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Introduction

1.1 THE IMPORTANCE AND PURPOSE OF THIS STUDY

Climate change is “the defining challenge of our era”.¹ The UN General Assembly, by its resolution of 43/53 of 1988, recognised that climate change is “a common concern of mankind” and should be dealt with effectively within a comprehensive global governance system.² Innovation and transfer of technologies play an essential role in creating an effective and meaningful global response to climate change.

Provisions for the development and transfer of technologies are at the centre of “any significant international agreement” to limit developing countries’ greenhouse gas (GHG) emissions.³ According to the Intergovernmental Panel on Climate Change (IPCC),⁴ despite widely different perceptions and interests, all parties to the United Nations Framework Convention on Climate Change (UNFCCC) have agreed that the use of energy-efficient and cleaner technologies will benefit all and that “transfer and cooperation to advance the availability and use” of such technologies is one of the most effective ways to

¹ Ban Ki-moon (2008), Statement by United Nations Secretary-General Ban Ki-moon at the opening of the High-Level Segment of COP 14 in Poznan, p. 4, available at <http://unfccc.int/2860.php>

² Protection of Global Climate for Present and Future Generations of Mankind, United Nations General Assembly Resolution, A/RES/43/53, 6 December 1988.

³ John H. Barton (2008), *Mitigating Climate Change through Technology Transfer: Addressing the Needs of Developing Countries*, Energy, Environment and Development Programme, Programme Paper 08/02, Chatham House, p. 2.

⁴ IPCC was jointly established by the World Meteorological Organization and the United Nations Environment Programme to provide scientific assessments of human induced-climate change. See Protection of Global Climate for Present and Future Generations of Mankind, UN General Assembly, A/RES/43/53, 6 December 1988, para. 5.

reduce global GHG emissions.⁵ Article 4.1(c) of the UNFCCC obliges all Parties to promote and cooperate in the development and transfer of environmentally sound technologies (ESTs). Developed countries have committed themselves under Article 4.5 to “take all practicable steps to promote, facilitate and finance” the transfer of ESTs and associated know-how to other Parties, particularly developing country Parties, to “enable them to implement the provisions of the Convention”.⁶ Moreover, facilitating the innovation and transfer of ESTs to developing countries was high on the agenda in the negotiations over a post-Kyoto agreement. The recent adoption of the Paris Agreement signalled participating countries’ determination to speed up low-carbon growth, including via development and wide dissemination and adoption of ESTs.

The innovation and transfer of technology has also been a central theme of several multilateral negotiations and agreements, most notably the Uruguay Round of multilateral trade negotiations resulting in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).⁷ The TRIPS Agreement includes a number of provisions that govern or facilitate innovation and transfer of technology because some World Trade Organization (WTO) members see technology transfer as part of the bargain in which they have agreed to provide a fairly high protection of intellectual property rights (IPRs), which was deemed to be essential to incentivise innovation by some other countries.⁸ Notably, the objectives of TRIPS (Article 7) affirm that the protection and enforcement of intellectual property (IP) rights should contribute to technological innovation and to the transfer and dissemination of technology.⁹ Article 66.2 of the Agreement obliges developed countries to provide incentives to their companies to promote and encourage technology transfer to least developed countries (LDCs).

Yet, some commentators claim there has been very little actual and effective implementation of technology transfer provisions in international law.¹⁰

⁵ IPCC (2000), *IPCC Special Report: Methodological and Technological Issues in Technology Transfer*, Cambridge University Press, p. 87.

⁶ United Nations Framework Convention on Climate Change (UNFCCC), Article 4.5, 1992, FCCC/INFORMAL/84, GE.05-62220 (E) 200705.

⁷ UNEP, EPO and ICTSD (2010), *Patents and Clean Energy: Bridging the Gap between Evidence and Policy*, Munich: Mediengruppe Universal, p. 14.

⁸ World Trade Organization (2008), *Understanding the WTO*, p. 43.

⁹ Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), Article 7, 15 April 1994, Marrakesh Agreement Establishing the World Trade Organisation, Annex 1C, 33 I.L.M. 1197.

¹⁰ See, e.g., Moon Suerie (2011), *Meaningful Technology Transfer to the LDCs: A Proposal for a Monitoring Mechanism for TRIPS Article 66.2*, UNCTAD-ICTSD Project on IPRs and

In reality, the transfer of technology has not taken place at a scale large enough to effectively mitigate climate change. Empirical studies indicate that the innovation of ESTs is highly concentrated in a few industrialised countries and these technologies are rarely transferred to developing countries; when transferred, they primarily go to a handful of emerging economies (see Section 2.4).¹¹ Developing countries, which are in the greatest need of ESTs, generally have insufficient access to, or possession of, such technologies.

Different explanations have been given to account for the slow and inadequate transfer of ESTs to developing countries.¹² To the extent that ESTs are protected by IPRs, the role played by global IPR regimes (in particular, the TRIPS Agreement) in the process of technology transfer to developing countries has become one particularly contentious issue. Due to the existing asymmetries in the ownership and transfer of EST IP assets and the urgent need for a transition to a low-carbon economy the post-Kyoto negotiations have witnessed a North-South divide over IPRs and the innovation and transfer of ESTs. Briefly speaking, policy-makers in some developing countries argued on numerous occasions that the global IPR regime imposed by the WTO constitutes a (potential) barrier to the transfer of ESTs.¹³ Thus, they advocate the use and expansion of the TRIPS flexibilities and push for

Sustainable Development, Policy Brief No. 9; International Council on Human Rights Policy (2011), *Beyond Technology Transfer: Protecting Human Rights in a Climate-Constrained World*, International Council on Human Rights Policy, Geneva, Switzerland, p. 36.

¹¹ See, e.g., UNEP, EPO and ICTSD (2010), *Patents and Clean Energy: Bridging the Gap between Evidence and Policy*, Munich: Mediengruppe Universal, p. 9 (further noting that “The leading six countries – Japan, the USA, Germany, Republic of Korea, France and the UK – are the source of almost 80 per cent of all innovations developed worldwide in the field of CETs”); B. Lee, L. Iliev and F. Preston (2009), “Who Owns Our Low Carbon Future?”, *Intellectual Property and Energy Technologies*, A Chatham House Report, p. 25.

¹² Padmashree Gehl Sampath and Pedro Roffe (2012), *Unpacking the International Technology Transfer Debate: Fifty Years and Beyond*, ICTSD Programme on Innovation, Technology and Intellectual Property, working paper, ICTSD, Geneva, Switzerland, p. 29 (noting that other conditions are required for technology transfer include “infrastructure, human capital, financial investment, and a favourable technological regime that is geared towards creating greater opportunities for access to and absorption of technologies”), yet, developing countries generally lack of such enabling environments. Meanwhile, multinational companies who are often profit-oriented and want to maintain their competitiveness lack sufficient incentive to transfer their technologies to firms in developing countries.

¹³ See, e.g., UNDP (2011), *Technological Cooperation and Climate Change: Issues and Perspectives*, working papers presented at the Ministry of Environment and Forests, Government of India-UNDP Consultation on Technology Cooperation for Addressing Climate Change, UNDP, New Delhi, India; UNCTAD and ICTSD (2003), *Intellectual Property Rights: Implications for Development*, UNCTAD-ICTSD Project on IPRs and Sustainable Development, Policy Discussion Paper, UNCTAD and ICTSD, Geneva, Switzerland.

stronger language on compulsory licensing or even the exclusion of ESTs from patentability.¹⁴ In contrast, multinational companies (MNCs), with advanced ESTs, often cite insufficient IPR protection in developing countries as a barrier to innovation and transfer of technology and suggest stronger IP protection, for instance, by a full implementation of the TRIPS Agreement or TRIPS-plus provisions in free trade agreements (FTAs).¹⁵ Most developed nations believe that only strong IP regimes will facilitate the necessary innovation, diffusion and transfer of such technologies,¹⁶ thereby ignoring developing countries' positions. Notably, the US House of Representatives, on the road to Copenhagen, voted unanimously (432–0) to pass the legislative amendment to:

prevent any weakening of, and ensure robust compliance with and enforcement of, existing international legal requirements as of the date of the enactment of this Act for the protection of intellectual property rights related to energy or environmental technology.¹⁷

However, neither side has fully proved its case and the evidence remains inconclusive. Nevertheless, this divergence over the IPR issue in innovation and transfer of technology threatens the long-term prospects for a comprehensive international solution to mitigate climate change. There is an urgent need to conduct an in-depth study on the interface between the TRIPS Agreement and innovation and transfer of ESTs.

This book attempts to fill this gap with a view to making the TRIPS Agreement a more efficient and effective instrument for facilitating innovation and transfer of ESTs, mainly through legal interpretative devices. Two main research questions will be addressed: First, whether and, if so, to what extent do the minimum IPR standards established by the TRIPS Agreement facilitate or inhibit innovation and transfer of ESTs? Second, whether and, if so, to what extent the TRIPS flexibilities can be interpreted to facilitate innovation

¹⁴ See, e.g., Keith E. Maskus (2010), *Differentiated Intellectual Property Regimes for Environmental and Climate Technologies*, *OECD Environment Working Papers*, No. 17, OECD Publishing, doi: 10.1787/5kmfwjvc83vk-en, p. 7; Sangeeta Shashikant (2009), *No Patents on Climate-friendly Technologies*, *Says South*, 12 June 2009, *TWN Info Service on Intellectual Property Issues*, available at www.twinside.org.sg/title2/intellectual_property/info.service/2009/twn.ipr.info.090609.htm

¹⁵ Nicholas Stern (2007), *The Economics of Climate Change – The Stern Review*, Cambridge University Press, p. 566.

¹⁶ UNEP, EPO and ICTSD (2010), *Patents and Clean Energy: Bridging the Gap between Evidence and Policy*, Munich: Mediengruppe Universal, p. 14.

¹⁷ Foreign Relations Authorization Act, Fiscal Years 2010 and 2011, H.R. 2410, 22 June 2009, 111th Congress, Section 329, available at www.govtrack.us/congress/bills/111/hr2410/text

and transfer of ESTs so as to address global climate change. Taking into account, *inter alia*, the WTO's sustainable development objective, the object and purpose of the TRIPS Agreement and relevant rules of international law, this book seeks to propose a balanced and pro-competitive interpretation of the relevant TRIPS provisions. With a view to making such interpretation more authoritative, this book additionally proposes a Doha-type Declaration on Intellectual Property Rights and Climate Change. In order to further remedy the insufficiency of the treaty interpretation, this book also briefly recommends international guidelines for licensing of IP-protected ESTs as possible pathways to improve the current international IP regime for facilitating innovation and transfer of ESTs.

1.2 THE SCOPE AND STRUCTURE OF THIS STUDY

To the extent that ESTs are protected by IPRs, as found in Section 2.4, strict IPRs protection may help emerging economies access ESTs through market-based channels, though this may not be the case for other developing countries, in particular LDCs. Therefore, the findings in this book may not apply to LDCs. To the extent that innovation is the source of technologies, this book addresses not only the transfer of ESTs but also the innovation of ESTs.

This book includes two parts: Part I, entitled “Intellectual Property Rights, Innovation and Transfer of ESTs”, introduces the basic concepts of ESTs, technology transfer and IPRs, examines the legal framework governing innovation and transfer of ESTs, and studies the role of minimum IPRs established by TRIPS in innovation and transfer of ESTs. Part II is dedicated to investigating whether, and to what extent, the limits to patent protection and the competition-related provisions in the TRIPS Agreement, when properly interpreted, could be applied to facilitate innovation and transfer of ESTs, thus contributing to reconciling the public interest in tackling climate change with the private sector's interest in IP protection. Part I contains the first three chapters (Chapters 2 to 4), and Part II includes the remaining four chapters (Chapters 5 to 8).

Chapter 2, entitled “Concepts and Context: IPRs, Innovation and Transfer of ESTs”, first studies innovation and transfer of technology as part of the solution to climate change, followed by a description of transfer of ESTs including defining the concepts of ESTs and technology transfer. It then explores the fundamental issues in innovation and transfer of ESTs, including (1) ESTs as global public goods; (2) failures in the market for technologies and IPRs as a policy response to correct the market failures and (3) the concept of IP rights and their justifications. Subsequently, this chapter examines through

literature review and empirical studies the global distribution of innovation and international transfer of ESTs.

Chapter 3, entitled “International Legal Framework Governing IPRs, Innovation and Transfer of Technologies, Including ESTs”, introduces three approaches to regulate IP rights, innovation and transfer of technologies: the New International Economic Order (NIEO) approach, the market-based development approach, namely the TRIPS Agreement, and the sustainable development approach, with a focus on the UNFCCC. It first discusses the NIEO model, which was dominated by the revision of the Paris Convention and the creation of an UNCTAD Code of Conduct for Transfer of Technology during the 1970s and 1980s. It then provides a more detailed legal analysis of IP and technology transfer under the TRIPS Agreement. Finally, this chapter first examines EST transfer commitments in multilateral environmental agreements, in particular, the UNFCCC, and then discusses the interface between IPRs and innovation and transfer of ESTs in international climate negotiations.

Chapter 4, entitled “The Effects of Minimum IPR Standards Shaped by TRIPS on Innovation and Transfer of ESTs”, seeks to examine the implications of minimum IPR standards for innovation and transfer of ESTs, in particular, whether strong IPRs protection is a prerequisite for innovation and transfer of ESTs and whether strong IPRs protection presents a barrier to EST transfer to developing countries. This chapter studies in turn (1) mandatory minimum IPR standards under TRIPS; (2) the positive role of minimum IPRs protection in facilitating innovation and transfer of ESTs and (3) the potentially negative effects of strong IPR protection on innovation and transfer of ESTs.

Chapter 5, entitled: “Rules Governing Treaty Interpretation and the Elements against Which the TRIPS Agreement Should Be Interpreted”, identifies the methodology and relevant elements for interpreting the TRIPS Agreement. Under Articles 31 and 32 of the Vienna Convention on the Law of Treaties (VCLT), the terms of a treaty including the TRIPS Agreement shall be interpreted in good faith in accordance with their ordinary meaning in their context and in light of its object and purpose. This chapter first studies the customary rules governing treaty interpretation and then examines the elements in light of which the TRIPS Agreement should be interpreted, including the object and purpose of the treaty, subsequent development, as well as relevant rules of public international law.

Chapter 6, entitled: “Interpreting Patent-Related Flexibilities in the TRIPS Agreement for Facilitating Innovation and Transfer of ESTs”, examines to what extent patent-related flexibilities can be interpreted to facilitate

innovation and transfer of ESTs so as to address global climate change concerns. It first addresses the interpretative issues regarding the patentable subject matter under Article 27 and then examines the limits to patent rights in the TRIPS Agreement, followed by a study of compulsory licensing under Article 31. Their relevance to innovation and transfer of ESTs is addressed respectively.

Chapter 7, entitled: “Interpreting Competition-Related Flexibilities in the TRIPS Agreement for Facilitating Innovation and Transfer of ESTs”, examines to what extent competition-related TRIPS flexibilities can be interpreted to facilitate innovation and transfer of ESTs so as to address global climate change concerns. This chapter addresses, in turn, the interpretative issues of the basic principle established under Article 8.2, control of anti-competitive practices in contractual licences under Article 40, and compulsory licensing as a remedy to anti-competitive practices under Article 31(k). Their relevance to the innovation and transfer of ESTs is addressed respectively.

Chapter 8 serves as the conclusion to this study. It also identifies potential challenges and provides recommendations. This chapter summarizes the main findings contained in Chapters 1 to 7. With a view to making the balanced and pro-competitive interpretation of the TRIPS Agreement contained in Chapters 6 and 7 more authoritative, this chapter additionally proposes a Doha-type Declaration on Intellectual Property Rights and Climate Change. In order to further remedy the insufficiency of the treaty interpretation, this chapter briefly recommends international guidelines for licensing of IP-protected ESTs as possible pathways to improve the current international IP regime for facilitating innovation and transfer of ESTs.