-industrial levels during the timeframe from 2011 to 2020.[2] Global emissions of greenhouse gases (GHGs) consistently show an upward trend, reflecting uneven historical and ongoing contributions arising from unsustainable energy use, alterations in land use, and consumption and production patterns.[3] Economic activities have so far surpassed three planetary boundaries, of which climate change is one.[4] The effects of climate change are hard to overstate and extensive in scope, ranging from ocean acidification and biodiversity loss to melting ice and extreme weather events. Furthermore, as GHG emissions continue, they

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[1] Folke C et. al. "Our Future in the Anthropocene Biosphere" (2021) *Ambio* 840; Jefferies C S G, Seck S L & Stephens T "International Law, Innovation, and Environmental Change in the Anthropocene" in Craik E, Jefferies, Seck & Stephens T (eds.) *Global Environmental Change and Innovation in International Law* (2018) Cambridge University Press 3.

[2] International Panel on Climate Change *Climate Change* (IPCC) *2023 6th Synthesis Report* (2023) 4. For further reading on the Anthropocene and the influence of international economic systems on the environment, see: Reins L "The Anthropocene and Trade" in Delimatsis P & Reins L (eds.) *Trade and Environmental Law* (2021) Edward Elgar Publishing.

[3] Intergovernmental Panel on Climate Change (IPCC) IPCC *6th Synthesis Report* 8-9.

[4] Planetary boundaries are a set of nine critical global environmental thresholds that define safe operating limits for key Earth system processes. The concept of planetary boundaries was origionally proposed by Rockström et. al. and has been widely adopted by scholars in the realm of environmental economics. For the full research on planetary boundaries see: Rockström et. al. "Planetary Boundaries: Exploring the Safe Operating Space for Humanity" *Ecology and Society* (2009) 1-35.

trigger a feedback loop between increasing temperatures and various environmental elements, causing the intensity of extreme events to escalate with each incremental temperature increase.[5]

Global warming impacts a multitude of facets, influencing the physical environment as well as social and economic systems.[6] Environmental deterioration impacts developing nations to a far greater extent compared to the developed world.[7] Most countries in the Global South emit a fraction of the GHGs that the Global North emits and barely contribute towards environmental degradation, yet they bear most of the environmental burden.[8] This inequality is rooted in former colonialist systems and exacerbated by factors such as geographic location, limited resources and administrative capacity, ongoing foreign resource extraction, and a high burden of waste dumping by Global North countries.[9]

Broadly, efforts made in response to climate change can be divided into two main categories: adaptation measures and mitigation measures.[10] Adaptation focusses on anticipating the effects of environmental degradation and global warming, and taking

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[5] IPCC *6th Synthesis Report* 12-13.

[6] United Nations (UN) *Technology and Innovation Report 2023* UNCTAD/TIR/2022 6; Folke et. al. (2021) *Ambio* 840; Ahmad Z *WTO Law and Trade Policy Reform for Low-Carbon Technology Diffusion* (2021) Brill Publishing 7.

[7] Atapattu S "Global South Approaches" in Rajamani L & Peel J (eds.) *Oxford Handbook of International Environmental Law* (2021) 183-185. For further reading see: Givens J, Huang X & Jorgenson A "Ecologically Unequal Exchange: A Theory of Global Environmental Injustice" (2019) *Sociology Compass* 1-15.

[8] Natarajan U "Environmental Justice in the Global South" in Attapatu S A, Gonzalez C G & Leck S L *The Cambridge Handbook of Environmental Justice and Sustainable Development* (2021) Cambridge University Press 45.

[9] Natarajan "Environmental Justice in the Global South" in Attapatu, Gonzalez & Leck *Cambridge Handbook* 45; Atapattu "Global South Approaches" in Rajamani & Peel *Oxford Handbook* 183-185.

[10] Sands P & Peel J *Principles of International Environmental Law* (2018) Cambridge University Press 296; Tamura M & Mimura N "Adaptation and Mitigation Strategies in Response to Climate Change" (2011) *United Nations University Press* 133.

action to limit or prevent the damage it may cause.[11] Mitigation on the other hand, seeks to prevent and counteract the causes of global warming.[12]

As developing countries are experiencing rapid growth of their economies, they position themselves at the forefront of future increases in energy requirements and the emission of greenhouse gases.[13] The widespread dissemination of Environmentally Sound Technologies (ESTs) is indispensable in combatting climate change.[14] Development and transfer of law-carbon technologies is vital for mitigating GHGs.[15] Moreover, adaptive technology is critical in ensuring climate resilience in developing countries, who often lack the financial, institutional and technological capacity to develop ESTs themselves.[16] The potential of technology as a means to reach the goals in climate change treaties is invaluable universally, yet accessibility remains limited in certain regions.[17]

The equitable diffusion of both climate mitigation and adaptation technologies between countries has gained a central position in the negotiation and formulation of the 1992 United Nations Framework Convention for Climate Change (UNFCCC),[18] and subsequent agreements.[19] The fundamental role of technology transfer in equitably the equitable diffusion of such technologies was emphasized in the 2023

[11] IPCC *6th Synthesis Report* 8; Tamura & Mimura *UN University Press* 149.

[12] IPCC *6th Synthesis Report* 10-11; Tamura & Mimura *UN University Press* 135.

[13] Sands & Peel *Principles* 299; Pueyo A & Linares P "Renewable Technology Transfer to Developing Countries: One Size Does Not Fit All" (2012) *IDS Working Papers* 6.

[14] Sarnoff J D "Patents and Climate Change" in Sarnoff J D (ed.) *Research Handbook on Intellectual Property and Climate Change* (2016) Edgar Publishing 334.

[15] International Renewable Energy Agency (IRENA) *Word Energy Transition Outlook 2023* (2023) 24; Ahmad *WTO Law* 9; IPCC *Mitigation of Climate Change Summary for Policy Makers* (2022) 45.

[16] Rajamani & Peel *Oxford Handbook* 844.

[17] Perrone N & Glena N S "Technology Transfer and Climate Change: A Transnational Law Analysis" (2022) *Transnational Legal Theory* 262.

[18] United Nations Framework Convention on Climate Change (UNFCCC), No. 30822, adopted in Paris on 20 March 1883.

[19] Rajamani & Peel *Oxford Handbook* 845.

Global Stocktake, completed during the UNFCCC Conference of the Parties (COP) 28 in Dubai.[20]

The United Nations Environmental Program (UNEP) describes ESTs as "technologies that have the potential for significantly improved environmental performance relative to other technologies" and highlights that "they can also be defined as total systems that include know-how, procedures, goods and services, and equipment, as well as organizational and managerial procedures for promoting environmental sustainability".[21] Several mechanisms for transfer of ESTs have been developed, such as the Technology Mechanism under the UNFCCC,[22] the Clean Development Mechanism (CDM) under the Kyoto Protocol,[23] and the Technology Framework under the Paris Agreement.[24]

However, the approach to achieving technology transfer remains a debate in policy discussions between states and within international organisations as well as in academic literature.[25] One key point of disagreement is the role that intellectual property rights (IPRs) play in the transfer of ESTs.[26] IPRs are private rights, aimed at incentivizing and rewarding innovation to provide maximum economic benefit to owners through methods such as licensing and patenting.[27] Technology transfer on the other hand, often involves distributing IPRs without sufficient monetary compensation, thereby contradicting the traditional concept of individual reward for innovation within the IPR system.[28] Developing countries have asserted that IPRs

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[20] UNFCCC Conference of the Parties (COP) 28, Decision CMA.5 *Outcome of the First Global Stocktake 2023* paras. 101-103.

[21] UNEP "Environmentally Sound Technologies" accessed on 13 July 2023 https://ap.lc/YAOhh

[22] UNFCCC, Article 4 and 11.

[23] Kyoto Protocol to the UNFCCC, Vol. 2303, adopted in Kyoto on 11 December 1997, Article 12.

[24] Paris Agreement to the UNFCCC, No. 54113, adopted in Paris on 12 December 2015, Article 10.

[25] This debate is considered in more detail in part 3 of this dissertation.

[26] Rajamani & Peel *Oxford Handbook* 845; Sands & Peel *Principles* 726-727.

[27] Taubman A, Wager H & Watal J (eds.) *Handbook on the WTO TRIPS Agreement* (2020) Cambridge University Press 105-106.

[28] Zaman K "The TRIPS Patent Protection Provisions and Their Effects on Transferring Climate Change Technologies to LDCs and Poor Developing Countries: A Critical Appraisal" (2013) *Asian Journal of International Law* 148.

present a significant obstacle to the transfer of ESTs, while developed countries on view IPRs as a prerequisite for innovation and diffusion of such technologies.[29] Consequently, discussions regarding IPRs in the UNFCCC negotiations have remained in a state of uncertainty, reflecting the disagreement between stakeholders on the matter.[30] The 2023 Global Stocktake urges parties to address the barriers to the uneven pace of development and adoption of ESTs globally.[31] Doing so necessitates not only reaching consensus among the stakeholders involved, but also finding a way to reconcile international environmental law with the existing international legal framework on IPRs.[32] The Agreement on Trade Related Aspects of Intellectual Property (TRIPS),[33] is the main international agreement on the international use of IPRs and provides the minimum standards for various forms of IPR protection.[34]

Several suggestions have been made regarding how to overcome the stalemate around IPRs in the UNFCCC during the preparations for the UNFCCC COP16.[35] Some options that have formed the focus of attention are: the creation of patent pools; the sharing of publicly funded technologies; the use of public-private partnerships; and a flexible interpretation of the TRIPS Agreement to facilitate

[29] Shabalala D "Technology Transfer for Climate Change and Developing Country Viewpoints on Historical Responsibility and Common but Differentiated Responsibilities" in Sarnoff *Research Handbook* 173-174.

[30] Zhou C "Can intellectual property rights within climate technology transfer work for the UNFCCC and the Paris Agreement?" (2019) *International Environmental Agreements: Politics, Law and Economics* 109-121; Latif A "Intellectual Property Rights Protection and the Transfer of Climate Change Technologies: Issues, Challenges, and Way Forward" (2014) *Climate Policy* 106.

[31] UNFCCC COP28 *Outcome of the First Global Stocktake 2023*, para. 103.

[32] Fitzgerald O E "Introduction to the Paris Agreement and the World Trade Organization" in Delimatsis & Reins *Trade and Environmental Law* 126.

[33] Agreement On Trade Related Aspects of Intellectual Property Rights (TRIPS) Annex 1C to the Marrakesh Agreement, No. 1144, adopted in Marrakesh on 15 April 1994.

[34] Taubman, Wager & Watal *Handbook TRIPS* 12.

[35] UNFCCC COP16 *Report on the Conference of the Parties on its Sixteenth Session* FCCC/CP/2010/7/Add.1. adopted in Cancun on 15 March 2011.

technology transfers.[36] Earlier suggestions by several countries focussed on the use of global climate finance to enhance technology transfer.[37] Some authors have even suggested a modification of the TRIPS Agreement in favour of technology transfer to developing countries.[38]

In this dissertation, the potential of compulsory licensing under the TRIPS Agreement is examined to facilitate the transfer of ESTs. This solution stands out as it has a strong legal foundation and requires exploring the contemporary interpretation of an existing treaty. The TRIPS Agreement contains certain flexibilities, elaborated upon by the Doha Declaration,[39] of which compulsory licensing is one. Compulsory licensing is the authorized use of a patented item or process without the consent of the patent holder, often during national emergencies or for public welfare reasons.[40] So far, compulsory licensing provisions have mostly been interpreted and used in the field of pharmaceuticals.[41] The possibility of the application of compulsory licensing for ESTs in the context of climate change however, is a more recent topic of discussion.[42] Using compulsory licensing for disseminating ESTs requires an extensive interpretation of certain provisions of the TRIPS Agreement.[43]

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[36] Ad Hoc Working Group on Long-Term Cooperative Action under the Convention 12th Session FCCC/AWGLCA/2010/14 46-47.

[37] AD-Hoc Working Group on Long-Term Cooperative Action under the Convention 2nd Session FCCC/AWGLCA/2008/CRP3 2-3.

[38] Littleton M *The TRIPS Agreement and Transfer of Climate-Change-Related Technologies to Developing Countries* DESA Working Papers ST/ESA/2008/DWP/71 15.

[39] Declaration on the TRIPS Agreement and Public Health (Doha Declaration) WT/MIN(01)/DC/2, adopted in Doha on 14 November 2001; Taubman, Wager & Watal *Handbook TRIPS Agreement* 199-203.

[40] TRIPS Agreement, Article 31.

[41] Zhou (2019) *Int. Environmental Agreements* 115; Fair R "Does Climate Change Justify Compulsory Licensing of Green Technology" (2009) *International Law & Management Review* 24.

[42] Zhou (2019) *Int. Environmental Agreements* 115.

[43] Zhuang W *Intellectual Property and Climate Change* (2017) Cambridge University Press 233-310; Fair (2009) *Int. Law & Management Review* 24.

This dissertation aims to contribute to the understanding of the legality and feasibility of compulsory licensing to address IPR-related barriers to the transfer of ESTs, with the ultimate objective of establishing an equitable distribution of such technologies.

1.2. Purpose and Scope

This is dissertation combines dimensions of the international climate change regime with that of the international trade regime. Bodanksky, Brunée and Rajamani have asserted that "perhaps the most controversial and difficult interface issues arise in the relationship between climate change law and international trade law".[44] In an attempt to address some aspects of this intricate intersection, this dissertation specifically focuses on the challenges related to technology transfer for climate purposes within the framework of the TRIPS Agreement. As such, the purpose of this dissertation is to critically consider the following primary research question: **What is the legal viability and practical feasibility of using compulsory licensing within the framework of the TRIPS Agreement to facilitate technology transfer under the UNFCCC regime?**

To address this key question, several subsidiary questions need to be answered. Firstly, what is the existing UNFCCC framework governing transfer of technology and what obligations can be drawn from it? Secondly, what is the current relationship between international environmental law and intellectual property law regarding technology transfer and what are the primary areas of tension between the two? Thirdly, what is compulsory licensing and how is it regulated under the TRIPS Agreement? And lastly, would compulsory licensing under the TRIPS Agreement prove a legal and feasible mechanism to promote the transfer of ESTs?

Regarding the scope of this dissertation, a few aspects need to be addressed. Firstly, the term "technology transfer" finds application in fields beyond that of climate

[44] Bodanksy D, Brunnée J & Rajamani L *International Climate Change Law* (2017) Oxford University Press 54-55.

change, such as the pharmaceutical industry and in the university context.[45] The term is also invoked within other fields of international environmental law.[46] This dissertation exclusively considers the interpretation of technology transfer as referred to in the UNFCCC regime. Moreover, this dissertation is narrower in scope, in the sense that is focusses on the international transfer of ESTs and considers predominantly the transfer of ESTs from countries in the Global North to countries in the Global South.

Secondly, the UNFCCC definition of technology transfer needs to be examined to further delimit the scope of this dissertation. The IPCC uses the following definition of technology transfer:

"the flows of know-how, experience and equipment, for mitigating and adapting to climate change amongst different stakeholders such as governments, private-sector entities, financial institutions, non-governmental organizations (NGOs) and research/education institutions".[47]

Based on this definition, the term "transfer" includes a variety of exchanges, involving public-to-public, public-to-private, and private-to-public interactions. Moreover, within the context of ESTs, the definition extends to encompass both "hardware" aspects of technology and "software" such as know-how, education and human capacity.

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[45] For further reading on technology transfer in the pharmaceutical industry, see: Geiger S & Gross N "Tech Sharing, Not Tech Hoarding: Covid-19, Global Solidarity, and the Failed Responsibility of the Pharmaceutical Industry" (2023) *Organization* 1-16. For further reading on technology transfer in the university context see: Amry D K, Ahmad A J, Lu D "The New Inclusive Role of University Technology Transfer: Setting an Agenda for Further Research" (2021) *International Journal of Innovation Studies* 9-22.

[46] See for instance: Convention on Biological Diversity (CBD), No. 30619 adopted in Rio de Janeiro on 5 June 1992, Article 16; 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 (High Seas Treaty) No. A/CONF.232/2023/4 adopted in New York on 20 June 2023, Article 40; Stockholm Convention on Persistent Organic Pollutants (POPs), No. 40214 adopted in Stockholm on 22 May 2001, Article 12.

[47] IPCC Special Report of Working Group III *Summary for Policymakers Methodological and Technological Issues in Technology Transfe*r (2000) 5.

Moving beyond the scope of the climate regime, the World Trade Organisation (WTO) established a Working Group on Trade and Technology Transfer (WGTTT).[48] In their report to the General Council, the WGTTT noted that technology transfer can be described as: "a collaborative process encompassing knowledge, skills and know-how, that it involved several actors including governments, academia, and industries; and that technology transfer had been providing a powerful tool to narrow the technological gap between developed and developing countries, and for integrating developing countries into the multilateral trading system".[49] In many ways similar to the IPCC definition, the WGTTT explicitly refers to the origin of the transfer and the destination. The WGTTT specifically addresses the need for the transfer of ESTs from developed countries to developing countries. The TRIPS Agreement seems to affirm this idea, as article 66(2) obliges that developed country parties must institute incentives to promote technology transfer from their enterprises to Least Developed Countries (LDCs).[50]

Based on the above definitions, for the purpose of this dissertation, the term "technology transfer" refers to the exchange of both tangible and intangible components, including equipment, knowledge, and capacity, between international stakeholders in both the public and the private sector. Technology transfer predominantly centres on facilitating the equitable dissemination of ESTs and includes both mitigation and adaptation technology in the context of climate change.

Thirdly, the key difference between two research areas needs to be understood. The first area involves the discussion on whether patents are in fact an effective means to incentivize the development of ESTs. The second field of research considers how to best facilitate distribution of technologies that are already protected by patents.

[48] WTO Ministerial Declaration WT/MIN(01)/DEC/1 adopted in Doha on 20 November 2001, 37.

[49] Report of The Working Group on Trade and Transfer of Technology to the General Council WT/WGTTT/W/32 adopted on 1 December 2022, para. 2.3.

[50] TRIPS Agreement, Article 7 and Article 66(2).

Although the two discussions are closely linked, the scope of this dissertation only includes the latter discussion and does not aim to answer the question as to whether patents are an effective means of incentivizing technological development. Instead, this research is focused exclusively on the stage of innovation where a patent has already been established. The rationale behind this is the fact that the discussion on whether patents are successful in incentivizing the initial development of ESTs, does not directly correspond to the question of how best to globally diffuse these technologies.[51] Researching compulsory licensing as a means of technology transfer only comes into play in the phase where a patent has already been established.

Lastly, several ways have been proposed within scholarly literature to overcome the IPR-related barriers to the transfer of ESTs.[52] This dissertation focuses exclusively on the TRIPS Agreement to facilitate the use of compulsory licensing for ESTs. As mentioned above, one of the reasons for focussing on this solution is its strong legal foundation. The TRIPS Agreement is a well-established international legal framework that provides a comprehensive framework for IPRs. Additionally, by concentrating on the flexibilities of the TRIPS Agreement, this dissertation explores a solution based on existing international trade law, reducing the potential need for a solution that involves amendments of the TRIPS Agreement or the adoption of any new legal frameworks. Lastly, in light of the increased interrelated nature of global

[51] For a detailed critique the role of patents in technological advancement, see: Tur-Sinai O "Patents and Climate Change: A Skeptic's View" (2018) *Environmental Law* 211-261; Correa C M "Innovation and Technology Transfer of Environmentally Sound Technologies: The Need to Engage in a Substantive Debate" (2013) *RECEIL* 55. See also: Sarnoff "Patents and Climate Change" in Sarnoff *Research Handbook* 334-351.

[52] For further reading on Public-Private Partnerships, see: Sarnoff J D & Sonn M "Innovation Law and Policy Choices for Climate Change Related Public-Private Partnerships" in Chon M, Roffe P & Latif A *Public-Private Partnerships, Intellectual Property Governance, and Sustainable Development* Cambridge University Press 245-288. For the use of the CDM, see: Shabalala D *Climate Change, Technology Transfer and Intellectual Property: Options for Action at the UNFCCC* Doctoral Thesis (PHD), Maastricht University 160-170. Several other options are considered in: Maskus K "Differentiated Intellectual Property Regimes for Environmental and Climate Technologies" (2010) *OECD Environment Working Papers* 1-35.

challenges generally, and climate change in particular, it is essential to approach legal fields holistically rather than in isolation. This dissertation underscores the interconnectedness of legal frameworks by examining the TRIPS regime in combination with the climate regime, emphasizing the need for cohesive and integrated legal solutions.

1.3. Methodology and Structure

This dissertation comprises of desktop research and the following types of sources will be drawn from: international environmental law, primarily based on the UNFCCC and subsequent agreements; WTO law, with a specific focus on the TRIPS Agreement and the Doha Declaration thereon; soft law and non-binding instruments; commentary and decisions on hard law; handbooks; journal articles and online sources.

This dissertation comprises of six parts, with parts 2 to 5 linked to each of the four subsidiary questions highlighted above. Before setting forth the existing tensions between technology transfer for climate change purposes and IPRs, it is crucial to gain a thorough understanding of what technology transfer is and what obligations follow from the international climate change regime in this context. As such, following this introductory part, part 2 provides an examination of the existing international legal framework governing technology transfer under the UNFCCC. This analysis considers key relevant principles of international environmental law, the provisions of the UNFCCC, as well as the Kyoto Protocol and the Paris Agreement. In addition, it critically assesses the challenges and opportunities in terms of transferring ESTs under the climate change regime. Based on these guiding principles, treaty provisions and scholarly commentary, the technology transfer obligations on developed country parties are outlined, and the degree to which legal action by developed country parties is possibly becomes apparent.

In order to provide an accurate answer to the question of whether compulsory licensing could be a potential solution to address the current issues with the transfer of ESTs, it is necessary to identify the exact points of friction in more detail, and understand the requirements of both technology creators on one side and

developing nations on the other. Part 3 aims to do so, using a theoretical perspective. Drawing from scholarly literature on the intersection between IPRs and technology transfer, the different views of developed and developing countries are considered and challenges and opportunities are identified. This section explores the challenges at the intersection of technology transfer in the international climate change regime and IPRs, in order to ultimately identify a solution that adequately corresponds to the problem at hand, in part 4 and 5.

The WTO, the TRIPS Agreement, the Doha Declaration as well as the flexibilities of the TRIPS Agreement are discussed in part 4. Particular attention is given to the relationship between WTO law and the environment. The provisions of the TRIPS Agreement and case law are used in this examination. The purpose of this part is to provide an overview of the legal framework of compulsory licensing to assess its potential use for the transfer of ESTs, which forms the focus of part 5.

In part 5, an assessment of the possibility of using compulsory licensing under the TRIPS Agreement for climate-related purposes follows. First, the relevant provisions of the TRIPS Agreement and the Doha Declaration will be examined to find legal grounds for the use of compulsory licensing in the context of ESTs. This part provides insights into the legality of compulsory licensing for use beyond the pharmaceutical industry. Having discussed the legality, a critical evaluation of the practical feasibility of compulsory licensing is undertaken. This includes justifications for and challenges to interpreting the TRIPS agreement for an environmental purpose.

This dissertation ends with a conclusion in part 6, in which the answer to the primary research question is formulated.

2. International Environmental Framework Relevant to Technology Transfer

This part examines the existing UNFCCC framework governing the transfer of technology and what obligations can be drawn from it. The stronger the normative power of the legal obligations on technology transfer, the more ground developing country parties have to take legal action to address IPR-related issues. Conversely, the less substantive the obligation to transfer technology to developing country parties, the harder it will be for them to take actionable steps through the climate change framework to legally address IPR-related barriers through the UNFCCC Framework.

The guiding principles of international environmental law will be discussed, with a particular focus on those strongly related to climate change and technology transfer. Having discussed the central principles, the three key treaties on climate change will be examined: the UNFCCC, the Kyoto Protocol and the Paris Agreement. After examining the technology transfer obligations in these agreements, some existing critiques will be discussed.

2.1. Key Principles of International Environmental Law

Before examining the specific legal provisions on technology transfer outlined in the UNFCCC, the Kyoto Protocol, and the Paris Agreement, it is crucial to address the broader guiding principles of international environmental law and identify those relevant to technology transfer. Most of the principles were first recognised in the 1972 Stockholm Declaration on the Human Environment,[53] and formulated at the UN Conference on Environment and Development held in Rio de Janeiro in 1992.[54] The seven key principles of international environmental law, commonly recognised by scholars, include the no harm principle, sovereignty and responsibility of states, the precautionary approach, the polluter pays principle, common but differentiated responsibilities (CBDR), sustainable development, and cooperation among states.[55]

[53] Stockholm Declaration on Human and Environment (Stockholm Declaration) A/RES/2994, adopted in Stockholm on 15 December 1972.

[54] Rio Declaration on Environment and Development (Rio Declaration) A/CONF.151/26, adopted in Rio de Janeiro 14 June 1992.

[55] Sands & Peel *Principles* 198.

These principles function as cornerstones of international environmental law, though the formal legal status of the principle differs, as set out below.[56]

The no harm principle was first formulated in 1941 in the *Trail Smelter Arbitration*,[57] and has later been incorporated into the Stockholm Declaration and the Rio Declaration.[58] The principle of sovereignty and responsibility is implicit to the no harm principle, in the sense that respecting another state's territory reflects state sovereignty, and, simultaneously, mandates states to prevent their sovereign exploitation of resources from causing environmental harm to other states.[59] The no harm principle has the status of general international customary law.[60] For the issue of technology transfer in the international climate regime, however, this principle is has limited relevance, because it is inherently preventive. In contrast, technology transfer in the context of climate action is proactive, centred on the action of transferring relevant ESTs by developed countries to developing countries. As such, the no harm principle and the principle of sovereignty and responsibility will not be considered further.

Closely linked to the above principle is the principle of preventative action.[61] This principle entails that states take early measures to prevent potential threats or risks to the environment before the activities become a violation of international law.[62] In the *Case Concerning Pulp Mills on the River Uruguay* (*Pulp Mills*),[63] the ICJ stated that due diligence is required of states in their own territory and that a certain level of vigilance in the enforcement of relevant rules and preventative measures is

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[56] Rajamani, Jeffrey, Höhne, Hans, Glass, Ganti & Geiges "National 'Fair Shares' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law" (2021) *Climate Policy* 985.

[57] Trail Smelter Arbitration (*U.S. v. Canada*) Arbitral Tribunal 11 March 1941 1965.

[58] Stockholm Declaration, Principle 21; Rio Declaration, Principle 2.

[59] Brunnée J "Harm Prevention" in Rajamani & Peel *Oxford Handbook* 271.

[60] Brunnée "Harm Prevention" in Rajamani & Peel *Oxford Handbook* 271; Advisory Opinion on The Legality of the Threat or Use of Nuclear Weapons, International Court of Justice (ICJ) 8 July 1996, para. 29.

[61] Sands & Peel *Principles* 211.

[62] Sands & Peel *Principles* 213.

[63] Case Concerning the Pulp Mills on the River Uruguay (*Argentina v. Uruguay*) ICJ 20 April 2010.

required.[64] The principle of preventative action also enjoys status of general customary international law.[65] Although an essential component of international environmental law, the principle of preventative action has limited applicability to technology transfer, for the same reasons mentioned above. Notably, preventative action fails to distinguish between developed and developing nations, and equity considerations play a minor role in its application. The lack of differentiation in this regard opposes the essential role equity plays in meeting obligations related to technology transfer in the global climate change framework.[66] Similarly, the principle of precaution will not be used in this dissertation. The principle of precaution is, like the principle of preventative action, focussed on avoiding harm to the environment. However, the principle of precaution sees mostly to the situation in which there is scientific uncertainty about the potential harm of a certain activity, in which case potential environmental or health risks should be minimized.[67]

The polluter pays principle is another principle of international environmental law. Though the principle enjoys broad regional support, the polluter pays principle is not yet recognised as international customary law.[68] The primary focus of the polluter pays principle is on assigning responsibility and costs for pollution to the party causing it.[69] However, in the technology transfer context, the emphasis is on promoting the development and equitable diffusion of ESTs rather than solely

[64] *Argentina v. Uruguay* ICJ 2010, para. 197.

[65] *Argentina v. Uruguay* ICJ 2010, para. 101.

[66] Brunnée J & Streck C "The UNFCCC as a Negotiating Forum: Toward Common but More Differentiated Responsibilities" (2013) *Climate Policy* 593; Rajamani L "The Changing Fortunes of Differential Treatment in the Evolution of International Environmental Law" (2012) *International Affairs* 609-612.

[67] Rio Declaration, Principle 15; Sands & Peel *Principles* 230-231. The principle was relevant in several international cases, see for instance: *Argentina v. Uruguay* ICJ 2010, para. 164; Southern Bluefin Tuna (*New Zealand & Australia v. Japan*) ITLOS 4 August 2000, para 77; MOX Plant Case (*Ireland v. United Kingdom*) International Tribunal for the Law of the Sea (ITLOS) 3 December 2001, para 89.

[68] Heine D, Faure M G & Dominioni G "The Polluter-Pays Principle in Climate Change Law: an Economic Appraisal" (2020) *Climate Law* 94-115.

[69] Sands & Peel *Principles* 240.

allocating costs for environmental damage.[70] Furthermore, the polluter pays principle may not effectively guide the fair and equitable distribution of technology. Therefore, this dissertation will not explore the polluter pays principle as a basis that could impose an obligation on developed countries to transfer ESTs to developing countries.

The principle of cooperation may be more applicable in the context of technology transfer. Through wide state practice and recognition by the ICJ, the principle of cooperation is regarded as a principle of international customary law.[71] Cooperation between states is widely applied in different legal fields and is incorporated in many international treaties, jurisprudence and international institutions.[72] In the context of international environmental law, the principle of cooperation was first formulated in principle 24 of the Stockholm Declaration of 1972, and later in principle 27 of the Rio Declaration.[73] The principle of cooperation has since been expressed in climate change law through several provisions within the UNFCCC framework.[74] While the principle of cooperation frequently applies when multiple countries share a common resource, there is also a general obligation to cooperate. The general obligation to cooperate has manifested into more concrete obligations in the field of international environmental law, including: the requirement to perform environmental impact assessments; the requirement of information exchange, prior consultation, and notification; the obligation to provide emergency information; and the transboundary enforcement of environmental standards.[75] Notably, technology transfer is not one of those specific commitments. To the extent that the principle of cooperation requires

[70] Alam A "Technology Assistance and Transfers" in Rajamani & Peel *Oxford Handbook* 957.

[71] The principle was of key importance in: North Atlantic Coast Fisheries Case (*Great Britain v. United States*) Tribunal of Arbitration 7 September 1910; Lac Lanoux Arbitration (*France v. Spain*) Arbitral Tribunal 16 November 1957; Gabčíkovo-Nagymaros Project (*Hungary v. Slovakia*) ICJ 25 September 1977; *Ireland v. United Kingdom* ITLOS 2001; *Argentina v. Uruguay* ICJ 2010.

[72] Rudall J "The Duty to Cooperate in the Fight against Climate Change" (2021) *International Community Law Review* 185.

[73] Stockholm Declaration, Principle 24; Rio Declaration, Principle 27.

[74] The principle of cooperation is referred to in the UNFCCC, Articles 3, 4, 5, 6, 7 and 9; Kyoto Protocol, Articles 2, 10, and 13; Paris Agreement, Articles 6, 7, 8, 10 and 13.

[75] Sands & Peel *Principles* 216.

assistance to developing states in order to meet their obligations under the UNFCCC, whether financial or technical, the principle of cooperation is interwoven with the CBDR principle.[76] For instance, the Paris Agreement obliges states to enhance cooperation on technology transfer and developing states are required to show how they will aid less developed country parties.[77] As such, the CBDR principle may be more relevant to consider in the context of technology transfer in the international climate change regime.

The CBDR principle is the legal foundation for the difference in responsibilities between countries in their commitments and allows certain level of flexibility in the applying the UNFCCC obligations.[78] It is widely agreed upon in scholarly literature that international technology transfer for the environmental purposes is grounded in the principle of the CBDR.[79] Moreover, the CBDR principle is a central factor in the context of climate finance, capacity building, and compliance.[80] In addition, the wording of the UNFCCC provision on technology transfer makes specific mention of the CBDR principle and provides that states should take the principle of CBDR into consideration when applying the provision.[81] The principle of CBDR is also a central

[76] Rudall (2021) *Community Law Review* 187.

[77] Rudall (2021) *Community Law Review* 187.

[78] Cullet P "Differentiation" in Rajamani & Peel *Oxford Handbook* 320-322; Orlando E "Principles, Standards and Voluntary Commitments in International Environmental Law" in Law" in Techera E, Lindley J, Scott K N & Telesetsky A (eds.) *Routledge Handbook of International Environmental Law* Routledge Publishing 21.

[79] Sands & Peel *Principles* 720; Cullet "Differentiation" in Rajamani & Peel *Oxford Handbook* 324; Maguire R "The Role of Common but Differentiated Responsibility in the 2020 Climate Regime" (2013) *Carbon and Climate Law Review* 264.

[80] Rajamani L & Guérin E "Central Concepts in the Paris Agreement and How They Evolved" in Klein D, Caraza M, Doelle M, Bulmer J & Highham A (eds.) *The Paris Agreement on Climate Change Analysis and Commentary* (2017) Oxford University Press 81-82; Huggins A & Karim S "Shifting Traction: Differential Treatment and Substantive and Procedural Regard in the International Climate Change Regime" (2016) *Transactional Environmental Law* 427-448.

[81] UNFCCC Article 4(1) provides "[…] all states, taking into account the CBDR principle, shall […]".

feature of the Paris Agreement.[82] Therefore, the CBDR principle will be further examined below.

Lastly, the principle of sustainable development is a guiding principle in the UNFCCC framework,[83] and strongly linked to the transfer of ESTs.[84] Sustainable development is a concept with an undefined boundary, but at its core, it emphasizes that growth must respect the environment's limits.[85] Based on the principle of sustainable development, the extraction of resources should not exceed satisfying current needs to the extent that it undermines the ability to meet future needs effectively,[86] and environmental protection considerations should be integrated into economic development.[87] Technological advancements play a pivotal role in economic development, and ESTs can contribute to achieving the objective of sustainable development in developing nations.[88]

In light of the above, it is crucial to consider the legal status and application of both the CBDR principle and the principle of sustainable development in more detail, to determine the degree to which they contain state obligations in the context of transferring ESTs. The principle of CBDR and the principle of sustainable development are accordingly discussed further below.

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[82] Article 2.2. of the Paris Agreement provides: "This Agreement will be implemented to reflect equity and the principle of differentiated responsibilities and respective capabilities, in the light of differential national circumstances".

[83] UNFCCC, Article 3.4.

[84] Pandey N, de Connick H & Sagar A "Beyond Technology Transfer: Innovation Cooperation To Advance Sustainable Development in Developing Countries" (2021) *WIREs Energy and Environment* 2; Blohmke J "Technology Complexity, Technology Transfer Mechanisms and Sustainable Development" *Energy for Sustainable Development* (2014) 237-238; Ma Z F "The Effectiveness of the Kyoto Protocol and the Legal Institution for International Technology Transfer" (2012) *Journal of Technology Transfer* 75-76.

[85] Sands & Peel *Principles* 218-219; Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 54-55.

[86] Brundtland G H *Report of the World Commission on Environment and Development: Our Common Future* (1987) UNGA A/42/427.

[87] Sands & Peel *Principles* 218-219; Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 54-55.

[88] Pandey, de Coninck & Sagar (2021) *WIREs Energy and Environment* 2; Blohmke *Energy for Sustainable Development* (2014) 237-238.

2.1.1. CBDR Principle

Principle 7 of the Rio Declaration contains the CBDR principle and recognizes the distinction between the Global North and the Global South, as well as their respective historical contributions to global environmental degradation.[89] The CBDR principle is rooted in the overarching concept of equity.[90] "Common responsibility" refers to the shared obligations that all states have to protect environmental resources where they do not fall under the national jurisdiction of one or more states.[91] The preamble of the UNFCCC recognises global warming as a "common concern of humankind".[92] "Differentiated responsibility" on the other hand, recognises that the degree to which states have responsibility differs. The CBDR is particularly important in the climate law context as it acknowledges the varying historical contributions and economic capacities of countries, leading to the establishment of differentiated Nationally Determined Contributions (NDCs). [93] The NDCs represent the varying voluntary commitments of each party towards the global mitigation goal.[94] In the outcome of the first global stocktake at COP28, it was emphasized again that the NDCs reflect the principles of equity and CBDR.[95]

The rationale behind differentiation is twofold. Firstly, it is a recognition of the differential historical contributions of wealthier countries to global environmental problems, highlighting their responsibility in addressing climate change.[96] This justification is predominantly supported by countries in the Global South,[97] and can be viewed as a form of corrective justice.[98] Secondly, it acknowledges the varying financial and technical capacities of countries to undertake measures in preventing

[89] Rio Declaration, principle 7.

[90] Sands & Peel *Principles* 244; Rajamani (2012) *International Affairs* 623.

[91] Sands & Peel *Principles* 245.

[92] UNFCCC, Preamble.

[93] Paris Agreement, Article 4.

[94] Paris Agreement, Article 4.

[95] UNFCCC COP28 *Outcome of the First Global Stocktake*, paras. 5-7.

[96] Rajamani & Peel *Oxford Handbook* 346-349.

[97] Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 27; Brunnée & Streck "The UNFCCC as a Negotiating Forum: Toward Common but More Differentiated Responsibilities" (2013) *Climate Policy* 590.

[98] Cullet "Differentiation" Rajamani & Peel *Oxford Handbook* 320-322.

and combating climate change.[99] The "capacities" justification is an embodiment of redistributive justice, and finds more support from countries in the Global North.[100] Overall, differentiation is used as a means to address the limits of formal equality and cultivate substantive equality.[101]

The CBDR is expressed in two primary ways: through the allocation of rights; and the redistribution of resources.[102] The allocation of rights refers to the creation of different obligations or implementation terms based on the national situation of countries, while realization of the CBDR through redistribution of resources is based on assessing the needs of vulnerable countries and allocating financial resources or transfer technology accordingly.[103]

There is uncertainty about the legal status of the CBDR principle, which has led to different applications of the CBDR principle among states, often in their own favour.[104] For instance, the United States have consistently expressed its disagreement with any open-ended principles in IEAs that would impose binding obligations upon them.[105] In contrast, developing countries argue that the principle should be interpreted extensively.[106]

There is little case law supporting the view that the CBDR principle would in fact reflect international customary law. However, the International Tribunal for the Law of the Sea (ITLOS) has provided clarity to a certain degree. In the *Advisory Opinion on Responsibilities and obligations of States sponsoring persons and entities with*

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[99] Cullet "Differentiation" Rajamani & Peel *Oxford Handbook* 320-322.

[100] Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 27; Brunnée & Streck "The UNFCCC as a Negotiating Forum: Toward Common but More Differentiated Responsibilities" (2013) *Climate Policy* 590.

[101] Cullet "Differentiation" Rajamani & Peel *Oxford Handbook* 346-349.

[102] Honkonen T "The Principle of Common but Differentiated Responsibility in Post-2012 Climate Negotiations" (2009) *Review of European, Comparative and International Law* 257.

[103] Honkonen (2009) *RECEIL* 257.

[104] Rajamani (2012) *International Affairs* 618.

[105] Rajamani (2012) *International Affairs* 618; Maguire (2013) *Carbon and Climate Law Review* 263.

[106] Rajamani (2012) *International Affairs* 618; Maguire (2013) *Carbon and Climate Law Review* 263.

respect to activities in the Area,[107] the Seabed Disputes Chamber of the ITLOS (Seabed Disputes Chamber) confirmed the view that to date, the CBDR principle is not generally applicable unless the differentiating obligations are specifically codified in the provision in question.[108] The Seabed Disputes Chamber had to decide whether developing states enjoy "preferential treatment" in their environmental obligations compared to developed states.[109] More specifically, the Seabed Dispute Chamber needed to determine whether developing nations sponsoring activities within the Area should be subject to reduced environmental responsibilities, in the form of decreased liability under the provisions of ITLOS. This question was raised due to the financial constraints faced by developing states, which make them unable to carry the costs of potential legal risks involved with these projects. In its judgement, the Seabed Dispute Chamber held that "[…] the responsibility and liability of the sponsoring state apply equally to all sponsoring states, whether developed or developing […]".[110]

Drawing from legal scholarship, and based on the above judgement, it can be concluded that the CBDR principle has not yet gained the status of customary international law.[111] No state obligations follow directly from the principle itself.[112] Thus, international transfer of ESTs might be in alignment with the CBDR principle, but the principle alone does not justify an obligation to do so. The question then remains, what is the normative value of the principle if it is not part of international customary law?

[107] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Advisory Opinion), Seabed Disputes Chamber of the ITLOS (Seabed Disputes Chamber) 1 February 2011.

[108] *Advisory Opinion* Seabed Disputes Chamber 2011, paras. 107-110.

[109] *Advisory Opinion*, Seabed Dispute Chamber 2011, paras. 151-163.

[110] *Advisory Opinion*, Seabed Dispute Chamber 2011, para. 158.

[111] Sands & Peel *Principles* 246-248*;* Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 27; Maguire (2013) *Carbon and Climate Law Review* 263.

[112] Sands & Peel *Principles* 303.

Firstly, the principle can be used in judicial arguments.[113] For instance, in the WTO case *Import Prohibition of Certain Shrimp and Shrimp Products* (*Shrimp Turtle*),[114] the CBDR principle was used as an interpretive tool. In this case, the US had implemented a ban on shrimp imports from countries that did not have measures to prevent the unintentional entanglement of sea turtles in shrimp trawl fisheries. The affected countries challenged this measure at the WTO, arguing that it was discriminatory and violated international trade rules. The Appellate Body of the WTO found that the US was not allowed to unilaterally require other states to adhere to their regulatory programme "without taking into consideration different conditions which may occur in the territories of those other Members".[115]

Secondly, the principle is a tool in the formulation of international treaty obligations. Allowing for differential commitments or delayed implementation based on the CBDR principle can be an incentive for Global South countries to sign onto IEAs.[116]

Thirdly, the nature and legal status of the CBDR principle can be decided upon circumstantially: based on the location of the provision, the subject of the provision and the normative substance.[117] For instance, in the provision on technology transfer in the UNFCCC, the CBDR is specifically referred to as a principle that states must take into consideration when applying the provision.[118]

In conclusion, while the CBDR principle may not have attained customary international law status, its normative value remains vital in guiding judicial interpretations, shaping treaty obligations, and facilitating equitable international collaboration. The context in which it was used in the UNFCCC emphasizes the

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[113] Cullet "Differentiation" in Rajamani & Peel *Oxford Handbook* 324.

[114] Import Prohibition of Certain Shrimp and Shrimp Products (*United States v. Malaysia*) WT/DS58/RW, Appellate Body of the WTO, 6 November 1998.

[115] *United States v. Malaysia*, Appellate Body of the WTO 1998, par. 164.

[116] Cullet "Differentiation" in Rajamani & Peel *Oxford Handbook* 323; Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 222.

[117] Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 133.

[118] UNFCCC, Article 3.1.

distinct responsibility of developed nations to actively engage in and promote technology transfers to support developing country parties.

2.1.2. Principle of Sustainable Development

The relationship between technology transfer and sustainable development is deeply intertwined, with technology serving as a crucial tool in capacity building, the creating of partnerships and the mitigation of and adaption to climate change.[119] It is therefore crucial to understand the normative value of the principle of sustainable development to determine its implications on technology transfer obligations.

The concept of sustainable development was initially presented in the Brundtland Commission report titled "Our Common Future"[120] and was subsequently incorporated into the language of multiple of the principles of the Rio Declaration.[121] In broad terms, the principle of sustainable development emphasizes balancing economic growth with environmental conservation.[122] This principle encompasses four key elements: intergenerational equity; wise use; intragenerational equity; and the integration of environmental considerations in economic planning.[123] Over time, the concept of sustainable development has transcended its origins in international environmental law. At present, sustainable development has been integrated into economic frameworks and human rights agreements due to its acknowledgment of the interconnectedness between environmental considerations and key social issues, such as equity and poverty alleviation.[124] The primary contemporary way through which the concept of sustainable development has expressed itself is

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[119] Sands & Peel *Principles* 721; Blohmke (2014) *Energy for Sustainable Development* 237-238.

[120] Brundtland G H *Report of the World Commission on Environment and Development: Our Common Future* (1987) UNGA A/42/427.

[121] Rio Declaration, Principles 2, 4 ,5, 7, 9, 12, 21, 22, 24, 27.

[122] Bosselmann K "Sustainable Development Law" in Techera E, Lindley J, Scott K N & Telesetksy A (eds.) *Routledge Handbook of International Environmental Law* Routledge Publishing 32.

[123] Sands & Peel *Principles* 219.

[124] Sands & Peel *Principles* 218. For a detailed discussion on the legal implications of the principle of sustainable development, see Barral V "Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm" (2012) *European Journal of International Law* 377-400.

through the 2015 UN Sustainable Development Goals (SDGs).[125] While the SDGs are not legally binding, they provide guidance for a wide array of environmental policy instruments.[126]

In the *Gabčíkovo-Nagymaros Project* case,[127] the status of the principle of sustainable development was discussed by the ICJ for the first time. The ICJ held that "It is for the Parties themselves to find an agreed solution that takes account of the objectives of the Treaty, which must be pursued in a joint and integrated way, as well as the norms of international environmental law […]".[128] In his separate opinion, vice-president Weeramantry elucidated on the status of the principle of sustainable development, arguing that it is "more than a mere concept" and "a principle with normative value".[129] In 2005, in the *Arbitration Regarding the Iron Rhine* (*Iron Rhine*),[130] a dispute between the Netherlands and Belgium brought before the Permanent Court of Arbitration, the principle was also in question. In the *Iron* Rhine case, the Permanent Court of Arbitration described sustainable development as an emerging principle of international law.[131] It further commented that the principle of sustainable development, among other emerging principles, serves to integrate environmental protection in the process of economic development.[132] In 2010, in the *Pulp Mills* case, the ICJ took it one step further than in the *Gabčíkovo-Nagymaros Project* case. The ICJ was asked to interpret article 27 of the Statute of the River of Uruguay and argued that sustainable development was inherent to this provision and

[125] UN Transforming Our World: the 2030 Agenda for Sustainable Development A/RES/70/1 adopted in New York on 25 September 2015. See also: UN "The 17 Goals" available at https://sdgs.un.org/goals accessed on 17 august 2023.

[126] UN Transforming Our World: The 2030 Agenda for Sustainable Development A/RES/70/1 adopted on 25 September 2015.

[127] *Hungary v. Slovakia*, ICJ 1977.

[128] *Hungary v. Slovakia,* ICJ 1977, para. 140.

[129] Separate Opinion of Vice-President Weeramantry in *Hungary v. Slovakia* ICJ 1977, 85.

[130] Arbitration regarding the Iron Rhine (*Belgium v. Netherlands*) Permanent Court of Arbitration 25 May 2005.

[131] *Belgium v. Netherlands* Permanent Court of Arbitration 2005, paras. 58-59.

[132] *Belgium v. Netherlands* Permanent Court of Arbitration 2005, para. 59.

implementation thereof.[133] Moreover, the principle should be considered an objective that state conduct needs to be consistent with.[134]

As illustrated by the case law above, the principle of sustainable development is a tool for judges in interpreting specific provisions. While the principle of sustainable development is a fundamental part of several intersecting areas of law, its status as international customary law remains a topic of debate.[135] Some commentators contend that the principle of sustainable development can indeed be considered international customary law.[136] Other scholars view the principle of sustainable development as a "normative concept", which can only have decision-making power if applied in relationship to other, already accepted, customary law norms.[137] Moreover, even if the principle of sustainable development would be considered a part of international customary law, its exact normative value has to be further scrutinised to determine the exact obligations that would follow from it.[138] Currently, legal interpretation of the principle of sustainable development is too ambiguous to establish concrete laws and policies based on it.[139] However, limiting the principle of sustainable development to merely being a guiding tool in adjudication would fail to recognise the strong influence it has had both on the formulation and implementation of international law.[140]

Based on the above considerations and ongoing discussions in academic literature, this dissertation will not consider the principle of sustainable development as a

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[133] *Argentina v. Uruguay* ICJ 2010, para. 177.

[134] *Argentina v. Uruguay* ICJ 2010, para. 177.

[135] Bosselmann "Sustainable Development Law" in Techera, Llindley, Scott & Telesetksy *Routledge Handbook* 30-42.

[136] Sands & Peel *Principles* 219; Separate Opinion of Vice-President Weeramantry in *Hungary Slovakia* 85; Separate Opinion of Judge Cancado Trindade in *Argentina v. Uruguay* 184-190.

[137] Viñuales J E "Sustainable Development" in Rajamani & Peel *Oxford Handbook* 292.

[138] Bosselmann "Sustainable Development Law" in Techera, Llindley, Scott & Telesetksy *Routledge Handbook* 34.

[139] Bosselmann "Sustainable Development Law" in Techera, Llindley, Scott & Telesetksy *Routledge Handbook* 30-31.

[140] Viñuales "Sustainable Development" Rajamani & Peel *Oxford Handbook* 289; Barral (2012) *European Journal of International Law* 378.

standalone principle of international customary law on which technology transfer obligations could be based. Instead, the dissertation will use the principle in determining and interpreting the existing technology transfer obligations and objective guiding state practice.

2.2. UNFCCC

The UNFCCC is a framework convention, meaning it outlines general commitments, guidelines, and principles for addressing climate change, while subsequent protocols and agreements provide more detailed measures and actions to be taken by participating countries.[141] The central objective of the UNFCCC to stabilize GHG concentrations in the atmosphere.[142] The UNFCCC is guided by the principles outlined in article 3, namely: equity and the CBDR principle, the precautionary principle, sustainable development and cooperation.[143]

Despite its framework nature, the UNFCCC contains several provisions related to the transfer of ESTs.[144] Article 4 of the UNFCCC addresses several technology transfer obligations. Article 4(1) provides that all states, considering the CBDR principle, shall "[…] promote and cooperate in the development, application and diffusion, including transfer, of technologies […]"[145] Moreover, it promotes cooperation in technological information related to climate change.[146] Furthermore, article 4(3) establishes that the responsibility for covering the expenses rests with developed nations.[147] This obligation is, however, dependent upon mutual agreement between developed and developing nations.

[141] Sands & Peel *Principles* 300.

[142] UNFCCC, Article 2.

[143] UNFCCC, Article 3.

[144] Maguire (2013) *Carbon and Climate Law Review* 264.

[145] UNFCCC Article 4(1)(c).

[146] UNFCCC Article 4(1)(h).

[147] UNFCCC, Article 4(3)

Article 4(5) is considered the key provision on technology transfer.[148] While article 4(1) refers to "all parties", article 4(5) specifically refers to developed countries and their responsibility to enable as well as finance the transfer of ESTs to developing countries, in order for the latter to implement the UNFCCC provisions.[149]

Further, article 4(7) of the UNFCCC contains a conditionality clause, under which developing countries can suspend the implementation of the Convention in case they do not receive the financial and technological commitments as outlined in the convention.[150] Lastly, the particular technological needs of the LDC's are taken into account in article 4(9) of the UNFCCC.[151]

2.3. Kyoto Protocol

The Kyoto Protocol was adopted at the UNFCCC COP3 held in 1997. Although the Kyoto Protocol has to a great extent been replaced by the Paris Agreement, the provisions established a foundational and framework for subsequent legal instruments addressing climate change.[152]

The Kyoto Protocol is known as one of the most quantified treaties in international environmental law, as it included strict reduction objectives and clear obligations.[153] The Kyoto protocol clearly distinguished between objectives of developed and developing countries. Developed nations were referred to as Annex I countries and are required to meet reduction targets averaging 5% below their emission levels of 1990. Non-Annex I countries had no such obligations.[154] The core objective of the Kyoto Protocol was for developed nations to achieve their quantified objectives for the limitation and reduction of emissions.[155]

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[148] Zhou (2019) *Int. Environmental Agreements* 109; De Connick H & Sagar A *Technology in the 2015 Paris Agreement and Beyond* (2015) ICTSD Programme on Innovation, Technology and Intellectual Property 1.

[149] UNFCCC Article 4(5).

[150] UNFCCC Article 4(7).

[151] UNFCCC, Article 4(9).

[152] Ma (2012) *Journal of Technology Transfer* 75-76.

[153] Ma (2012) *Journal of Technology Transfer* 75-76; Rajamani (2012) *International Affairs* 612.

[154] Kyoto Protocol Article 3(1).

[155] Kyoto Protocol Article 2(1).

Under the Kyoto Protocol, a set of flexible mechanisms was created, which integrated the need for reducing GHG emissions with the need to decrease the expenses associated with fulfilling these reduction obligations.[156] They were classified in two main categories: Joint Implementation (JI) and the CDM.

The obligations on technology transfer in the Kyoto Protocol were situated in article 10(c), 11(2)(b) and 13(4). Article 10(c) emphasized the need for all states to work together to promote effective ways of developing, using, and diffusing ESTs, knowledge, practices, and processes that were relevant in addressing climate change. It highlighted the importance of supporting developing countries in accessing these technologies.[157] Article 11(2)(b) provided that developed states have an obligation to financially assist developing parties in their technological needs, either through direct financing or through technology transfers.[158] Article 13(4) again emphasized the need to minimize effects of climate change through funding, insurance, and technology transfer.[159]

In 2010, at the UNFCCC COP16, the Technology Mechanism was established.[160] The Technology Mechanism consists of two collaborating entities, namely the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN). The Technology Mechanisms strove to improve both mitigation and adaptation technologies to effectively implement the Convention. To do so, they focused on identifying national technology needs and speeding up progress in technology development and transfer, in alignment with the responsibilities set forth in the UNFCCC regime.[161]

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[156] Pandey, de Coninck & Sagar (2021) *WIREs Energy and Environment* 12.

[157] Kyoto Protocol Article 10(c).

[158] Kyoto Protocol Article 11(2)(b).

[159] Kyoto Protocol Article 13(4).

[160] COP *Report of the Conference of the Parties on its Sixteenth Session* UNFCCC/CP/2010/7/Add. 1 par 117.

[161] COP *Sixteenth Session* para. 113-115.

The discussions regarding the scope of technology transfer obligations during the following COPs centred increasingly around the role of IPRs, resulting in growing disagreements between developed and developing nations.[162] Annex I countries directed the developing nations towards the Technology Mechanism to facilitate technology transfer. In contrast, developing states increasingly stressed the specific obligations they believed the Annex I states had, based on the specific technology transfer provisions in the UNFCCC and the Kyoto Protocol.[163]

[162] Rimmer M "Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice" (2019) *Laws* 1-24.

[163] Azam M "A journey from Rio to Paris via Kyoto to facilitate technology transfer to the LDCs under the UNFCCC" (2021) *Journal of Property, Planning and Environmental Law* 66.

2.4. Paris Agreement

The Paris Agreement was adopted under the auspices of the UNFCCC COP21 held in 2015. The treaty is a cornerstone of international climate change law.[164] Its objective is to enhance the international response to the effects of climate change and ensure that the global temperature increase remains significantly below 2 degrees Celsius above pre-industrial levels, with endeavours to restrict it to 1.5 degrees Celsius.[165] The division between Annex I and non-Annex I countries as used under the Kyoto Protocol was abandoned under the Paris Agreement and replaced with the NDCs. Despite the widespread agreement on the need for deployment of ESTs in developing countries, the issue of IPRs have remained a topic of controversy in the COPs; a result of strong disagreement on the topic of differentiation in drafting the Paris Agreement.[166] The lack of any wording on IPRs in the international legal framework on climate change reflects the disagreement on the topic.[167] This was no different in COP21, and as a result, article 10 of the Paris Agreement does not mention IPRs. It states that the full realization of technology development and transfer is necessary for the mitigation of and adaptation to climate change is shared amongst member states.[168] Article 10 further emphasizes the need for parties to strengthen collaborative efforts on technology development and transfer and reaffirms the role of existing technologies.[169] Lastly, article 10 establishes a Technology Framework which serves to guide the Technology Mechanism in enabling and supporting technology development and transfer to ultimately promote the implementation of the Paris Agreement.[170] In terms of financing, article 9 provides that developed country parties should, through a variety of instruments, assist developing countries to reach their obligations under the UNFCCC.[171] Moreover, several transparency and reporting requirements on

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[164] Bodanksy, Brunnée & Rajamani *Int. Climate Change* Law 209-210.

[165] Paris Agreement, Article 2(1).

[166] Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 219; Rimmer M "Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice" (2019) *Laws* 4-6.

[167] Latif *Climate Policy* 106.

[168] Paris Agreement, Article 10.

[169] Paris Agreement, Article 10(2) & 10(3).

[170] Paris Agreement, Article 10(4).

[171] Paris Agreement, Article 9(1) & 9(3).

estimated levels of public finance should be provided for by developed countries.[172] In terms of substantive wording, the only new substantive norm is found in article 9(3), which states that the "mobilization of climate finance should represent a progression beyond previous efforts".[173] Article 14 of the Paris Agreement prescribes the global stocktake to evaluate collective progress towards achieving the goals formulated in 2015.[174] In 2023, during the first global stocktake, enhanced technological collaboration and capacity building related to ESTs were again highlighted as crucial components in addressing climate change.[175]

2.5. Critique of the International Climate Change Regime

The international climate change regime provides extensive technology transfer obligations. While obligations to transfer technology can be found in several other environmental treaties as well as in the WTO regime, as will be discussed in part 4, those in the climate change regime are the most extensive and specific.[176] As one commentator contends: "developing countries have a right to expect that these provisions will finally produce consistent and high-quality technology transfer results".[177] However, though the UNFCCC, the Kyoto Protocol and the Paris Agreement are legally binding, the legal force of each provision varies, based on the context of the provision, the addressee, the language and precision of their formulation.[178] The international climate change regime was designed in a way that would ensure nearly universal initial participation, which is only achieved through broadly formulated commitments.[179] This has several consequences for its effectiveness.

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[172] Paris Agreement, Article 9(5), 9(6) & 9(7).

[173] Paris Agreement, Article 9(3); Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 240.

[174] Paris Agreement, Article 14.

[175] UNFCCC COP28 *Outcome of the First Global Stocktake* paras. 8, 22, 32, 34, 110.

[176] Shabalala "Viewpoints on Historical Responsibility" in Sarnoff *Research Handbook* 194.

[177] Shabalala "Viewpoints on Historical Responsibility" in Sarnoff *Research Handbook* 194.

[178] Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 18.

[179] Wold C, Hunter D, Melissa P *Climate Change and the Law* (2009) LexisNexis 184.

Firstly, the language reflected in the international climate change regime is vague and non-substantive, giving way to different interpretations among parties about what is considered part of a technology transfer and what is not.[180] Without a well-defined framework, stakeholders are inclined to adhere to conventional rules regulating IPRs as provided for by the by the WTO.[181] As will become clear in part 4 of this dissertation on the WTO framework on international IPRs, the central objective of the TRIPS Agreement differs significantly from that of the Paris Agreement. The main purpose of the TRIPS Agreement is to provide strong IPR protection, as opposed to focussing on equitable distribution of technologies and correction of market failures, the latter of which was promoted by developing country parties.[182] If stakeholders choose to adhere exclusively to the business-as-usual WTO practices, this may undermine the implementation and effectiveness of the international climate change regime's objectives. Therefore, better coordination between the two regimes is needed.[183]

Secondly, the effective dissemination of EST is dependent on a multitude of factors, such as the IPR regime of the receiving country, institutional and technical capacity of the receiving country, asymmetric information, the Foreign Direct Investment (FDI) climate, and the innovative value of the technology in question.[184] The international climate change regime's provisions on the transfer of ESTs to developing countries does not deal with relevant aspects of technology transfer such as capacity. Even if developing countries and LDCs were to receive financial support to acquire relevant technologies, several other barriers would have to be addressed, relating to institutional capacity and human resources.[185]

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[180] Zhou (2019) *Int. Environmental Agreements* 112; De Connick & Sagar (2015) 6.

[181] Zhou (2019) *Int. Environmental Agreements* 112; Ni K "Legal Aspects (Barriers) of Granting Compulsory Licenses for Clean Technologies in Light of WTO/TRIPS Rules: Promise or Mirage?" (2015) *World Trade View* 710.

[182] Alam "Technology Assistance and Transfers" in Rajamani & Peel *Oxford Handbook* 957.

[183] De Connick & Sagar (2015) 9; Sarnoff "Patents and Climate Change" in Sarnoff *Research Handbook* 345.

[184] Zaman (2013) *AJIL* 145-146; Sarnoff "Patents and Climate Change" in Sarnoff *Research Handbook* 339.

[185] Zaman (2013) *AJIL* 145.

Thirdly, the broad formulation of the provisions of reflected in the international climate change framework create ambiguity around financing. The transfer of relevant technologies often requires significant absorbing capacity of receiving countries.[186] The absorbing capacity, meaning the ability of a country to effectively acquire, assimilate, adapt, and use new technology or practices from other sources, is often low in developing countries.[187] In certain sectors, infrastructure can pose a barrier to the adequate transfer of technologies.[188] The lack of financial and institutional capacity of many developing countries on the receiving end of technology transfers raises the question of who should carry the financial burden of ensuring absorbing capacity.[189]

Article 4(3) of the UNFCCC, for example, addressing the financing of technology transfer, provides that Annex I parties should provide financing to developing country parties, including the transfer of technology. [190] Yet, when assessing which specific costs are meant, the wording "agreed full incremental costs" implies that it is only costs that are agreed upon between developed and developing parties, and the words "full incremental costs" is open for diverse interpretation.[191] The extent to which the envisioned funds include the expenses for obtaining IPR licenses therefore remains uncertain.[192] Similarly, while the Paris Agreement asserts that developed nations will aid developing countries through investments in ESTs or financial assistance, decisions concerning the mechanisms to ensure the financial flow have been deferred and any determination about the legal framework of the agreement

[186] Shabalala *Technology Transfer* PHD 160.

[187] Blohmke (2014) *Energy for Sustainable Development* 240; Santamauro J P "Failure is Not an Option" in Brown, A E (ed.) *Environmental Technologies, Intellectual Property and Climate Change: Accessing, Obtaining and Protecting* (2013) Edward Elgar Publishing 101.

[188] Shabalala *Technology Transfer* PHD 160.

[189] Shabalala *Technology Transfer* PHD 359; De Connick & Sagar (2015) 6.

[190] UNFCCC, Article 4(3).

[191] UNFCCC, Article 4(3). Shabalala *Technology Transfer* PHD 160.

[192] Shabalala *Technology Transfer* PHD 160.

have been postponed.[193] At COP28, technology development and transfer were discussed, and the inadequacy of the transfer of technology to developing countries was emphasized.[194] In response, a separate decision was adopted focussed on the strengthened cooperation between the CTCN, the Green Climate Fund and the Global Environment Facility, which development which might prove fruitful in the future, but the full extent of its impact is yet to be seen.[195]

Lastly, the soft language on the obligation to transfer ESTs is not supported by sufficient accountability mechanisms.[196] In the Paris Agreement, there is a general lack of consequences for non-compliance, even in provisions of a more legally binding nature.[197] Article 15 of the Paris Agreement, for example, aims to establish a mechanism, governed by a committee of experts, for both implementation and non-compliance. However, the committee has to function in a non-punitive manner and provides limited substantive language on practical steps to be taken in cases of non-compliance.[198]

The central aim of this part was to examine to what extent developed country parties have an obligation to transfer patented ESTs to developing countries, based on principles and provisions of the UNFCCC framework. Relevant principles of international environmental law and the substantive provisions on technology transfer in the international climate change regime have been examined. Technology transfer is a fundamental component in all the UNFCCC treaties. The presence of technology transfer obligations throughout the UNFCCC framework and in many

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[193] Chasek P "The Paris Negotiations: Background and Context" in Jepsen H, Lundgren M, Monheim K & Walker H (eds.) *Negotiating the Paris Agreement: Insider Stories* (2021) Cambridge University Press 38.

[194] UNFCCC COP28 Decision -/CP28 *Enhancing Climate Technology Development and Transfer Through the Technology Mechanism* adopted in Dubai on 6 December 2023, para. 9.

[195] UNFCCC COP28 Decision -/CP28 *Linkages Between the Technology Mechanism and the Financial Mechanism* adopted in Dubai on 6 December 2023.

[196] Huggins A & Karim S "Shifting Traction: Differentiated Treatment and Substantive and Procedural Regard in the International; Climate Regime" (2016) *Transnational Environmental Law* 441.

[197] Paris Agreement, Article 15.

[198] Paris Agreement, Article 12(2); Bodanksy, Brunnée & Rajamani *Int. Climate Change Law* 246.

international environmental law treaties is an acknowledgment by the global community of its significance in combatting climate change.[199] However, the specificities regarding the quantity, method of transfer, and patent costs associated with technology transfer remain ambiguous, and the international climate change regime does not include any binding language on IPRs. The following section examines the diverse perspectives on the interplay between the international transfer of ESTs and IPRs, after which part 4 provides an in-depth analysis of the WTO IPR regime.

[199] Zaman (2013) *AJIL* 147.

3. Balancing Technology Transfer Imperatives and IPR Imperatives

The majority of patented ESTs originate from a limited number of developed nations located in the Global North, and from a select few emerging economies, such as China and India, rather than from the developing world.[200] Naturally, the debate around IPRs is one of strongly differing agendas between the Global North and the Global South. Discussions around the role of IPRs have become highly polarized during the UNFCCC COPs, resulting in a stalemate situation.[201] In addition to significant policy discussions between states and within international organisations, the subject of barriers imposed by IPRs on the diffusion of ESTs has received substantial academic attention. The existing body of literature within this domain is still in development. To effectively address whether compulsory licensing could potentially solve the current challenges with technology transfer, it is crucial to precisely identify the issues at play, and understand the requirements of both technology creators and developing countries. Below, an analysis will be given of the arguments both in favour of and against strong IPR protection in the context of international technology transfer for climate change. As discussed above, this dissertation does not aim to determine whether patents effectively incentivize technological development. However, understanding the key arguments on both sides of the IPR debate is essential for finding solutions that facilitate the widespread distribution of ESTs. Following the presentation of these arguments, an overview will be given with the efforts of the international community to overcome the tensions as well as proposed solutions by scholars.

3.1. Arguments in Favour of Strong IPR Protection

The main argument for a strict IPR regime is that the central purpose of IPRs is to provide incentives for technological innovation.[202] This argument is based on the notion that investments in Research and Development (R&D) would only be viable when a patent or other form of IPR can be established on the technology afterwards

[200] Sarnoff "Patents and Climate Change" in Sarnoff *Research handbook* 335.

[201] Latif (2014) *Climate Policy* 104; Mpanu-Mpanu T "The Staircase of Paris" in Jepsen, Lundgren, Monheim & Walker *Negotiating the Paris Agreement: Insider Stories* 191.

[202] Dussaux D Dechezleprêtre A & Glachant M "The impact of Intellectual Property Rights Protection on Low-Carbon Trade and Foreign Direct Investments" (2022) *Energy Policy* 1-12.

and the product can be commercialized.[203] There is an increased argument that a shift towards stronger IPR protection might also incentivize multinational corporations to introduce ESTs within developing nations faster and to a higher degree than they would under an ineffective IPR system.[204] Additionally, proponents of the use of IPRs in the transfer of ESTs assert that IPRs facilitate the cross-industry exchange of intellectual property, particularly within the realm of "green" technologies, promoting collaborative innovations and partnerships across diverse sectors.[205] The accessibility of the patent documents is highlighted as a mechanism to encourage knowledge dissemination, thereby positioning the patent system as a catalyst for the transfer of ESTs, rather than a barrier.[206] While developing countries assert that IPR holders are reluctant to transfer the best available or appropriate technologies, developed countries claim to have limited influence on private technology holders.[207]

An empirical study was conducted on the effects of IPR on the international transfer of low-carbon technology, and found that the strengthening of IPR-protection of mitigation technologies had a positive effect on the degree to which they were transferred.[208] The study found that strengthening IPRs would promote the transfer of multiple low-carbon technologies, manifesting in increased imports of capital goods and FDI in areas like solar PV, solar thermal, wind energy, heating, lighting, and eco-friendly vehicles.[209] However, current empirical studies are still too limited to come to conclusive evidence on the role that IPR protection plays in transferring

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[203] Chu J M "Developing and Diffusing Green Technologies: the Impact of Intellectual Property Rights and Their Justification" (2012) *Washington and Lee Journal of Energy, Climate, and the Environment* 73-74.

[204] Branstetter L, Foley C F, Saggi K "Has the Shift to Stronger Intellectual Property Rights Promoted Technology Transfer, FDI, and Industrial Development?" (2010) *WIPO Journal* 94; Ahmad *WTO Law* 89.

[205] Eppinger et. al. "Sustainability Transitions in Manufacturing: the Role of Intellectual Property" (2021) *Current Opinion in Environmental Sustainability* 121-122.

[206] Eppinger et. al. (2021) *Current Opinion* 121-122.

[207] Shabalala *Technology Transfer* PHD 211.

[208] Dussaux, Dechezleprêtre & Glachant (2022) *Energy Policy* 6.

[209] Dussaux, Dechezleprêtre & Glachant (2022) *Energy Policy* 6.

green technology.[210] In addition, what may be true for developing countries with emerging economies such as China, Brazil, India or South Africa, might not be the case for the LDCs.[211] The UNEP, the European Patent Office, and the International Centre for Trade and Development found in a collaborative study that almost 80% of all clean energy technologies are patented in Japan, the United States, Korea, Germany, the United Kingdom and France.[212] This is an important statistic when considering arguments of both the developed and the developing countries. It is no surprise that developed countries holding the largest number of patents on ESTs are opposed to weaker IPR rules. Furthermore, the potential impact of patents on innovation in developing countries is minimal due to most patents in these regions being owned by foreign entities.[213]

3.2. Arguments in Favour of Weak IPR Protection

The assertion that strict IPR regimes stimulate technological innovation, is primarily applicable to developed states with established innovation capabilities, as developing states often lack the requisite financial resources and infrastructure for significant R&D.[214] Therefore, some authors argue that the effects of IPR-protection are dependent on the level of advancement in the domestic development of ESTs.[215] From this perspective, IPRs protection is a positive for countries who have developed ESTs and want to export them globally. However, for countries that rely on foreign technologies, IPRs have adverse effects.[216] Furthermore, the argument that stronger IPRs facilitates transfer of ESTs contrasts with the outcomes observed in a recent study of foreign technology transfer to developing countries under

[210] Shabalala *Technology Transfer* PHD 230.

[211] Zaman (2013) *AJIL* 148.

[212] UNEP, European Patent Office, ICTSD *Patents and Clean Energy: Bridging the Gap between Evidence and Policy – Final Report* (2010) 33.

[213] Correa (2013) *RECEIL* 55.

[214] Correa (2013) *RECEIL* 55

[215] Pueyo & Linares (2012) *IDS Working Papers* 16.

[216] Pueyo & Linares (2012) *IDS Working Papers* 16; Sarnoff "Patents and Climate Change" in Sarnoff *Research Handbook* 339.

stronger IPR protection.[217] This study categorized nations into OECD and non-OECD groups, revealing that strong IPR policies failed to produce the anticipated benefits in technology transfer between 2008 and 2018 and that strict de facto IPR measures resulted in a reduction in CCMTs transfer across all countries.[218] Moreover, the LDCs experience several problems related to inadequate technology transfers for mitigation and adaptation purposes.[219] Little financial support, and the relatively low level of technological development within the LDCs leaves them highly dependent on the developed world for technology that could facilitate an energy transition.[220] Furthermore, some commentators argue that a stringent IPR regime creates market monopolies and discourages R&D.[221]

Many of the arguments in favour of weakening the IPRs on ESTs are rooted in global climate justice discourses.[222] Rapidly industrializing developing countries are experiencing drastic increases of their CO2 emissions, bypassing the current emissions of several Global Northern countries.[223] However, many developed states have undergone a similar stage of economic growth, making them responsible for most of the climate crisis based on cumulative historic emissions.[224] In fact, the countries that were classified under "Annex I" of the UNFCCC contributed for 90% of excess CO2 emissions.[225] Not surprisingly, calls from the Global North to reduce emissions are viewed by developing countries as somewhat hypocritical.[226] The

[217] Athreye S, Kathurbia V, Martelli A & Piscitello L "Intellectual Property Rights and the International Transfer of Climate Chance Mitigation Technologies" *Research Policy* 2023 11-14.

[218] Athreye S, Kathurbia V, Martelli A & Piscitello L (2023) *Research Policy* 11-14.

[219] Azam (2021) *Journal of Property, Planning and Environmental Law* 77.

[220] Azam (2021) *Journal of Property, Planning and Environmental Law* 77; Ahmad *WTO Law* 86.

[221] Zaman (2013) *AJIL* 147.

[222] Rimmer M "Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice" (2019) *Laws* 1-24.

[223] For further reading see: Azevedo V G, Sartori S & Campos L M S "CO2 Emissions: A Quantitative Analysis among the BRICS nations" (2018) *Renewable and Sustainable Energy Reviews* 107-115.

[224] Hickel J "Quantifying National Responsibility for Climate Change Breakdown: an Equality-based Attribution Approach for Carbon Dioxide Emissions in Excess of the Planetary Boundary" (2020) *Lancet Public Health* 399-404.

[225] Hickel (2020) *Lancet Public Health* 399.

[226] Fair (2009) *Int. Law & Management Review* 21-22.

CBDR principle, in which the technology transfer provisions are rooted, is based on the above discussed notion of historical responsibility.[227] Developed countries have disproportionately contributed to current environmental challenges, and therefore, by weakening IPRs, developing countries can more readily access ESTs, ensuring a more equitable distribution of resources. Overall, developing countries argue that the high cost of royalties, licenses and patents on IPR-protected technologies pose a barrier in accessing the technology needed.[228]

3.3. Proposed Solutions

Some academics contend that the international climate change regime inadequately incorporates a human rights perspective into the discourse on technology transfers.[229] In doing so, parties could circumvent debates centred on historical responsibility rooted in climate justice arguments and instead base technology transfer on human rights situations in developing countries.[230] This approach would strengthen the argument of developing countries that the responsibility to transfer pertinent technologies lies with developed states. Nevertheless, others contend that this strategy fails to tackle the fundamental issue of the concentration of the majority of ESTs in the Global North, leading to a consequential dependence of the Global South on these nations.[231] Other scholars have argued that existing policy instruments under the UNFCCC, such as the CDM, should be tailored to facilitate technology transfer and bypass the issue of IPRs entirely.[232] However, most of the solutions to the issues related to transfer of ESTs are found outside of the international environmental law framework. In contrast to the international

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[227] Shabalala "Viewpoints on Historical Responsibility" in Sarnoff *Research Handbook* 173-174; for further reading see: Will U & C Mangler-Nestler (eds.) "Fairness, Equity and Justice in the Paris Agreement: Terms and Operationalization of Differentiation" (2021) in *Leiden Journal of International Law* 397-420.

[228] Azam (2021) *Journal of Property, Planning and Environmental Law* 77.

[229] Shabalala D "Climate Change, Human Rights and Technology Transfer: Normative Challenges and Technical Opportunities" in Land M K & Aronson J D (eds.) *New Technologies for Human Rights Law and Practice* (2018) Cambridge university Press 64-65.

[230] Shabalala "Human Rights and Technology Transfer" in Land & Anderson *New Technologies* 64.

[231] Perrone & Glena (2022) *Transnational Legal Theory* 267.

[232] Zhou (2019) *Int. Environmental Agreements* 119.

environmental law regime, the WTO regime can play a significant role in practical implementation of EST transfers.[233]

Creating a more flexible IPR regime for climate-related technology has been suggested by several authors and institutions. For instance, the UN Technology and Development Report of 2023 held that "the international IPR system should be reformed to enable governments in developing countries to manage their systems to support climate action, based on the needs of different sectors and different stages of development."[234] Some authors suggest that there should be a general obligation for firms to license certain technology, if that technology increases safety or sustainability and thus has environmental or social benefits to everyone.[235]
A similar argument is used by proponents of "greening" IPRs. Green IPR involves a differentiation in the classification of patents and refers to the specialized management and protection of IPRs within the realm of green technologies and practices.[236] Another dominant perspective is that an entire reform of the IPR system would be politically difficult and time-consuming, and that the way forward lies in creatively using the existing IPR system to facilitate technology transfer.[237]

Based on the above examinations of the tensions between transferring and receiving countries as well as scholars, it can be asserted that a feasible solution should include two key components:

(1) Enhancing distribution of EST to developing countries for them to mitigate and adapt to climate change, while;
(2) Remunerating the creator of the technology to incentivize innovation and distribution of ESTs.

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[233] Rajamani & Peel *Oxford Handbook* 968-971.

[234] United Nations *Technology and Innovation Report 2023* 25.

[235] Eppinger et. al. (2021) *Current Opinion* 120.

[236] Dereń A M & Skonieczny J "Green Intellectual Property as a Strategic Resource in the Sustainable Development of an Organisation" (2022) *Sustainability* 1-11.

[237] Azam (2021) *Journal of Property, Planning and Environmental Law* 72; De Connick & Sagar (2015) 15.

Compulsory licensing under the TRIPS Agreement is one of the ways proposed in scholarly literature to creatively leverage the existing IPR framework by interpreting TRIPS in an extensive manner. Moreover, developing countries have continuously proposed the use of compulsory licensing to practically achieve technology transfer as promoted under the UNFCCC.[238] In the next part of this dissertation, the TRIPS Agreement and the Doha Declaration will be examined, and compulsory licensing provisions will be explored. The main question is whether these provisions can be applied in the realm of climate change. The legal plausibility of this interpretation needs confirmation, including the underlying justifications, if applicable.

Subsequently, an evaluation of practical feasibility is necessary. In assessing the feasibility, it will be examined to what degree compulsory licensing as a solution meets the two above-mentioned criteria.

[238] Ni (2015) *World Trade View* 709.

4. TRIPS and Compulsory Licensing

Part 2 of this dissertation has extensively dealt with state obligations regarding technology transfer within the international climate change regime. Part 3 focussed on identifying IPR-related constraints in the realization of technology transfers. This part aims to examine the existing relationship between trade and the environment and provide an overview of the international legal framework relevant to compulsory licensing.

4.1. WTO and the Environment

IPRs are legal protections that grant creators exclusive rights to their intellectual creations, encouraging innovation and creativity by allowing individuals and organizations control over the use and dissemination of their unique ideas and works.[239] IPRs can generally be categorized in copyright and related rights or industrial property. Industrial property in turn distinguishes between trademarks and other types of industrial property including patents, utility models and trade secrets.[240] The central aim of IPRs is to incentivize creative and innovative work to ultimately benefit the public, while providing the creator with financial benefit.[241] IPRs are private rights and are granted under national law.[242] Early treaties governing the international IPR regime are the 1883 Paris Convention for the Protection of industrial Property,[243] (Paris Convention) and the 1886 Berne Convention for the Protection of Literacy and Artistic Works, [244] (Berne Convention). The central aim of these instruments was to ensure that individuals or entities from one country, holding IPRs, would receive the same level of protection and rights in another country as the

[239] Taubman, Wager & Watal *Handbook TRIPS Agreement* 1.

[240] Taubman, Wager & Watal *Handbook TRIPS Agreement* 2.

[241] Correa C M *Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* (2020) Oxford University Press 9.

[242] Taubman, Wager & Watal *Handbook TRIPS Agreement* 2.

[243] Paris Convention for the Protection of industrial Property TRT/PARIS/001, adopted in Paris on 20 March 1883.

[244] Berne Convention for the Protection of Literacy and Artistic Works TRT/BERNE/001, adopted in Berne on 9 September 1886.

domestic right holders in that other country, also referred to as the national treatment principle.[245]

Before the establishment of the WTO, the 1947 General Agreement on Tariffs and Trade (GATT) [246] was the main international agreement governing trade. As global trade in goods and services expanded towards the end of the twentieth century, a series of negotiations unfolded from 1986 to 1994, referred to as the Uruguay Round.[247] During this series, the WTO was established through the Marrakesh Agreement Establishing the World Trade Organization,[248] (Marrakesh Agreement) in 1994, replacing the 1947 GATT, and providing the central institutional framework overseeing trade relations and facilitating the implementation and operation of multilateral trade agreements. The WTO was established with the ultimate aim of liberalizing trade, in which the IPR system was recognised as a legitimate exception to such trade.[249] The WTO also serves as a negotiating and administrative forum with a separate international dispute settlement procedure.[250] Besides establishing the WTO, discussions in the Uruguay Round led to the adoption of several of ground-breaking multilateral trade agreements, of which the General Agreement on Tariffs and Trade (GATT 1994)[251] is the primary one. Another multilateral trade treaty adopted in the Uruguay Round was the General Agreement on Trade in Services (GATS).[252] As the relationship between international trade and IPR became increasingly relevant, the TRIPS Agreement was also adopted in 1994.

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[245] Gervais D J "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research handbook* 54.

[246] General Agreement on Tariffs and Trade, (GATT 1947) adopted in Geneva on 30 October 1947.

[247] See WTO "The Uruguay Round" available at https://ap.lc/AyZWV accessed on 1 November 2023.

[248] Marrakesh Agreement Establishing the World Trade Organization (Marrakesh Agreement), adopted in Marrakesh on 15 April 1994, Article 2 & 3.

[249] Zhuang *Intellectual Property* 61-62.

[250] Marrakesh Agreement, Article 2 & 3.

[251] General Agreement on Tariffs and Trade (GATT 1994), Annex 1A to the Marrakesh Agreement, adopted on 15 April 1994 in Marrakesh.

[252] General Agreement on Trade in Services (GATS) Annex 1B to the Marrakesh Agreement, adopted on 15 April 1994 in Marrakesh.

While historically approached as separate issues in isolated legal frameworks, the relationship between trade and the environment has gained prominence since the United Nations Conference on Environment and Development (UNCED).[253] The Preamble of the Marrakesh Agreement recognises the need to reconcile trade and economic objectives with optimal resource use and environmental protection and mentions both the CBDR and the principle of sustainable development.[254] Although environmental considerations were not initially included in the agenda for the Uruguay Rounds, the language of the preamble of the Marrakesh Agreement ultimately proved to be of substantial value in subsequent decisions regarding WTO disputes.[255] In the Ministerial Decision on Trade and Environment, [256] also adopted in 1994, ministers elaborated on the preambular provision of the WTO Agreement. Moreover, the 1994 GATT, the GATS as well as he TRIPS Agreement contain provisions including exceptions which concern environmental protection.[257] Finally, a Committee on Trade and Environment (CET) was established as an institutional body of the WTO, which has continued to play an instrumental role in governing the intersection between trade and the environment as well as relevant stakeholders.[258] Since the Uruguay Round, there has been a notable shift in the understanding and interpretation of the WTO Agreements, acknowledging that environmental measures restricting trade are compatible with international trade rules.[259]

The Doha Declaration on the TRIPS Agreement was adopted in 2001. It was a response to concerns that strict intellectual property rules, particularly related to patents on pharmaceuticals, could hinder access to essential medicines, particularly in developing nations grappling with public health emergencies like HIV/AIDS, malaria, and other epidemics.[260] The Doha Declaration affirmed the flexibility of

[253] Delimatsis & Reins *Trade and Environmental Law* 1.

[254] Marrakesh Agreement, Preamble.

[255] Lim A H "History of the Trade and Environment Debate at the WTO" in Delimatsis & Reins *Trade and Environmental Law* 10.

[256] Ministerial Decision on Trade and Environment, adopted in Marrakesh on 15 April 1994.

[257] See: 1994 GATT, Article XX; GATS, Article XIV; TRIPS Agreement, Article 27(2) & Article 30.

[258] Ministerial Decision on Trade and Environment, adopted in Marrakesh on 15 April 1994.

[259] Lim "Trade and Environment WTO" in Delimatsis & Reins *Trade and Environmental Law* 10.

[260] See generally: Ministerial Declaration WT/MIN(01)/DEC/1 adopted in Doha on 14 November 2001.

TRIPS agreement to protect public health and recognized the right of WTO members to take measures to protect do so, emphasizing the need to find a balance between IPRs and public health objectives.[261] The provisions of the Doha Declaration will be further discussed below.

4.2. TRIPS: General Provisions

Recognizing the central tension of the relationship between international trade and IPRs, the first paragraph of the preamble of the TRIPS Agreement identifies the need to "promote effective and adequate protection of intellectual property rights" while also ensuring that measures are in place to guarantee that "intellectual property rights themselves do not become barriers to legitimate trade".[262] What is considered "effective" or "adequate" in this context remains open for interpretation. Interestingly, this first paragraph of the preamble foregrounds the objective to limit barriers to trade, which contradicts the notion that IPRs in themselves can be a trade barrier, as discussed in part 3.[263] The preamble also reaffirms that IPRs are private rights.[264] Moreover, the preamble recognises underlying public policy objectives, including development and technology objectives as well as the specific needs of LDCs.[265] The TRIPS Agreement does not centre around harmonization but establishes a baseline for IPR protection, limiting national discretion in the formulation of IPR laws.[266]

In article 2 of the TRIPS Agreement, the rights and obligations that parties have under the previous international IPR-treaties, including the Paris Convention and the Berne Convention, are highlighted.[267] The nature and scope of this TRIPS Agreement is relatively straightforward. It applies to all WTO members and obliges states to ensure equivalent levels of protection to nationals of other member

[261] Doha Declaration 2001.

[262] TRIPS Agreement, Preamble.

[263] Correa *Commentary TRIPS* 2.

[264] TRIPS Agreement, Preamble.

[265] TRIPS Agreement, Preamble.

[266] Correa *Commentary TRIPS* 23.

[267] TRIPS Agreement, Article 2.

states.[268] The TRIPS Agreement sets a minimum standard for IPR protection.[269] However, it allows for stricter IPR protection, as long as it is ensured that such protection does not contradict the TRIPS Agreement.[270] The beneficiaries of the TRIPS Agreement are referred to as "nationals".[271] They can include individuals or entities, whether natural or legal, with a strong affiliation to the member state.[272]

Article 4 contains the most favoured nation principle, meaning that if a country grants certain favourable treatment or benefits to the IPRs of one WTO member, it must extend the same treatment to the IPRs of all other members.[273] This principle aims to ensure fairness and non-discrimination among the members of the WTO.[274] Additionally, article 6 of the TRIPS Agreement specifies that the issue of exhaustion of intellectual property rights is not to be addressed under the agreement's dispute settlement procedures, with exceptions noted in Articles 3 and 4.[275]

The preamble of the TRIPS Agreement should be read in conjuncture with the objective and principles of the Convention.[276] The general provisions and basic principles are set out in Part I of the TRIPS Agreement. Article 7 provides the objective of the TRIPS Agreement and reads as follows:

"The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation *and to the transfer and dissemination of technology*, to the mutual advantage

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[268] TRIPS Agreement, Article 1(1) and 1(3).

[269] Correa *Commentary TRIPS* 7; Taubman, Wager & Watal *Handbook TRIPS Agreement* 15.

[270] TRIPS Agreement, Article 1.

[271] TRIPS Agreement, Article 1(3).

[272] Taubman, Wager & Watal *Handbook TRIPS Agreement* 15.

[273] TRIPS Agreement, Article 4.

[274] TRIPS Agreement, Article 4.

[275] TRIPS Agreement, Article 6; Taubman, Wager & Watal *Handbook TRIPS Agreement* 21. For further reading see: Rai R K "Should the WTO Harmonize Parallel Import Laws? An Analysis of the Exhaustion Doctrine" (2011) *Journal of Intellectual Property & Practice* 898-911.

[276] Taubman, Wager & Watal *Handbook TRIPS Agreement* 14; Gervais "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research handbook* 56.

of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations." (emphasis added).[277]

Furthermore, article 8 contains the general principles guiding the TRIPS Agreement.[278] Significantly, article 8 provides that "appropriate measures" might be needed, to prevent that IPRs unreasonably restrict the international transfer of technology.[279]

Part II of the TRIPS Agreement addresses various topics: copyright and related rights, trademarks, geographical indications, industrial designs, patents, layout designs, undisclosed information, and control of anti-competitive practices.
As ESTs are mostly patent protected, Part II, section 5, which considers patents, is of particular relevance to this research.[280] In preparing the TRIPS Agreement, patent provisions were amongst the most difficult to negotiate.[281] Developing nations advocated for the incorporation of provisions related to public interest, exceptions, and access to technology, based on the fear that developed countries might monopolize the market leading to inequitable outcomes.[282] In this context it is noteworthy to mention that few developing countries participated in the drafting of the TRIPS Agreement and they had little negotiating power.[283] Developed states argued for stronger IPR protection in order to increase FDI and technology transfers to developed states.[284] The provisions on patents as well as the exceptions to these provisions are considered below.

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[277] TRIPS Agreement, Article 7.

[278] TRIPS Agreement, Article 8.

[279] TRIPS Agreement, Article 8.

[280] Hsu L "Environmental Technology Transfer" in Delimatsis & Reins *Trade and Environmental Law* 421; Sarnoff J D "Patents and Climate Change" in Sarnoff *Research handbook* 334.

[281] Taubman, Wager & Watal *Handbook TRIPS Agreement* 8; Gervais "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research Handbook* 56.

[282] Zhuang *Intellectual Property* 63.

[283] Gervais "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research handbook* 55.

[284] Zhuang *Intellectual Property* 63.

4.2.1. TRIPS: Patents and Exceptions

The patent system is increasingly under pressure, as the accessibility and dissemination of ESTs depends significantly on how the patent system is implemented and interpreted.[285] Article 27 of the TRIPS Agreement delineates the criteria for patentable inventions. To secure a patent for a creation, it must meet three cumulative prerequisites: novelty; inventiveness; and suitability for industrial application.[286] Moreover, patents are available for products and processes and in all fields of technology, subject to inventions that are legally allowed to be exempted from patentability, as discussed below.[287] Article 28 of the TRIPS Agreement sets out the exclusive rights that the patent holder has after having established a patent, which include the "making, using, offering for sale, selling, or importing for the purposes that product", and prevents third parties from undertaking these actions without consent of the patent holder.[288] Additionally, the patent holder is allowed to enter into licensing contracts.[289] WTO members are obliged to ensure clear disclosure for the invention by the patent holder to the public.[290]

The TRIPS Agreement, while establishing a minimum standard for IPR protection, contains several flexibilities to serve public interest objectives.[291] There are three main exceptions to patent rights. Firstly, certain inventions may be entirely excluded from patentability.[292] However, the TRIPS Agreement does not allow for ESTs to be excluded from patent protection, as it does not differentiate between patentability of inventions with or without environmental or other added societal value.[293] Secondly, once a product is patented, members can provide exceptions to the patent, subject to certain qualifications such as the consideration of the legitimate interest of the

[285] Sarnoff "Patents and Climate Change" in Sarnoff *Research handbook* 334.

[286] TRIPS Agreement, Article 27.

[287] TRIPS, Article 27(1); Taubman, Wager & Watal *Handbook TRIPS Agreement* 107.

[288] TRIPS, Article 28(1)(a)(b).

[289] TRIPS, Article 28(2)

[290] TRIPS Agreement, Article 29.

[291] Zhuang *Intellectual Property* 234.

[292] TRIPS Agreement, Article 27(3).

[293] Zhuang *Intellectual Property* 237 & 250.

patent owner and third parties.[294] Lastly, subject to several requirements specified in article 31 of the TRIPS Agreement, the use of the invention without the authorization of the right holder may be permissible in certain circumstances.[295] This exception under article 31 of the TRIPS Agreement is known as compulsory licensing.

4.2.2. Compulsory Licensing

Compulsory licensing is the use of a patented creation without the consent of the patent holder, authorized by the government of the licensee for use by the government or by third parties.[296] Compulsory licensing can serve the purpose of protecting public interest including the environment as well as regulating anti-competitive behaviours.[297] During the 30th session of the WIPO Standing Committee on the Law of Patents (WIPO Standing Committee), compulsory licensing was discussed extensively. According to the WIPO Standing Committee, compulsory licenses serve as an instrument to protect public interest, including health, defence, development and economy and respond to national emergencies.[298]

Article 31 of the TRIPS Agreement builds on article 5A of the Paris Convention, and lists several cumulative conditions that are to be fulfilled before the compulsory license can be granted by the government of the licensee, in order to respect the legitimate interest of the patent holder. These conditions are, however, not the

[294] TRIPS Agreement, Article 30.

[295] TRIPS Agreement, Article 31.

[296] TRIPS Agreement, Article 31; Taubman, Wager & Watal *Handbook TRIPS Agreement* 121; Graham G & Lindsay D "Compulsory Licensing – Variations" in Graham G & Lindsay D *Public Rights* (2018) Cambridge University Press 392-432.

[297] This dissertation only considers the public interest ground. For the use as compulsory licensing as an anti-competitive remedy, see: TRIPS Agreement, Article 31(k); *United States v. Glaxo Group Ltd.,* 410 U.S. 52, U.S. Supreme Court 22 January 1973, para. 64. For further reading see: de Morais R P "Antitrust and Compulsory Licensing in BRICS and Developing Countries" (2016) *International Law and Economics* 149-167.

[298] WIPO Standing Committee on the Law of Patents (WIPO Standing Committee) *Draft Document on the Exception Regarding Compulsory Licensing* WIPO SCP/30/3, adopted on 21 May 2019, para. 9-11.

grounds on which the issuing of compulsory licenses should be based, but rather procedural rules in application.[299]

Firstly, the request for granting a compulsory license will be done on a case-by-case basis.[300] Secondly, the applicant must have attempted, without success, to obtain the authorization from the patent holder for a voluntary license, prior to the use of the compulsory license and on "reasonable commercial terms" within a "reasonable period of time".[301] An exemption to the prerequisite of prior negotiation exists in situations involving a national emergency, extreme urgency, or instances of public non-commercial use.[302] In the Doha Declaration, the national emergency exception was elaborated upon and it was emphasised that public health crises would constitute a national emergency.[303] However, the Doha Declaration does not limit national emergencies to public health emergencies and governments have the discretion to determine the conditions constituting a national emergency or extreme urgency.[304] This provision does not however imply that a "national emergency" is a prerequisite for the issuing of a compulsory license.[305] As the Doha Declaration clarifies, WTO members have the freedom to determine grounds upon which compulsory licenses will be granted.[306] This was reaffirmed by the WIPO Standing Committee, which stated that "no international treaty restricts a freedom of countries to determine the grounds upon which compulsory licenses are granted under their respective national law".[307]

The patent holder must be notified promptly in the case of public non-commercial use, or as soon as reasonably practicable in the case of a national emergency.[308]

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[299] Ni (2015) *World Trade View* 710.

[300] TRIPS Agreement, Article 31(a).

[301] TRIPS Agreement, Article 31(b).

[302] TRIPS Agreement, Article 31(b).

[303] Doha Declaration, Article 5 under c.

[304] Doha Declaration, Article 5 under c.

[305] Taubman, Wager & Watal *Handbook TRIPS Agreement* 201.

[306] Doha Declaration, Article 5 under b.

[307] WIPO Standing Committee *Draft Document* par. 9

[308] TRIPS Agreement, Article 31(b).

Moreover, the use of the patented invention under a compulsory license should be limited to the purpose for which it was authorized.[309] As such, a compulsory license will be terminated after the ground that justified the unauthorized use no longer applies.[310] Furthermore, the use has to be non-exclusive, meaning that the use of the patented creation is not limited to the licensee.[311] Article 31(f) requires that the use will be authorized "predominantly for the supply of the domestic market" of the licensee country.[312] This provision has posed challenges in certain cases, as not all members possess sufficient absorbing capacity, mainly due to limited technical or institutional capabilities discussed above. As a result, the countries in greatest need of using the flexibilities of the TRIPS Agreement often find themselves unable to take advantage of the compulsory licensing provision.[313]

A significant feature of compulsory licensing as opposed to other flexibilities under the TRIPS Agreement is that the licensee is obliged to pay "adequate remuneration" to the patent holder.[314] As the TRIPS Agreement does define "adequate remuneration", the amount is to be decided by the national authority of the issuing country.[315] When determining this amount, the particular circumstances of the case and the economic value of the authorization should be considered.[316] National laws will further detail the manner in which the adequacy of the remuneration is determined, which can differ per country.[317] Decisions on remuneration will however be subject to judicial or other independent review.[318] Lastly, article 31(k) of the

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[309] TRIPS Agreement, Article 31(c).

[310] Taubman, Wager & Watal *Handbook TRIPS Agreement* 122.

[311] TRIPS Agreement, Article 31(d).

[312] TRIPS Agreement, Article 31(f).

[313] Mercurio B & Yu R "Compulsory Licensing for Environmental Purposes" in Delimatsis & Reins *Trade and Environmental Law* 431.

[314] TRIPS Agreement, Article 31(h)

[315] Mercurio & Yu "Compulsory Licensing for Environmental Purposes" in Delimatsis & Reins *Trade and Environmental Law* 431.

[316] TRIPS Agreement, Article 31(h); WIPO Standing Committee *Draft Document* par. 87.

[317] WIPO Standing Committee *Draft Document* paras. 86-89.

[318] TRIPS Agreement, Article 31(j).

TRIPS Agreement provides that governments may issue compulsory licensing to prevent or respond to anti-competitive practices.[319]

5. Legality and Feasibility as Compulsory Licensing as a Solution

Having extensively dealt with the WTO framework, the TRIPS Agreement, patenting provisions, and in particular compulsory licensing, this part seeks to evaluate to what extent the TRIPS Agreement can be interpreted to facilitate the transfer of ESTs. Thereafter, this parts assesses whether compulsory licensing would also be a feasible solution to the existing problems with the transfer of ESTs.

5.1. Legality

A considerable part of determining the legality of compulsory licensing for climate change purposes, is treaty interpretation. Annex 2 of the Marrakech Agreement is titled Understanding on Rules and Procedures for Governing Settlement of Disputes (DSU),[320] which provides a useful tool as to how to interpret WTO treaties. Article 3 of the DSU provides that the customary rules of public international law can be used to clarify the provisions of WTO agreements.[321] The Vienna Convention on the Law of Treaties (VCLT)[322] is accordingly a useful lens through which to examine the compulsory licensing provision in the TRIPS Agreement.

5.1.1. Context, Purpose and Objectives

Article 31(1) of the VCLT provides that treaties need to be interpreted in their context and in the light of the object and purpose of that treaty. [323] This includes the preamble, the treaty text as well as subsequent agreements.[324] In this regard, it is crucial to remember that the preamble of the overarching Marrakech Agreement to which the TRIPS Agreement is an Annex, explicitly mentions sustainable

[319] TRIPS Agreement, Article 31(k)

[320] Understanding on Rules and Procedures for Governing Settlement of Disputes (DSU), Annex 2 to the Marrakesh Agreement, adopted on 15 April 1994 in Marrakesh.

[321] DSU, Article 3(2).

[322] Vienna Convention on the Law of Treaties, No. 1155, adopted in Vienna on 23 May 1969.

[323] VCLT, Article 31(1).

[324] VCLT, Article 31(2)(a)(b).

development. However, it is important to note that this does not imply that sustainable development incorporated as a principle in WTO regime. Instead, it is relevant in the context of treaty interpretation.[325] As such, the principle of sustainable development needs to be considered when interpreting article 31 of the TRIPS Agreement.

The preamble of the TRIPS Agreement focusses strongly on the balancing of rights and removing barriers to trade, as well as overarching public interest objectives which include technology transfer. In terms of the treaty text itself, it has a separate provision on technology transfer.[326] Article 66(2) of the TRIPS Agreement, a provision on the LDCs, provides:

"Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base".[327]

The facilitation of technology transfer, whether for public health or addressing climate change, has been a recurring theme in the adoption of WTO Agreements, with a distinct provision in the TRIPS Agreement itself. The increasingly dominant narrative within the WTO framework that trade objectives should reconcile with socio-environmental considerations is a crucial consideration in interpreting the TRIPS Agreement.[328] Interpreting article 66(2) of the TRIPS Agreement on technology transfer in light of the objective and purpose of the Agreement would provide a basis for the possibility of the transfer of ESTs.[329] Issuing compulsory licenses to increase the dissemination of ESTs as required by the UNFCCC Agreements enables

[325] Lo C "The Difference Between Treaty Interpretation and Treaty Application and Possibility to Account for non-WTO Treaties During WTO Treaty Interpretation" (2012) *International Law & Competition Law Review* 19.

[326] TRIPS Agreement, Article 66.

[327] TRIPS Agreement, Article 66(2).

[328] Zhuang *Intellectual Property* 212-213.

[329] Gervais "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research handbook* 56.

developing countries to better mitigate and adapt to the effects of climate change, thereby directly responding to article 66(2) of the TRIPS Agreement.[330]
The object and purpose of the TRIPS Agreement is found in the overarching objectives of the WTO regime as well as in article 7 and 8 of the TRIPS Agreement, which have been discussed above. Both article 7 and article 8 of the TRIPS Agreement assert that IPRs should promote, rather than obstruct the dissemination of innovative technologies. These provisions are indispensable in interpreting the TRIPS Agreement for transfer of ESTs.[331]

While the TRIPS Agreement was primarily aimed at establishing a minimum standard for the protection of IPRs, it allows for deviations on grounds of public interest. In the examination of the development and objectives of the WTO regime, along with the goals and preamble of both the Marrakesh Agreement and the TRIPS Agreement, it has become evident that public interest includes considerations for environmental protection and sustainable development, and that climate change is a matter of public interest.[332] Especially considering the vulnerability of LDCs to the effects of climate change and their limited capacity to mitigate and adapt, climate change could provide a basis of public interest upon which compulsory licenses could be issued.[333]

5.1.2. Subsequent Agreements

In addition to the context and purpose of the treaty, the VCLT provides other aspects that can be considered in the interpretation of a treaty, including subsequent agreements between parties, subsequent practice in application of the treaty and any other relevant rules of international law applicable between parties.[334] Some scholars use the uncertainty around the status of the Doha Declaration as a

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[330] Mercurio & Yu "Compulsory Licensing for Environmental Purposes" in Delimatsis & Reins *Trade and Environmental Law* 435.

[331] Gervais "Climate Change, the International Property Regime, and Disputes under the TRIPS Agreement" in Sarnoff *Research Handbook* 56.

[332] Zhuang *Intellectual Property* 301.

[333] Zaman (2013) *AJIL* 156; Littleton *Technologies to Developing Countries* 10.

[334] TRIPS Agreement, Article 31(3)(a)(b)(c).

"subsequent agreement" under article 31(3)(a) of the VCLT.[335] In the case *Measures Concerning the Importation, Marketing and Sale of Tuna Products*, [336] brought before the Appellate Body of the WTO by the United States, it was decided that a decision by the Technical Barriers to Trade Committee was considered a "subsequent agreement".[337] Moreover, a subsequent agreement must aid the interpretation or application of certain norms of the treaty.[338] The Doha Declaration, having more legal power than a decision and serving as a key tool to clarify the relationship between certain TRIPS Agreement provisions and public health, can therefore be considered a "subsequent agreement." The Doha Declaration proves a valuable tool in support of the argument that compulsory licenses can be issued for ESTs in three ways.

First, the Doha Declaration provides that "the [TRIPS] Agreement can and should be interpreted and implemented in a manner supportive of WTO Members' right to protect public health".[339] Climate change can pose a significant threat to human health and global public health.[340] For instance, air pollution from various sources including the burning of fossil fuels leads to direct health risks and the worsening of respiratory illnesses.[341] Disruptions to ecosystems also threaten access to essential resources like clean water and food, while compromising healthcare infrastructure

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[335] See for instance: Charnovitz S "The Legal Status of the Doha Declarations" (2002) *International Journal of Economic Law* 207-211; And more recently: Solovoy E M "The Doha Declaration at Twenty: Interpretation, Implementation, and Lessons Learned on the Relationship Between the TRIPS Agreement and Global Health" (2022) *North-western Journal of International Law and Business* 252-301.

[336] *Measures Concerning the Importation, Marketing and Sale of Tuna Products* WT/DS/381/AB/R, Appellate Body WTO 13 June 2012.

[337] *Measures Concerning the Importation, Marketing and Sale of Tuna Products* Appellate Body WTO para. 372.

[338] Lo (2012) *International Law & Competition Law Review* 19.

[339] Doha Declaration, para. 4.

[340] Sands & Peel *Principles* 297.

[341] Samet J M "Air Pollution: Adverse Effects and Disease Burden" in Al-Delaimy W K, Ramanathan V, Sorondo M S (eds.) *Health of People, Health of our Planet and Our Responsibility* Springer Nature Publishing 63-78.

and medicine availability, thus disproportionately affecting vulnerable populations.[342] In this regard, it is not far-fetched to interpret the TRIPS Agreement taking into account environmental considerations.

Secondly, the Doha Declaration has offered crucial clarification regarding the conception held by some scholars that a "national emergency" would be a prerequisite for the issuance of a compulsory license.[343] Analysis of article 31 shows that it outlines conditions that WTO members must adhere to when granting compulsory licenses, but it does not explicitly specify the grounds upon which such licenses should be based.[344] This only becomes relevant when a country needs to bypass the prior negotiations requirement.[345] Given the absence of a specific definition for "national emergency" in the TRIPS Agreement, some experts contend that climate change could fall within this category.[346] If climate change would indeed be considered a national emergency, then no prior negotiations would be needed and EST could be deployed immediately to countries in need through the issuing of a compulsory license.[347]

Lastly, the Doha Declaration reinforces the perspective that states have discretion in determining which grounds of public interest warrant the justification of a compulsory license. Therefore, although compulsory licenses have primarily been granted for medical purposes, there is no legal obligation for countries to confine the granting of compulsory licenses exclusively to pharmaceutical use. As stated above, climate change might as well be a public interest ground.

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[342] Sands & Peel *Principles* 297; for further reading see: Ghazani et. al. "Climate Change Impacts on Disaster and Emergency Medicine Focussing on Mitigation and Disruptive Effects: International Perspective" (2018) *International Journal of Environmental Research and Public Health* 1-13.

[343] Taubman, Wager & Watal *Handbook TRIPS Agreement* 201-202.

[344] Ni (2015) *World Trade View* 710.

[345] TRIPS Agreement, Article 31(b).

[346] Zaman (2013) *AJIL* 156; Fair (2009) *Int. Management & Law Review* 27; Zhou (2019) *Int. Environmental Agreements* 115.

[347] Zhuang *Intellectual Property* 302.

5.1.3. Subsequent Practice

In terms of subsequent practice as referred to in article 31(3)(b), internationally, states have not yet engaged in compulsory licensing for the transfer of EST.[348] However, governments have issued compulsory licenses for pharmaceuticals on several occasions for the purpose of providing medicine.[349] In the absence of examples of the use of compulsory licensing for environmental purposes, subsequent practice does not provide further basis upon which to ground an argument for the compulsory licensing of ESTs.

5.1.4. Other Relevant Agreements

Another crucial question in determining the legality of the use of compulsory licensing for transfer of ESTs is to what extent the TRIPS Agreement, as a WTO treaty, should take into account other independent treaties or norms, such as those of the UNFCCC. While the UNFCCC and the WTO are relatively isolated treaty systems, they do not operate independently from general international law.[350] Interpretation of WTO treaties in a consistent manner with non-WTO international law treaties could harmonize treaty systems, but is only possible to a certain extent.[351] In some cases, a direct reference to a treaty or specific provisions of another treaty is made, through which direct application of that treaty or provision is possible.[352] In other instances, non-WTO norms are used because of their status as international customary law.[353] Yet, when the rule does not fall under international customary law, like the technology transfer provisions outlined in the international climate change regime, direct application becomes unfeasible, and the use of

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[348] Ni (2015) *World Trade View* 708; Khan, Z.A. & Singh S "Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability" (2023) *Nature Environment and Pollution Technology* 2150-2151.

[349] Zhuang *Intellectual Property* 302.

[350] International Law Commission (ILC) *Report on Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law* A/CN.4/L.682, 13 April 2006 41.

[351] ILC *Report on Fragmentation of International Law* 16; Lo (2012) *International Law & Competition Law Review* 1-26.

[352] See for instance: TRIPS Agreement, Article 2.

[353] Lo (2012) *International Law & Competition Law Review* 7.

external norms requires reliance on treaty interpretation.[354] This is where article 31(3)(c) of the VCLT may be used, which provides that, for the purpose of interpretation, other relevant rules of international law that apply between parties may be considered.[355] Such interpretation is referred to as systemic integration.[356] Systemic integration involves interpreting treaties by recognizing them as products of international law and integral components of the broader international legal framework. [357] As such, even though a court or tribunal may have jurisdiction limited to a specific treaty, it is obligated to interpret and apply that treaty in consideration of its connection to the broader normative context.[358] In terms of the WTO, the International Law Commission (ILC) provides that WTO treaties are "creations of, and constantly interact with, other norms of international law".[359] As one commentator contends with regard to article 31(3)(c) of the VCLT: "in hard cases, it may be necessary to invoke an express justification for looking outside the four corners of a particular treaty to its place in the broader framework of international law […]".[360]

To look "outside the four corners" of the TRIPS Agreement, it must be examined what other international law can be considered "relevant" in the sense of article 31(3)(c) of the VCLT. In particular, the question arises as to whether the UNFCCC framework could be considered "relevant" international law in interpreting article 31 of the TRIPS Agreement. To answer this question, WTO caselaw and the views of academic commentators are examined below.[361]

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[354] Lo (2012) *International Law & Competition Law Review* 11.

[355] VCLT, Article 31(3)(c).

[356] ILC *report on Fragmentation of International Law* 106; De wet E & Vidmar J "Conflicts Between International Paradigms: Hierarchy Versus Systemic Integration" (2013) *Global Constitutionalism* 210.

[357] McLachlan (2005) "The Principle of Systemic Integration and Article 31(3)(c) of the Vienna Convention" *International and Comparative Law Quarterly* 280.

[358] ILC *Report on Fragmentation of International Law* 86.

[359] ILC *Report on Fragmentation of International law* 17.

[360] McLachlan (2005) *International and Comparative Law Quarterly* 281.

[361] For the purpose of this dissertation, the WTO case law on article 31(3)(c) has been examined. However, other international courts and tribunals have also produced case law on this provision. See for instance: *Belgium v. Netherlands* Arbitral Tribunal para. 79; Case Concerning Oil Platforms (*Iran v.*

Over the past decades, adjudicating bodies of the WTO have gradually become more willing to take environmental considerations into account.[362] There is some case law of the WTO Panel and the WTO Appellate Body on the use of environmental norms in the application of WTO law. For instance, in the *Shrimp Turtle* case the WTO Appellate Body used article 31(3)(c) of the VCLT, and referred to several different treaties of international environmental law.[363] Moreover, in the case *European Communities – Measures Affecting the Approval of Marketing of Biotech Products*, [364] brought before the WTO Panel, the Panel used article 31(3)(c) of the VCLT to justify the its consideration of the Convention on Biological Diversity as well as the Cartagena Protocol on Biosafety.[365] The Panel argued that these instrument were "relevant" because all parties to the WTO treaty were also parties to the non-WTO treaty. Furthermore, in the case *European Communities – Measures Concerning Meat and Meat Products*,[366] brought before the WTO Appellate Body, the WTO Appellate Body responded to an argument by the European Community that, had the legal status of the precautionary principle been a "general principle of law", the WTO Panel would have to apply it.[367] At the time however, the precautionary principle was not yet established as such.

U.S.) ICJ 6 November 2003, para. 40-42; Certain Questions of Mutual Assistance in Criminal Matters (*Djibouti v. France*) ICJ 4 June 2008, para. 113; Maritime Delimitation in the Indian Ocean (*Somalia v. Kenia*) ICJ 2 February 2017, para 89.

[362] Trujillo E "Climate Change Adjudication in Trade-Driven Tribunals" in Delimatsis & Reins *Trade and Environmental Law* 72.

[363] *United States v. Malaysia*, Appellate Body of the WTO paras. 130-134 & 158.

[364] European Communities – Measures Affecting the Approval and Marketing of Biotech Products (*European Community/ U.S.)* WT/DS291/R / WT/DS292/R / WT/DS293/R WTO Panel 21 November 2006.

[365] *European Communities – Measures Affecting the Approval and Marketing of Biotech Products* WTO Panel, paras. 7.68-7.70.

[366] European Communities – Measures Concerning Meat and Meat Products (*European Communities v. U.S.*) WT/DS48/AB/R WTO Panel, 16 January 1998.

[367] *European Communities – Measures Concerning Meat and Meat Products* WTO Panel 16 January 1998, paras. 120-125.

In the cases of *Brazil – Measures Affecting Imports of Retreated Tyres*,[368] and more recently *India – Certain Measures Relating to Solar Cells and Solar Modules*, [369] the Appellate Body did not quote an environmental treaty directly, but gave some important insights into the relationship between domestic environmental measures and WTO law. In the first case, the WTO Appellate Body justified a restrictive trade practice by citing environmental concerns related to the import of certain used tyres, which were deemed to accumulate waste and took into account the limited resources available to address such environmental risks.[370] In the second case, the dispute concerned a domestic Indian decarbonization policy. The WTO Appellate Body did not support India's argument for a domestic environmental policy restricting trade.[371] However, the case highlighted the need for more flexibility for developing countries to make progress on local decarbonization.[372]

In examining the case law of the WTO Appellate Body, it has become clear that the use of international environmental norms in the interpretation and application of WTO treaties by adjudicating bodies of the WTO is increasingly common. Nevertheless, these decisions are specific to each case and, on their own, fail to establish standardized rules for evaluating the legality of using UNFCCC norms in the interpretation of article 31 of the TRIPS Agreement. Three other aspects may therefore be considered to decide what "relevant rules" are in the sense of 31(3)(c) of the VCLT: the subject matter of the treaty, the object and purpose, and intertemporal aspects.[373]

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[368] Brazil – Measures Affecting Imports of Retreated Tyres (*Brazil v. European Communities*) WT/DS332/R WTO Appellate Body 12 June 2007.

[369] India – *Certain Measures Relating to Solar Cells and Solar Modules* (*India v. U.S.*) DS/456/AB/R WTO Appellate Body 14 October 2016.

[370] For further analysis of the case see: Rengel-Goncalves A P "DS332: Brazil – Measures Affecting Imports of Retreated Tyres" in Delimatsis & Reins *Trade and Environmental Law* 560-562.

[371] India – *Certain Measures Relating to Solar Cells and Solar Modules* WTO Appellate Body 14 October 2016, para. 5.45.

[372] Trujillo "Climate Change Adjudication in Trade-driven Tribunals" in Delimatsis & Reins *Trade and Environmental Law* 77.

[373] Bhat S S "A Study of the Issue of 'Relevant Rules' of International Law for the Purposes of Interpretation of Treaties under Article 31(3)(c) of the Vienna Convention on the Law of Treaties" (2019) *International Community Law Review* 192.

Substantively, the UNFCCC and the TRIPS agreement clearly address different issues. However, this does not preclude interpreters of the TRIPS Agreement from potentially drawing on the UNFCCC. If the second factor, the object and purpose, reveals sufficient similarity, the UNFCCC may be relevant, even in the absence of a direct alignment in subject matter.[374] International adjudicating bodies have taken the object and purpose of treaties into account when considering which other rules of international law are "relevant rules", even in instances when the subject matter of treaties did not overlap.[375]

The object and purpose of the UNFCCC Agreements and the TRIPS Agreement differ, although they both generally include the promotion of sustainable development. The treaties align in their attention to overlapping concerns, such as global public health, human rights, and environmental matters.[376] Moreover, both agreements contain provisions addressing the promotion of widespread development and dissemination of technology, and both take the needs of developing countries into account in this regard.

While technology transfer is not the primary objective of either agreement, it constitutes a key aspect of certain substantive provisions within them. In international law, the object and purpose of specific provisions within a treaty may diverge from the object and purpose of the whole treaty.[377] The question then becomes whether it is possible to qualify certain provisions, rather than the treaty as a whole, as "relevant rules" as referred to in Article 31(3)(c) of the VCLT. In other words, is a provision "relevant" in case the object and purpose of that specific provision is similar to that of the treaty provision that needs to be interpreted? In the *Whaling in the Antarctic* case,[378] a distinction was drawn between the object and purpose of a given provision and the broader object and purpose of the treaty in

[374] Bhat (2019) *International Community Law Review* 199.

[375] See for instance: *Djibouti v. France* ICJ, para 113; *Ioan Micula, Viorel Micula and others v. Romania* ARB/05/20 International Centre for Settlements of Investment Disputes para. 305.

[376] Zaman (2013) *AJIL* 155.

[377] Bhat (2019) *International Community Law Review* 203.

[378] Whaling in the Antarctic (*Australia v. Japan*) ICJ 31 March 2014.

question.[379] This case offers a new perspective on the interpretation of article 31(3)(c) of the VCLT, suggesting that norms within international law may qualify as "relevant rules" contingent on the object and purpose of a specific treaty provision, rather than the whole treaty.[380] Taking such an approach, one could argue that article 31 of the TRIPS Agreement can be interpreted taking into account UNFCCC provisions on transfer of ESTs.

5.1.5. Inter-temporality

The last consideration for treaty interpretation is inter-temporality. Inter-temporality involves adapting the understanding of treaty provisions to changing real-world circumstances over time.[381] Such contemporary treaty interpretation is highly relevant in the context of climate change, and courts have increasingly been faced with climate litigation.[382] The ILC comments that the intention and the wording of the treaty must be used as an indication of whether an inter-temporal interpretation was envisaged.[383] This view was later confirmed by the ICJ, which held that the intention as to whether a provision includes "a meaning or concept capable of evolving" can be derived from the terms used in that provision.[384]

Through a detailed examination of the TRIPS Agreement in part 4 of this dissertation, with a specific focus on insights from the Doha Declaration in clarifying TRIPS Agreement provisions, it has become apparent that the wording of the TRIPS Agreement was designed to allow for flexibility. As the Doha Declaration provides on the use of TRIPS Agreement for public health reasons: "[…] we reaffirm the right of WTO Members to use, to the full, the provisions in the TRIPS Agreement, which

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[379] *Australia v. Japan* ICJ 31 March 2014, para. 57-58.

[380] Bhat (2019) *International Community Law Review* 204.

[381] Kolb R "Evolutionary Interpretation in International Law: Some Short and Less than Trail-Blazing Reflections" in *Evolutionary Interpretation and International Law* (2019) Hart Publishing 16.

[382] Mileva N & Fortuna M "Environmental Protection as an Object and Tool for Evolutionary Interpretation" in *Evolutionary Interpretation and International Law* (2019) Hart Publishing 136-137.

[383] ILC *Report on Fragmentation of International Law* 97.

[384] Dispute regarding Navigational and Related Rights (*Costa Rica v. Nicaragua*) ICGJ421, ICJ 13 July 2009 para. 63.

provide flexibility for this purpose".[385] Moreover, as stated above, the Doha Declaration leaves it up to WTO members to decide on which grounds they base the issuance of a compulsory license. Climate change is an indispensable inter-temporal consideration in many areas of law. The latest UFCCC COP conference held in Dubai in December 2023 included a unanimous decision to eliminate fossil fuels by 2030, triple the integration of renewable energy sources, and double efforts towards improve energy efficiency.[386] The global realization of these objectives hinges on the ability to interpret laws consistently with climate concerns and facilitate the transfer ESTs. As such, commentators argue that the issuing of a compulsory license to deploy an EST, is legally possible.[387]

5.2. Feasibility

One part of the central questions in this dissertation was to assess the legality of compulsory licensing of ESTs. Based on a thorough examination of the UNFCCC agreements, the TRIPS Agreement, the Doha Declaration, the VCLT, methods of interpretation and scholarly literature, this dissertation concludes that it is legally possible to use article 31 of the TRIPS Agreement for the purposes of transferring ESTs. The next part of the central question is to assess whether the use of compulsory licensing for ESTs purpose would also be feasible. The following part examines the feasibility of compulsory licensing for climate related technology transfer. In part 3, it was observed that a feasible solution needs to satisfy two key conditions: Enhancing the distribution of ESTs to developing countries for them to mitigate and adapt to climate change, while remunerating the creator of the technology to incentivize innovation and transfer of ESTs.

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[385] Doha Declaration, para. 4.

[386] COP28 UAE "The UAE Consensus" available at https://www.cop28.com accessed on 20 December 2023

[387] Zhuang *Intellectual Property* 297-298; Gunderson A "Protecting the Environment by Addressing Market Failure in Intellectual Property Law: Why Compulsory Licensing of Green Technologies Might Make Sense in the United States: A Balancing Approach" (2015) *BYU Law Review* 671-696; Zaman (2013) *AJIL* 153.

In line with article 31(h), the patent holder would be remunerated after the authorization by another government of a compulsory license. This would seem to satisfy the second condition. Whether compulsory licensing would indeed enhance transfer of ESTs to developing countries, the first condition, remains debated. The assumption of those in support of compulsory licensing is generally that facilitating the issuing of compulsory licenses would disseminate patented ESTs more widely and equitably.[388] The UNEP Report on patents and clean energy, for instance, advocates for enhancing market conditions to promote compulsory licensing for developing countries.[389] The goal is to rapidly diffuse ESTs, currently concentrated in a small number of countries. Advocates often cite the success of compulsory licensing in the pharmaceutical industry as a precedent.[390] Internationally, compulsory licenses have already contributed to the necessary dissemination of medicine. A recent example is that of the Covid-19 pandemic, in which several countries issued compulsory licenses for Covid-related medicine or Covid vaccines.[391] Before the Covid-pandemic, compulsory licenses had been issued in developing countries. For instance, the Indian Government successfully issued its first compulsory license for a cancer treatment in 2012.[392] In the case of *Nacto Pharma v. Bayer Corporation*,[393] the compulsory license issued by the Indian government was challenged Bayer Corporation, the pharmaceutical company holding the rights to the cancer drug in question. The Intellectual Property Appellate Board dismissed Bayer's appeal, paving the way for the Indian Government to issue

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[388] Henry C & Stiglitz E S "Intellectual Property, Dissemination of Innovation and Sustainable Development" (2010) *Global Policy* 245.

[389] United Nations Environmental Programme, European Patent Office, ICTSD *Patents and Clean Energy: Bridging the Gap between Evidence and Policy – Final Report* (2010) 63.

[390] Zhuang *Intellectual Property* 304; Sarnoff J D "Negative-Emission Technologies and Patent Rights after COVID-19" (2020) *Climate Law* 225-265; Bronin S C "What the Pandemic Can Teach Climate Attorneys" (2020) *Stanford Law Review* 155-164.

[391] For further reading see: Bonadio E & Contardi C "Compulsory Licenses During the Covid-19 Pandemic: A European and International Perspective" (2022) *The European Union and the Evolving Architectures of International Economic Agreements* 1-14.

[392] Bonadio E "India Grants a Compulsory License of Bayer's Patented Cancer Drug: The Issue of Local Working Requirement" (2012) *European Journal of Risk Regulation* 247-250.

[393] *Nacto Pharma v. Bayer Corporation* OA/35/2012/PT/MUM, Intellectual Property Appellate Board, 4 March 2013.

compulsory licenses for medical purposes in the future.[394] In the African context, compulsory licenses and other TRIPS flexibilities have been used in combatting HIV, AIDS and other communicable diseases.[395] Other countries have also successfully made use of the compulsory licensing provisions in the TRIPS Agreement, which has significantly contributed to global public health.[396]

Another argument in favour of compulsory licensing for the purpose of ESTs is that compulsory licensing has already effectively been implemented into domestic law in the United States, to advance the public's technological interest.[397] For instance, the Clean Air Act provides a provision called "mandatory licensing" which allows, under conditions similar to those of the TRIPS Agreement, the compulsory licensing of technologies that are necessary to comply with national emission standards.[398] Nevertheless, the provision has a limited scope and applies solely within the domestic context.[399]

Some commentators argue that compulsory licensing, while legally possible, is too complicated and contentious when it comes to ESTs.[400] The prior evaluation of article 31 of the TRIPS Agreement, it has become evident that multiple prerequisites

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[394] *Nacto Pharma v. Bayer Corporation*, para. 57.

[395] Vawda Y A "Compulsory Licenses and Government Use: Challenges and opportunities" in Correa C M & Hilty R M (eds.) *Access to Medicines and Vaccines* (2022) Springer Publishing 73-99; Owoeye O A "Compulsory Patent Licensing and Local Drug Manufacturing Capacity in Africa" (2014) *Policy & Practice* 214-219.

[396] Vawda "Compulsory Licenses and Government Use: Challenges and opportunities" in Correa & Hilty *Access to Medicines* 73-99. For further reading see: Rosenberg S T "Asserting the Primacy of Health over Patent Rights: A Comparative Study of the Process that Led to the Use of Compulsory Licensing in Thailand and Brazil" (2014) *Developing World Bioethics* 83-92.

[397] Gunderson (2015) *BYU Law Review* 681.

[398] The Clean Air Act, Public Law 159, 42 U.S.C. 7401–7626, adopted on 14 July 1955; For further reading see: Bernard J "Leveraging Mandatory Licensing Under the Clean Air Act – A Novel Framework to Domestic Reduction of Greenhouse Gasses" (2021) *Environmental Law* 301-332.

[399] Gunderson (2015) *BYU Law Review* 683.

[400] Santamauro "Failure is Not an Option: Enhancing the Use of Intellectual Property Tools to Secure Wider and More Equitable Access to Climate Change Technologies" in Brown *Environmental Technologies* 91; Fair (2009) *International Law & Management Review* 25; Maskus (2010) *Climate Technologies* 1-35; Ni (2015) *World Trade View* 710.

must be met for a country to legitimately grant a compulsory license. These conditions include prior negotiation, specified duration, provision of adequate remuneration, ensuring non-exclusivity, and other context-specific conditions. The necessity to adhere to these steps might make the process lengthy and limit the effectivity of its use.[401] Moreover, the relative success of the pharmaceutical industry in issuing compulsory licensing does not directly translate to the context of climate technology. Table 1 below provides a comparison between the employment of medicines and ESTs in developing countries.[402]

Table 1: Comparison between essential medicines and climate-related technology access

	Essential medicines access	Climate tech. access
Cost to access	Expensive	Varied
Level of emergency to developing society	High level	Climate change: a gradual process, depending on the vulnerability of each country
Local production capacity	Developing countries, such as Brazil, India, have relatively strong capacity on generics production	To be developed (the gap remains, though China invests a lot on this sector)

As shown in this table, the deployment of ESTs in developing countries is a more complicated undertaking than providing access to medicine. Firstly, the costs of transfer and implementation will greatly differ for different ESTs, because of factors such as technology size, durability, and specific requirements when implementing ESTs. Moreover, while climate change can pose immediate threats to the environment, the process itself is slow and the level of emergency in providing ESTs is therefore hard to quantify and different per geographical location. Differences such as the higher cost and complexity of implementing ESTs, implementation over varied geographical and socio-economic settings can hinder effective use of compulsory licensing.[403] Furthermore, when certain complex technologies consist of a

[401] Mercurio & Yu "Compulsory Licensing for Environmental Purposes" in Delimatsis & Reins *Trade and Environmental Law* 431.

[402] Ni (2015) *World Trade View* 701-719.

[403] Ni K (2015) *World Trade View* 711; Fair (2009) *Int. Law & Management Review* 24.

combination of patents, applying compulsory licenses can become a slow process.[404]

Another consideration is that some developing countries may lack the administrative, technical and institutional capacity as well as the know-how needed to effectively absorb advanced ESTs acquired through compulsory licensing.[405] This is a considerable argument against the use of compulsory licensing; acquiring ESTs requires a significant ability to adapt both infrastructurally and administratively, which can lead to additional costs as well as the risk of inadequate implementation.[406] In addition, implementation and maintenance of ESTs often require specific expertise, infrastructure, and regulatory frameworks, which may be lacking in certain regions.[407] The ability of a country to effectively acquire, assimilate, adapt, and use new technology or practices from other sources or countries is referred to as the "absorptive capacity", which in developing countries is often low.[408]

The above uncertainties about the practical feasibility of compulsory licensing make it an unlikely option as a tool to disseminate essential ESTs in the quantity and within the timeframe that such deployment is needed. The question naturally arises what alternative methods exist to facilitate transfer of ESTs while rewarding the creators of these technologies. As briefly mentioned in the introduction of this dissertation, there exists a substantial body of literature discussing such methodologies. These include strategies that lean more towards political frameworks, such as public-private partnerships, and those rooted in established legal practices, such as the CDM.

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[404] Shabalala *Technology Transfer* PHD 280.

[405] Mercurio & Yu "Compulsory Licensing for Environmental Purposes" in Delimatsis & Reins *Trade and Environmental Law* 433.

[406] Maskus (2010) *Climate Technologies* 7; Shabalala "Technology Transfer for Climate Change and Developing Country Viewpoints on Historical Responsibility and Common but Differentiated Responsibilities" in Sarnoff *Research Handbook* 173.

[407] Zaman (2013) *AJIL* 156; Shabalala "Viewpoints on Historical Responsibility" in Sarnoff *Research Handbook* 173.

[408] Blohmke (2014) *Energy for Sustainable Development* 240; Santamauro "Failure is Not an Option: Enhancing the Use of Intellectual Property Tools to Secure Wider and More Equitable Access to Climate Change Technologies" in Brown *Environmental Technologies* 101.

Although a detailed exploration of these methods falls outside the scope of this dissertation, the research conducted in this dissertation underscores the necessity for a holistic and integrated solution. WTO law and the international climate change regime are somewhat disconnected, as they prioritise different interests and lack a certain degree of coherence.[409] Therefore, finding a solution requires recognizing the interdependent relationship between WTO law and international environmental law and advocating for solutions that are as interconnected and multifaceted as the issues they aim to address. The growing interlinkages between global regulatory regimes highlight the importance of collaborative global initiatives to address common global challenges, as opposed isolated or limited to their competency.

[409] Ahmad *WTO Law* 22-23.

6. Conclusion

The significance of ESTs in fulfilling the objectives of the international climate change regime cannot be overstated. Their extensive distribution is vital for both mitigating and adapting to climate change. This is especially true for countries in the Global South, which have contributed the least to global warming and other environmental problems, yet disproportionately endure the impacts of these environmental challenges. The deployment of ESTs in these regions is therefore of paramount importance. In recognition of the critical role of technology in this context, the UNFCCC framework provides extensive provisions on the obligation to transfer technology. The vast majority of ESTs is concentrated in a small number of countries in the Global North, where the ESTs are developed and patented. The high costs of patents limit developing countries' access to essential climate technologies. As such, developing countries advocate for a more lenient IPR regime, grounding their argument in not only the immediate need for ESTs but also in the context of historical responsibility and the principles of climate justice. Conversely, developed countries contend that without strict IPRs protection ensuring adequate remuneration, along with the necessary local absorbing capacity, there would be too little incentive to invest in the development and subsequent dissemination of these ESTs.

Based on the provisions in the UNFCCC, the Kyoto Protocol, and the Paris Agreement, along with their supplementary documents, a clear obligation exists for developed countries to transfer ESTs to developing nations and LDCs. However, the scope and practical implications of this obligation, including the issues surrounding IPRs, remain open to various interpretations. Moreover, the CBDR principle and the principle of sustainable development should be used in interpreting the technology transfer provisions, but do not in themselves provide a ground upon which to base a claim to technology transfer. Although the UNFCCC framework reveals a general obligation for technology transfer, it has been subject to criticism. The critiques of the UNFCCC centre on its use of non-substantive language, the exclusion of explicit references to IPRs, inadequate integration with other legal regimes, limited financial commitments to developing countries, and the absence of robust accountability mechanisms.

The views amongst countries and of scholars differ widely on the existing IPR-related barriers to transfer od ESTs. Some support more stringent IPRs, while others argue that ESTs should be excluded from patentability entirely. All these considerations have led to an extensive body of literature in search of solutions to overcome the IPR-related barrier to the transfer of ESTs. It has become clear that a solution should facilitate enhanced distribution of ESTs to developing countries for them to mitigate and adapt to the effects of climate change, while at the same time remunerating the creator of the technology to incentivize innovation and distribution of ESTs. Compulsory licensing under the TRIPS Agreement has been proposed by some as a viable solution in this context.

While the TRIPS Agreement was primarily aimed at the establishment of a minimum standard for IPR protection, it allows for flexibilities on the grounds of public interest. Compulsory licensing is among the flexibilities embedded in the TRIPS Agreement, permitting a government to authorize a local third party to manufacture or use a patented invention without the agreement of the patent holder. To date, the provision has only been used for pharmaceutical purposes in cases. However, the provision might be useful to facilitate transfer of ESTs in the face of the climate crisis.

The VCLT provides methods for treaty interpretation, including the context, object and purpose of the treaty; subsequent agreements; subsequent practice; and other relevant agreements. Drawing on the VCLT, compulsory licensing should be seen in the context of the TRIPS Agreement, as well as in the broader context of WTO law. Based on the history and development of the WTO, WTO caselaw, scholarly literature and the substantive content of WTO treaties, it has become apparent that WTO law is increasingly being interpreted in a manner consistent with environmental considerations. Moreover, the flexibilities included in the TRIPS Agreement exist to strike a balance between trade objectives and the right of WTO members protect public health. In the preamble as well as the objective and the substantive provisions of the TRIPS Agreement, sustainable development, environmental matters, and equity are recurring themes. Furthermore, the TRIPS Agreement includes a separate provision on technology transfer, further indicating its importance.

The Doha Declaration to the TRIPS Agreement is a subsequent agreement to the TRIPS Agreement and can be used to further interpret the provisions of the TRIPS Agreement. Critically, the Doha Declaration explicitly provides that states have discretion in determining which grounds justify the issuing of a compulsory license.

Additionally, article 31 of the VCLT specifies that there may be other relevant agreements that can be used for the interpretation of a treaty, constituting a form of systemic integration. To ascertain whether the UNFCCC framework and WTO law are isolated treaty systems or integrated to a degree, WTO caselaw has been examined and academic literature has been assessed. While the UNFCCC framework and the TRIPS Agreement address distinct issues, the treaties overlap in their concerns for global public health, human rights and environmental matters, as well as the widespread development and dissemination of critical technologies. Such overlap, however, is only found in certain provisions. A new approach to ascertaining what "relevant rules" are in terms of the VCLT, would be to qualify certain provisions of a treaty, rather than the whole treaty. However, such an interpretation is still in development.

The last consideration for interpretation is that of inter-temporality. Given that climate change is a contemporary global issue and the TRIPS agreement allows for flexible interpretation, it is argued that the TRIPS Agreement can and should be interpreted in a manner consistent with addressing climate change.

The core question in this dissertation is: **What is the legal viability and practical feasibility of utilizing compulsory licensing within the framework of the TRIPS Agreement to facilitate technology transfer under the UNFCCC regime?**
Based on the above considerations, this dissertation finds that the use of compulsory licensing for the transfer of ESTs is legally possible. Based on compulsory licensing for medicine, domestic implementation of such licensing, and the great need for wider distribution of critical ESTs, commentators have argued that this approach would be not only legally possible but also a feasible solution. However, there are some serious barriers to effectively realizing technology transfer in the context of climate change. Firstly, the requirements of Article 31 of the TRIPS Agreement are extensive. Secondly, technology transfer for ESTs is in both physical and

administrative ways different from that of the pharmaceutical industry, so that the comparison cannot be made directly. Lastly, receiving countries generally do not have the absorbing capacity to implement the technologies adequately. Therefore, this dissertation concludes that compulsory licensing of ESTs in order to facilitate technology transfer under the UNFCCC is legally viable but not practically feasible. When considering alternative approaches to facilitate technology transfer, it is crucial to acknowledge the increasingly interconnected nature of WTO law and international environmental law. Any future efforts to promote the transfer of ESTs should take into account this interdependence and the intricate nature of the challenges they seek to address.

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