ARTICLES

THE COMPLEX INTERPLAY BETWEEN INTELLECTUAL PROPERTY AND THE RIGHT TO SCIENCE

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ABSTRACT

This Article examines the complex interplay between intellectual property and the right to enjoy the benefits of scientific progress and its applications (the right to science). It begins by documenting the historical evolution of this right, including its textual language, internal structure, and authoritative interpretation. This Article then turns to insights provided by General Comment No. 25*, the authoritative interpretation by the U.N. Committee on Economic, Social and Cultural Rights of the right to science. The discussion focuses on the interpretative comment's critique of intellectual property rights, its normative support for pro-development efforts in the intellectual property arena, and its potential complications for and hindrances to those efforts. This Article further applies these insights to three new technological contexts that have recently garnered considerable attention from intellectual property policymakers and commentators: (1) the right to research; (2) the COVID-19 pandemic; and (3) generative AI. The Article concludes with three reflections on human rights strategies and practices that the discussion of the complex interplay between intellectual property and the right to science can provide: (1) the limitations of using human rights as trump cards in international intellectual property debates; (2) the need to develop different balancing processes to address tensions and conflicts within the intellectual property and human rights systems; and (3) the importance of appreciating the interrelationship between the*

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different rights in article 27 of the Universal Declaration of Human Rights and article 15(1) of the International Covenant on Economic, Social and Cultural Rights.

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INTRODUCTION

In December 2023, the Universal Declaration of Human Rights ("UDHR")[1] celebrated its seventy-fifth anniversary.[2] Although this international instrument recognizes a wide array of human rights, not all of them have received the same level of support and attention. A case in point is the right to science—or, more formally, the right to enjoy the benefits of scientific progress and its applications.[3] This right has arguably received the smallest amount of

[1] G.A. Res. 217 (III) A, Universal Declaration of Human Rights (Dec. 10, 1948) [hereinafter UDHR]. For excellent discussions of the origin of article 27 of the UDHR, see generally JOHANNES MORSINK, THE UNIVERSAL DECLARATION OF HUMAN RIGHTS: ORIGINS, DRAFTING, AND INTENT 217-22 (1999); and Cesare P.R. Romano, *The Origins of the Right to Science: The American Declaration on the Rights and Duties of Man*, *in* THE RIGHT TO SCIENCE: THEN AND NOW 33 (Helle Porsdam & Sebastian Porsdam Mann eds., 2022) [hereinafter THE RIGHT TO SCIENCE].

[2] *See Human Rights 75 Initiative*, OFF. OF THE HIGH COMM'R FOR HUM. RTS., https://www.ohchr.org/en/human-rights-75 (last visited Apr. 16, 2025) (providing information about initiative commemorating seventy-fifth anniversary of UDHR).

[3] *See* UDHR, *supra* note 1, art. 27(1) ("Everyone has the right freely . . . to share in scientific advancement and its benefits."); G.A. Res. 2200 (XXI) A, annex, International Covenant on Economic, Social and Cultural Rights art. 15(1)(b) (Dec. 16, 1966) [hereinafter ICESCR] (recognizing "the right of everyone . . . [t]o enjoy the benefits of scientific progress and its applications"). For discussions of the right to science, see generally PHILIPP AERNI, ENTREPRENEURIAL RIGHTS AS HUMAN RIGHTS: WHY ECONOMIC RIGHTS MUST INCLUDE THE HUMAN RIGHT TO SCIENCE AND THE FREEDOM TO GROW THROUGH INNOVATION (2015); ANNA MARIA ANDERSEN NAWROT, THE UTOPIAN HUMAN RIGHT TO SCIENCE AND CULTURE: TOWARD THE PHILOSOPHY OF EXCENDENCE IN THE POSTMODERN SOCIETY (2014); RICHARD PIERRE CLAUDE, SCIENCE IN THE SERVICE OF HUMAN RIGHTS (2002); HUMAN RIGHTS IN EDUCATION, SCIENCE AND CULTURE: LEGAL DEVELOPMENTS AND CHALLENGES (Yvonne Donders & Vladimir Volodin eds., 2007) [hereinafter HUMAN RIGHTS IN EDUCATION]; AURORA PLOMER, PATENTS, HUMAN RIGHTS AND ACCESS TO SCIENCE 156-61 (2015); HELLE PORSDAM, SCIENCE AS A CULTURAL HUMAN RIGHT (2022) [hereinafter PORSDAM, SCIENCE]; HELLE PORSDAM, THE TRANSFORMING POWER OF CULTURAL RIGHTS: A PROMISING LAW AND HUMANITIES APPROACH (2019); CESARE P.R. ROMANO & ANDREA BOGGIO, THE HUMAN RIGHT TO SCIENCE: HISTORY, DEVELOPMENT, AND NORMATIVE CONTENT (2024); THE RIGHT TO SCIENCE, *supra* note 1; U.N. EDUC., SCI. & CULTURAL ORG. [UNESCO], THE RIGHT TO ENJOY THE BENEFITS OF SCIENTIFIC PROGRESS AND ITS APPLICATIONS (2009); MARGARET WEIGERS VITULLO & JESSICA WYNDHAM, AM. ASS'N FOR THE ADVANCEMENT OF SCI., DEFINING THE RIGHT TO ENJOY THE BENEFITS OF SCIENTIFIC PROGRESS AND ITS APPLICATIONS: AMERICAN SCIENTISTS' PERSPECTIVES (2013), https://www.aaas.org/sites/default/files/content_files/UNReportAAAS.pdf [https://perma.cc/N828-D23Y]; Lea Shaver [now Bishop], *The Right to Science and Culture*, 2010 WIS. L. REV. 121 [hereinafter Shaver, *Right to Science and Culture*]; Peter K. Yu, *Can the Right to Science Reduce the Tensions Between Intellectual Property and Human Rights?* [hereinafter Yu, *Right to Science*], *in* A HUMAN-CENTERED APPROACH TO HEALTH INNOVATIONS: RECONCILING INTELLECTUAL PROPERTY WITH HUMAN RIGHTS (Lisa Biersay, Thomas Pogge & Peter K. Yu eds., forthcoming 2025) [hereinafter A HUMAN-CENTERED APPROACH], https://ssrn.com/abstract=4273521; and Peter K. Yu, *The Anatomy of the Human*

interpretive attention.[4] What is the scope of the right and its normative content? How does this right interact with other human rights, in particular those relevant to intellectual property protection and technological developments? What impact will the right to science have on the future development of educational materials, pharmaceutical products, and generative artificial intelligence ("AI")?

When the UDHR was adopted in December 1948, three distinct rights were recognized alongside each other in article 27: (1) the right to take part in cultural life;[5] (2) the right to science;[6] and (3) the right to the protection of interests resulting from intellectual productions.[7] These rights were later transcribed into enforceable international treaty obligations under article 15(1) of the International Covenant on Economic, Social and Cultural Rights ("ICESCR").[8] Under both the UDHR and the ICESCR, the right to science was not as well developed as the two other rights. William Schabas referred to it as being "[t]ucked away at the tail end" of the UDHR,[9] while other commentators have described it as one of the most underexplored or most obscure rights in international human rights instruments.[10] It is indeed no surprise that the U.N.

Rights Framework for Intellectual Property, 69 SMU L. REV. 37 (2016) [hereinafter Yu, *Anatomy*].

[4] *See* U.N., Econ. & Soc. Council, Comm. on Econ., Soc. & Cultural Rts. [CESCR], General Comment No. 25 (2020) on Science and Economic, Social and Cultural Rights (Article 15(1)(b), (2), (3) and (4) of the International Covenant on Economic, Social and Cultural Rights), ¶ 2, U.N. Doc. E/C.12/GC/25 (Apr. 30, 2020) [hereinafter General Comment No. 25] ("[S]cience is one of the areas of the Covenant to which States parties give least attention in their reports and dialogues with the Committee."); *see also infra* text accompanying notes 9-12.

[5] *See* UDHR, *supra* note 1, art. 27(1) ("Everyone has the right freely to participate in the cultural life of the community [and] to enjoy the arts . . . .").

[6] *See id.* art. 27(1) ("Everyone has the right freely to . . . share in scientific advancement and its benefits.").

[7] *See id.* art. 27(2) ("Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.").

[8] *See* ICESCR, *supra* note 3, art. 15(1) (recognizing "the right of everyone . . . (a) [t]o take part in cultural life; (b) [t]o enjoy the benefits of scientific progress and its applications; (c) [t]o benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author").

[9] William A. Schabas, *Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Application*, *in* HUMAN RIGHTS IN EDUCATION, *supra* note 3, at 273, 273.

[10] *See* Lea Bishop, *Foreword* to THE RIGHT TO SCIENCE, *supra* note 1, at xi, xi (referring to provisions recognizing the right to science as the "most obscure of all the international human rights treaty provisions"); Audrey R. Chapman, *Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications*, 8 J. HUM. RTS. 1, 1 (2009) (noting the right to science "is so obscure and its interpretation so neglected that the overwhelming majority of human rights advocates, governments, and international human rights bodies appear to be oblivious to its existence").

Committee on Economic, Social and Cultural Rights ("CESCR")—the authoritative body in charge of interpreting rights recognized in the ICESCR—did not publish a general comment on the right to science until April 2020, amid the COVID-19 pandemic.[11] More than a decade before, that committee had already published one general comment on the right to the protection of interests resulting from intellectual productions in 2006 and another on the right to take part in cultural life in 2009.[12]

As the CESCR's authoritative interpretation of the right to science, *General Comment No. 25* deserves greater scrutiny—both alone and in relation to the two earlier general comments. As we continue to develop what some commentators have referred to as "the human rights framework for intellectual property,"[13] there are good reasons to closely examine the complex interplay between intellectual property and the right to science. First, because the CESCR released *General Comments No. 17* and *No. 21* more than a decade ago, at a time when many commentators began to study the interplay between intellectual property and human rights,[14] the analyses and frameworks developed by these commentators can benefit from some updates. Second, the COVID-19 pandemic has taken more than 7 million human lives and inflicted pain and suffering on

[11] *See* General Comment No. 25, *supra* note 4 (providing authoritative interpretative comment on right to science).

[12] *See* CESCR, General Comment No. 17 (2005): The Right of Everyone to Benefit from the Protection of the Moral and Material Interests Resulting from Any Scientific, Literary or Artistic Production of Which He or She Is the Author (Article 15, Paragraph 1(c), of the Covenant), U.N. Doc. E/C.12/GC/17 (Jan. 12, 2006) [hereinafter General Comment No. 17] (providing authoritative interpretative comment on right to protection of interests resulting from intellectual productions); CESCR, General Comment No. 21: Right of Everyone to Take Part in Cultural Life (Art. 15, Para. 1(a), of the International Covenant on Economic, Social and Cultural Rights), U.N. Doc. E/C.12/GC/21 (Dec. 21, 2009) [hereinafter General Comment No. 21] (providing authoritative interpretative comment on right to take part in cultural life).

[13] *E.g.*, JOO-YOUNG LEE, A HUMAN RIGHTS FRAMEWORK FOR INTELLECTUAL PROPERTY, INNOVATION AND ACCESS TO MEDICINES (2015); Laurence R. Helfer, *Toward a Human Rights Framework for Intellectual Property*, 40 U.C. DAVIS L. REV. 971, 1001 (2007) [hereinafter Helfer, *Human Rights Framework*]; Yu, *Anatomy*, *supra* note 3. For the Author's other discussions of the human rights framework for intellectual property, see generally Peter K. Yu, *Intellectual Property and Human Rights in the Nonmultilateral Era*, 64 FLA. L. REV. 1045, 1075-82 (2012) [hereinafter Yu, *Nonmultilateral Era*]; and Peter K. Yu, *Reconceptualizing Intellectual Property Interests in a Human Rights Framework*, 40 U.C. DAVIS L. REV. 1039 (2007) [hereinafter Yu, *Reconceptualizing Intellectual Property Interests*]. For a collection of book-length treatments of the interplay between intellectual property and human rights, see Peter K. Yu, *Intellectual Property and Human Rights 2.0*, 53 U. RICH. L. REV. 1375, 1379 nn.19-20, 1380 n.21 (2019) [hereinafter Yu, *IPHR 2.0*].

[14] *See* Yu, *IPHR 2.0*, *supra* note 13, at 1383-99 (discussing evolution and maturation of scholarship on intellectual property and human rights).

countless others.[15] Now that the pandemic has evolved into an endemic,[16] it is highly appropriate to revisit the debate on intellectual property and human rights. Such analysis can serve as a postmortem examination of the human rights challenges posed by the pandemic. Considering that many medical and public health experts have predicted that another global pandemic will happen in the next decade or two,[17] it will be worthwhile to start exploring how human rights analyses can be used more effectively to improve the pandemic preparedness of the intellectual property system—domestic and global alike.[18] Third, both the intellectual property and human rights systems are at a crossroads, facing growing challenges posed by the arrival of new technologies—most notably genetic engineering, AI, and robotics. With respect to generative AI, for example, the past few years have already seen a vibrant debate concerning how the intellectual property and human rights systems should be adjusted to effectively respond to fast-evolving technological change.[19] Finally, with the

[15] *See WHO COVID-19 Dashboard*, WORLD HEALTH ORG., https://data.who.int/dashboards/covid19/deaths [https://perma.cc/7ZEV-BFCF] (last visited Apr. 16, 2025).

[16] *See* Lara Herrero & Eugene Madzokere, *COVID Will Likely Shift from Pandemic to Endemic — but What Does That Mean?*, CONVERSATION (Sept. 20, 2021, 2:45 AM), https://theconversation.com/covid-will-likely-shift-from-pandemic-to-endemic-but-what-does-that-mean-167782 [https://perma.cc/3E5J-7R5Q] (discussing shift of COVID-19 from pandemic to endemic); Nicky Phillips, *The Coronavirus Will Become Endemic*, 590 NATURE 382 (2021) (discussing why COVID-19 is here to stay as endemic and what that means).

[17] *See, e.g.*, STEFAN ELBE, PANDEMICS, PILLS, AND POLITICS: GOVERNING GLOBAL HEALTH SECURITY 34 (2018) ("The episodic recurrence of . . . influenza pandemics leads many experts to believe that new flu pandemics occur roughly once every couple of decades."); SONIA SHAH, PANDEMIC: TRACKING CONTAGIONS, FROM CHOLERA TO EBOLA AND BEYOND 8 (2016) ("In a survey by the epidemiologist Larry Brilliant, 90 percent of epidemiologists said that a pandemic that will sicken 1 billion, kill up to 165 million, and trigger a global recession that could cost up to $3 trillion would occur sometime in the next two generations.").

[18] As I observed in an earlier article:

> Recognizing that it will not be easier to make significant adjustments to the international intellectual property system the next time a global crisis emerges, it is high time we start exploring how best to address this type of difficult situation. In doing so, we will greatly improve our emergency preparedness in the intellectual property arena.

Peter K. Yu, *Deferring Intellectual Property Rights in Pandemic Times*, 74 HASTINGS L.J. 489, 495 (2023) [hereinafter Yu, *Deferring Intellectual Property Rights*].

[19] For discussions of human rights issues relating to artificial intelligence, see generally ARTIFICIAL INTELLIGENCE AND HUMAN RIGHTS (Alberto Quintavalla & Jeroen Temperman eds., 2023); ARTIFICIAL INTELLIGENCE AND INTERNATIONAL HUMAN RIGHTS LAW: DEVELOPING STANDARDS FOR A CHANGING WORLD (Michał Balcerzak & Julia Kapelańska-Pręgowska eds., 2024); COUNCIL OF EUR., HUMAN RIGHTS BY DESIGN: FUTURE-PROOFING HUMAN RIGHTS PROTECTION IN THE ERA OF AI (2023), https://rm.coe.int/follow-up-recommendation-on-the-2019-report-human-rights-by-design-fut/1680ab2279 [http://perma.cc/SB64-Q8HC]; FILIPPO RASO, HANNAH HILLIGOSS, VIVEK KRISHNAMURTHY, CHRISTOPHER BAVITZ & LEVIN KIM, ARTIFICIAL INTELLIGENCE & HUMAN RIGHTS: OPPORTUNITIES & RISKS (2018), https://cyber.harvard.edu/sites/default/files/2018-09/2018-

celebration of the UDHR's seventy-fifth anniversary in December 2023, it will be a good time to take stock of the latest developments at the intersection of intellectual property and human rights while projecting the developments' future trajectory.

This Article examines the complex interplay between intellectual property and the right to science, with a view toward the human rights challenges brought about by both the COVID-19 pandemic and generative AI. Part I documents the historical evolution of the right to science, including its textual language, internal structure, and authoritative interpretation. This Part provides the much-needed background for policymakers, commentators, practitioners, and representatives of nongovernmental organizations ("NGOs") interested in intellectual property law and policy. Part II turns to insights provided by *General Comment No. 25*. This Part discusses the interpretative comment's critique of intellectual property rights, its normative support for pro-development efforts in the intellectual property arena, and its potential complications for and hindrances to those efforts.

Part III applies these insights to three new technological contexts that have recently garnered considerable attention from intellectual property policymakers and commentators: (1) the right to research; (2) the COVID-19 pandemic; and (3) generative AI. This Part shows that the right to science can play three distinct functions—enabling, discursive, and constraining, all falling within a continuum. Looking toward the future, Part IV concludes with three reflections on human rights strategies and practices that the discussion of the complex interplay between intellectual property and the right to science can provide: (1) the limitations of using human rights as trump cards in international intellectual property debates; (2) the need to develop different balancing processes to address tensions and conflicts within the intellectual property and human rights systems; and (3) the importance of appreciating the interrelationship between the different rights recognized in article 27 of the UDHR and article 15(1) of the ICESCR.

I. THE HISTORICAL EVOLUTION OF THE RIGHT TO SCIENCE

Article 27(1) of the UDHR states that "[e]veryone has the right freely to . . . share in scientific advancement and its benefits."[20] Using similar but somewhat different language, article 15(1)(b) of the ICESCR "recognize[s] the right of everyone . . . [t]o enjoy the benefits of scientific progress and its applications."[21] In both article 27 of the UDHR and article 15(1) of the ICESCR,

09_AIHumanRightsSmall.pdf [https://perma.cc/E4NY-23LD]; Anne Dulka, Note, *The Use of Artificial Intelligence in International Human Rights Law*, 26 STAN. TECH. L. REV. 316 (2023); and Mathias Risse, *Human Rights and Artificial Intelligence: An Urgently Needed Agenda*, 41 HUM. RTS. Q. 1 (2019).

[20] UDHR, *supra* note 1, art. 27(1).

[21] ICESCR, *supra* note 3, art. 15(1)(b).

the right to science is found alongside the right to take part in cultural life[22] and the right to the protection of interests resulting from intellectual productions.[23] Many commentators have now taken the view that the UDHR has achieved the status of customary international law.[24] Meanwhile, the ICESCR, which was adopted about two decades later, provided states with binding international treaty obligations in the human rights arena.[25]

Article 27(1) of the UDHR was adopted at a time when the drafters remained deeply disturbed by the abuse of science and technology during the Second World War and the wide use of conscripted scientists and engineers in Nazi Germany and Stalinist Russia.[26] Appearing on the initial draft put together by John Humphrey, the then-director of the U.N. Division on Human Rights, the UDHR provision drew inspiration from article XIII of the American Declaration on the Rights and Duties of Man.[27] Also known as the Bogotá Declaration, the

[22] UDHR, *supra* note 1, art. 27(1); ICESCR, *supra* note 3, art. 15(1)(a).

[23] UDHR, *supra* note 1, art. 27(2); ICESCR, *supra* note 3, art. 15(1)(c).

[24] *See* JOHN P. HUMPHREY, HUMAN RIGHTS AND THE UNITED NATIONS: A GREAT ADVENTURE 75-76 (1984) (providing evidence UDHR "is now part of the customary law of nations"); Richard Pierre Claude, *Scientists' Rights and the Human Right to the Benefits of Science*, *in* CORE OBLIGATIONS: BUILDING A FRAMEWORK FOR ECONOMIC, SOCIAL AND CULTURAL RIGHTS 247, 252 (Audrey Chapman & Sage Russell eds., 2002) [hereinafter CORE OBLIGATIONS] ("[A]fter fifty years, the Universal Declaration . . . has begun to take on the qualities of 'customary international law'."). *See generally* THEODOR MERON, HUMAN RIGHTS AND HUMANITARIAN NORMS AS CUSTOMARY LAW (1989) (discussing use of human-rights and humanitarian norms as customary law).

[25] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1059-60 (discussing efforts to create legally binding covenant, as opposed to more aspirational declaration); *see also* MORSINK, *supra* note 1, at 15 ("[M]ost of the smaller nation-states that were members of the United Nations in 1948 wanted a covenant that would bind small and large nations alike and not a mere declaration.").

[26] *See* Audrey R. Chapman, *A Human Rights Perspective on Intellectual Property, Scientific Progress, and Access to the Benefits of Science*, *in* WORLD INTELL. PROP. ORG. [WIPO], INTELLECTUAL PROPERTY AND HUMAN RIGHTS 127, 131 (1999) ("Like other provisions of the UDHR, the context for drafting Article 27 was the widespread reaction to the Nazi genocide and the brutality of World War II. Science and technology had played an important role in the war and served as an instrument of the Holocaust."); Claude, *supra* note 24, at 249-50 (discussing abuse of science and scientists for purposes of power aggrandizement); Mikel Mancisidor, *The Dawning of a Right: Science and the Universal Declaration of Human Rights (1941–1948)*, *in* THE RIGHT TO SCIENCE, *supra* note 1, at 17, 17-19 (linking origin of right to science to President Franklin Roosevelt's famous "Four Freedoms" speech and noting "long-standing memory of the two atomic bombs dropped on Hiroshima and Nagasaki in August 1945, which placed science, its limits, its control, and the social responsibility of scientists at the forefront of many debates").

[27] Article XIII of the American Declaration provides:

> Every person has the right to take part in the cultural life of the community, to enjoy the arts, and to participate in the benefits that result from intellectual progress, especially scientific discoveries.

American Declaration was adopted in Bogotá, Colombia, seven months before the UDHR. The American Declaration was still in draft form when the UDHR went through its early deliberations.[28]

This Part discusses, in turn, the textual language, internal structure, and authoritative interpretation of the right to science.

A. *Textual Language*

Two notable debates emerged during the UDHR drafting process. The first concerned whether the right to science should serve political goals. For instance, Soviet delegate Alexei Pavlov noted that "the benefits of science were not the property of a chosen few, but the heritage of mankind" and "stressed that the task of science was to work for the advancement of peaceful aims and to make human life better."[29] He even advanced a proposal that "the development of science must serve the interest of progress and democracy and the cause of international peace and cooperation."[30] While the right to science could serve these socially beneficial goals, the UDHR drafters feared that countries might misuse the identified goals to stifle the freedom of scientific research and "legitim[ize] political restrictions on science."[31] They therefore rejected the proposed purposive approach in the end.

The second debate pertained to whether an individual should have a human right to benefit from science despite not being a scientist. During the drafting process, the word "benefits" was deleted, causing the language to become "share in scientific advancement."[32] Nevertheless, Cuban delegate Guy Pérez Cisneros successfully pushed for the restoration of the original wording by adding "and its benefits" at the end of the provision.[33] As he observed, "not everyone was sufficiently gifted to play a part in scientific advancement."[34] French delegate René Cassin, a key UDHR drafter, concurred, "even if all persons could not play an equal part in scientific progress, they should indisputably be able to

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> He likewise has the right to the protection of his moral and material interests as regards his inventions or any literary, scientific or artistic works of which he is the author.

American Declaration of the Rights and Duties of Man art. XIII, May 2, 1948, https://www.oas.org/en/iachr/mandate/Basics/declaration.asp [https://perma.cc/3EWY-FQML]; *see also* Romano, *supra* note 1, at 35-52 (tracing origin of right to science to work of Inter-American Juridical Committee during development of American Declaration).

[28] MORSINK, *supra* note 1, at 217-18; Mancisidor, *supra* note 26, at 21; Romano, *supra* note 1, at 33; Schabas, *supra* note 9, at 275-76.

[29] MORSINK, *supra* note 1, at 219.

[30] Mancisidor, *supra* note 26, at 22.

[31] Claude, *supra* note 24, at 254.

[32] MORSINK, *supra* note 1, at 219.

[33] *Id.*

[34] *Id.*

participate in the benefits derived from it."[35] The Cuban proposal was unanimously adopted.[36]

Despite these two amendments, the UDHR drafters understood that the right to science should serve all individuals, and their understanding was never controversial during the drafting process. As *General Comment No. 25* reminds us, "doing science does not only concern scientific professionals but also includes 'citizen science' (ordinary people doing science) and the dissemination of scientific knowledge."[37] Paragraph 8 of the interpretive comment broadly defines "benefits" to include "the material results of the applications of scientific research," "the scientific knowledge and information directly deriving from scientific activity," and "the role of science in forming critical and responsible citizens who are able to participate fully in a democratic society."[38]

When article 27(1) of the UDHR was transposed to article 15(1)(b) of the ICESCR, thereby converting commitments in the Declaration into enforceable international treaty obligations,[39] the language "share in scientific advancement and its benefits" was changed to "enjoy the benefits of scientific progress and its applications."[40] The change brought about by the new language was not particularly significant, as the provisions involving both article 15(1)(a) and (b) were quickly adopted with "little dissension."[41] Moreover, as *General Comment No. 25* reminds us:

> The English version refers to the right to "share", but the expressions "participer", "participar" and "участвовать" appear respectively in the French, Spanish and Russian versions, which are also official texts of the Universal Declaration of Human Rights and which refer to the right of all persons to participate in scientific advancement and in the benefits derived from it.[42]

Some drafters also subscribed to the view that the language used in the ICESCR should differ from the UDHR language, as they feared that any omission of the latter could "undercut the authority of those parts of the

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[35] *Id.*

[36] *Id.*

[37] General Comment No. 25, *supra* note 4, ¶ 10; *see also* PORSDAM, SCIENCE, *supra* note 3, at 72-74 (discussing right to science in relation to citizen science); Effy Vayena & John Tasioulas, *"We the Scientists": A Human Right to Citizen Science*, 28 PHIL. & TECH. 479, 480 (2015) ("Citizen science unquestionably has great potential as a catalyst of valuable scientific innovation. . . . [T]he human right to science . . . has a central, and radically transformative, role to play in practical deliberation about citizen science.").

[38] General Comment No. 25, *supra* note 4, ¶ 8.

[39] *See supra* text accompanying note 25.

[40] *Compare* ICESCR, *supra* note 3, art. 15(1)(b), *with* UDHR, *supra* note 1, art. 27(1).

[41] Maria Green (Director, International Anti-Poverty Law Center), *Drafting History of the Article 15(1)(c) of the International Covenant on Economic, Social and Cultural Rights*, ¶¶ 19-20, U.N. Doc. E/C.12/2000/15 (Oct. 9, 2000).

[42] General Comment No. 25, *supra* note 4, ¶ 10 n.6.

Declaration that were not included in the covenant."[43] In light of the different language used in the equally authoritative UDHR texts, Mikel Mancisidor, who served as the rapporteur for the drafting process for *General Comment No. 25*, has proposed that "we should opt for an interpretation of 'to share in' that is synonymous with 'to participate in' or 'to take part in' through which we achieve the equivalence of meanings between language versions necessary to 'reconcile the texts.'"[44]

B. *Internal Structure*

The internal structure of the subprovisions in article 27 of the UDHR and article 15(1) of the ICESCR recognizes a close linkage between the subprovision on the right to science and other subprovisions in each article.[45] Consider article 15(1) of the ICESCR, for example. While each of the three subprovisions in article 15(1) supports a distinct right, all the subprovisions were drawn from a proposal advanced by the U.N. Educational, Scientific and Cultural Organization ("UNESCO") and were negotiated at the same time.[46] In addition to the three human rights recognized in article 15(1)—namely, the right to take part in cultural life, the right to science, and the right to the protection of interests resulting from intellectual productions—the provision covers the conservation,

[43] Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1060.

[44] Mancisidor, *supra* note 26, at 25.

[45] *See* General Comment No. 17, *supra* note 12, ¶ 4 (stating right to protection of interests resulting from intellectual productions is "intrinsically linked to the other rights recognized in article 15 of the Covenant"); Farida Shaheed (Special Rapporteur in the Field of Cultural Rights), *The Right to Enjoy the Benefits of Scientific Progress and Its Applications*, ¶ 3, U.N. Doc. A/HRC/20/26 (May 14, 2012) [hereinafter *Special Rapporteur's Report on the Right to Science*] (viewing right to science and right to take part in cultural life "as inherently interlinked, since both relate to the pursuit of knowledge and understanding and to human creativity in a constantly changing world"); Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1071-72 (discussing "strong interdependent relationship between articles 27(1) and 27(2) of the UDHR and among articles 15(1)(a), 15(1)(b), 15(1)(c), and 15(3) of the ICESCR"); *see also* Audrey R. Chapman, *Core Obligations Related to ICESCR Article 15(1)(c)*, *in* CORE OBLIGATIONS, *supra* note 24, at 305, 314 ("[T]he three provisions of Article 15[(1)] in the ICESCR were viewed by drafters as intrinsically interrelated to one another. . . . The rights of authors and creators are not just good in themselves but were understood as essential preconditions for cultural freedom and participation and scientific progress."); E.S. Nwauche, *Human Rights-Relevant Considerations in Respect of IP and Competition Law*, 2 SCRIPT-ED 467, 469-70 (2005), https://script-ed.org/wp-content/uploads/2016/07/2-4-Nwauche.pdf [https://perma.cc/N2NZ-TYA3] (arguing private reward components and public benefit components are "equal" and "are so related that regarding them as separate obscures the distinct feature of their equality").

[46] *See* Green, *supra* note 41, ¶¶ 14-17 (recounting deliberation on these subprovisions).

development, and diffusion of science,[47] the freedom of scientific research,[48] and the need for global scientific cooperation.[49] The provision therefore focuses on not only recognizing human rights but also advancing the scientific enterprise.

Indeed, taking note of the proximity of these subprovisions, the CESCR, the Special Rapporteur in the Field of Cultural Rights ("Special Rapporteur"), and other human rights advocates, practitioners, and commentators have all noted that these subprovisions are "intrinsically linked" to each other.[50] As the CESCR states in *General Comment No. 17*, the paragraphs in article 15 are "at the same time mutually reinforcing and reciprocally limitative."[51] *General Comment No. 25* goes even further to point out that the right to take part in cultural life subsumes the right to science:

> Culture is an inclusive concept encompassing all manifestations of human existence. Cultural life is therefore larger than science, as it includes other aspects of human existence; it is, however, reasonable to include scientific activity in cultural life. Thus, the right of everyone to take part in cultural life includes the right of every person to take part in scientific progress and in decisions concerning its direction.[52]

One could therefore interpret the right to science using *General Comment No. 21*, which provides an authoritative interpretation of the right to take part in cultural life.[53] Such linkage is consistent with paragraph 5 of the Vienna Declaration and Programme of Action, which states that "[a]ll human rights are universal, indivisible and interdependent and interrelated."[54]

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[47] *See* ICESCR, *supra* note 3, art. 15(2) ("The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture.").

[48] *See id.* art. 15(3) (requiring states to "undertake to respect the freedom indispensable for scientific research and creative activity").

[49] *See id.* art. 15(4) (requiring states to "recognize the benefits to be derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields"); *see also* PORSDAM, SCIENCE, *supra* note 3, at 99-121 (discussing right to science in relation to international cooperation and global solidarity).

[50] *See* sources cited *supra* note 45.

[51] General Comment No. 17, *supra* note 12, ¶ 4.

[52] General Comment No. 25, *supra* note 4, ¶ 10 (footnote omitted); *see also* PORSDAM, SCIENCE, *supra* note 3, at 6 ("[T]he right to science['s] . . . proximity to the right to participate in cultural life as well as to authors' rights may allow for ethical and human-centered deliberations to become more integral parts of the scientific endeavor.").

[53] General Comment No. 21, *supra* note 12.

[54] World Conference on Human Rights, *Vienna Declaration and Programme of Action*, ¶ 5, U.N. Doc. A/CONF.157/23 (June 25, 1993).

C. *Authoritative Interpretation*

In its first six decades, the right to science received little attention among human rights bodies, commentators, and practitioners.[55] Nevertheless, it began to garner more interest and support in the late 2000s,[56] thanks in no small part to the expert meetings in Galway, Amsterdam, and Venice that UNESCO organized in collaboration with human rights and international law organizations.[57] These meetings culminated in the adoption of the *Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and Its Application* ("*Venice Statement*") in July 2009.[58]

Three years later, Farida Shaheed, the first Special Rapporteur (2009-2015), issued a report on the right to science.[59] Although the adoption of the *Venice Statement* and the release of *General Comment No. 21* a few months later raised the expectation that the CESCR would release its authoritative interpretive comment on the right to science in the not-too-distant future, the Committee did not publish this comment until more than a month after the World Health Organization ("WHO") classified COVID-19 as a global pandemic.[60]

On April 30, 2020, the CESCR finally released *General Comment No. 25*, which covers not only the right to science but also different subprovisions in article 15 of the ICESCR. As the CESCR explains, "the purpose of this general comment is not confined to this right, but is also to develop the relationship more broadly between science and economic, social and cultural rights."[61] Although a considerable portion of this interpretive comment is devoted to the freedom of scientific research and issues relating to equity, access, and ethics—including the potential danger of genetic engineering, AI, robotics, and lethal autonomous weapons[62]—this authoritative comment has brought hope that a new human

[55] *See supra* text accompanying notes 9-12.

[56] *See* Yu, *IPHR 2.0*, *supra* note 13, at 1392-93 (discussing emergence of right to science).

[57] *See* UNESCO, *supra* note 3, at 3 (discussing these meetings); *see also* VITULLO & WYNDHAM, *supra* note 3, at 1 ("In 2007, UNESCO launched a process intended to inform the development of a general comment, culminating in 2009 with the development of the *Venice Statement* which provides a preliminary assessment of the meaning and content of the right.").

[58] UNESCO, *supra* note 3, at 13-20 (providing *Venice Statement*).

[59] *Special Rapporteur's Report on the Right to Science*, *supra* note 45.

[60] Tedros Adhanom Ghebreyesus, Dir.-Gen., World Health Org., Opening Remarks at the Media Briefing on COVID-19 (Mar. 11, 2020), https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 [https://perma.cc/BH9N-KUPS].

[61] General Comment No. 25, *supra* note 4, ¶ 3.

[62] *See id.* ¶ 72 ("[S]cientific and technological advancements in areas such as artificial intelligence, robotics, 3D printing, biotechnology, genetic engineering, quantum computers and management of big data . . . might change not only society and human behaviour, but even human beings themselves."); *id.* ¶ 81 (noting risks related to "the development of dangerous technologies, such as autonomous weapons based on artificial intelligence"); Peter K. Yu, *War and IP*, 49 BYU L. REV. 823, 886 (2024) (discussing autonomous weapons and killer robots).

rights tool has slowly emerged to help reduce the tensions and conflicts between intellectual property and human rights. Paragraph 69 of *General Comment No. 25* explicitly states that the right to science can play the role of "a significant mediator between a human right – the right to health – and a property right."[63] While the general comment is cognizant of the tensions and conflicts between these rights, it remains to be seen how effectively the newly interpreted right will mediate these tensions and conflicts.

II. RIGHT TO SCIENCE AS A NEW DEVELOPMENT TOOL?

In the intellectual property arena, several human rights have traditionally played an outsized role in facilitating access and development, especially in emerging and developing countries and in relation to the Internet and new technologies. For instance, the rights to life and health have been widely used to promote access to viruses, medicines, and other health products and technologies.[64] The right to education has played a similar role in increasing the affordability and availability of textbooks, other learning materials, and educational technologies.[65] The right to take part in cultural life provides the human rights basis for protecting traditional knowledge and traditional cultural expressions.[66] And intellectual property laws and policies relating to the Internet, other communication technologies, and online and social media platforms have frequently implicated the right to freedom of opinion and expression.[67]

One therefore cannot help but wonder whether the newly interpreted right to science can provide a new tool for development and thereby reduce the heavy burden on these other human rights. Section II.A recounts the critique *General Comment No. 25* provides of intellectual property rights. Section II.B identifies the normative support that this right offers to pro-development efforts in the intellectual property arena. Section II.C discusses the right to science's potential complications for and hindrances to those efforts.

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[63] General Comment No. 25, *supra* note 4, ¶ 69.

[64] *See* UDHR, *supra* note 1, art. 3 ("Everyone has the right to life . . . ."); *id.* art. 25(1) ("Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family . . . ."); ICESCR, *supra* note 3, art. 12(1) (recognizing "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health").

[65] *See* UDHR, *supra* note 1, art. 26(1) ("Everyone has the right to education."); ICESCR, *supra* note 3, art. 13(1) (recognizing "the right of everyone to education").

[66] *See* UDHR, *supra* note 1, art. 27(1); ICESCR, *supra* note 3, art. 15(1)(a).

[67] *See* UDHR, *supra* note 1, art. 19 ("Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."); G.A. Res. 2200 (XXI) A, annex, International Covenant on Civil and Political Rights art. 19 (Dec. 16, 1966) [hereinafter ICCPR] (recognizing "the right to hold opinions without interference" and "the right to freedom of expression").

A. *Critique of Intellectual Property Rights*

Conscious of the continuous tensions and conflicts between intellectual property and human rights, *General Comment No. 25* identifies three potential problems brought about by strong protection and enforcement of intellectual property rights.[68] These problems are particularly salient when a country has an out-of-balance intellectual property system that does not respect local needs, interests, conditions, and priorities.[69] As the interpretative comment states:

> [I]ntellectual property can sometimes create distortions in the funding of scientific research as private financial support might go only to research projects that are profitable, while funding to address issues that are crucial for economic, social and cultural rights might not be adequate, as these issues do not seem financially attractive for business.[70]

A case in point is the distortion of funding found in the public health arena. Major pharmaceutical companies have historically focused on products that would generate a high rate of return, including those targeting diseases prevalent in developed countries and lifestyle drugs, such as Viagra and Rogaine.[71] Because of such distortion, many diseases have become so-called "neglected diseases," which fail to attract innovative activities and investments in research and development ("R&D") despite the diseases' tremendous impacts on significant segments of the world population, mostly in the developing world.[72] Examples of these diseases are "measles, malaria, tuberculosis, sleeping sickness, leishmaniasis, and Chagas disease."[73] Even if drugs are available, they tend to undergo little improvement. For instance, the treatment of tuberculosis still takes several months[74] even though increased investments in R&D in this area could have shortened the duration for such treatment.[75] Meanwhile, the

[68] General Comment No. 25, *supra* note 4, ¶ 61.

[69] *See* Peter K. Yu, *The International Enclosure Movement*, 82 IND. L.J. 827, 858-63 (2007) [hereinafter Yu, *International Enclosure Movement*] (discussing Agreement on Trade-Related Aspects of Intellectual Property Rights and its enclosure of developing countries' policy space in intellectual property area).

[70] General Comment No. 25, *supra* note 4, ¶ 61.

[71] *See* Yu, *International Enclosure Movement*, *supra* note 69, at 842 (criticizing major pharmaceutical companies for focusing their energies and resources on developing lifestyle drugs, as opposed to other therapeutic needs).

[72] *See* General Comment No. 25, *supra* note 4, ¶ 61 (using neglected diseases to illustrate distortions in funding of scientific research).

[73] Yu, *International Enclosure Movement*, *supra* note 69, at 841.

[74] *See Treatment for TB Disease*, CDC, https://www.cdc.gov/tb/topic/treatment/tbdisease.htm [https://perma.cc/ZY76-6STR] (last updated Jan. 8, 2025) ("[Tuberculosis] treatment can take 4, 6, or 9 months depending on the regimen.").

[75] *Cf.* Mike Frick & Gisa Dang, *The Right to Science: A Practical Tool for Advancing Global Health Equity and Promoting the Human Rights of People with Tuberculosis*, *in* THE RIGHT TO SCIENCE, *supra* note 1, at 246, 248 ("There is a lack of scientific innovation in [tuberculosis] due to insufficient funding by the public sector and limited and diminishing

development of the first vaccine for the prevention of malaria in children, RTS,S/AS01, took thirty years.[76] With more funding, the vaccine might have been developed more quickly.

The second problem of strong intellectual property rights concerns the restrictions that such rights have placed on the dissemination and sharing of scientific knowledge, data, and other resources,[77] which are often global public goods and the building blocks of future scientific research.[78] As Special Rapporteur Shaheed and Andrew Mazibrada remind us: "Human development is about participation, necessitating freedom to fully and actively contribute, and the right to science must also be interpreted from that perspective. It cannot be just about access to the benefits, or the products, of scientific advances."[79]

activity by the pharmaceutical industry."); Yu, *International Enclosure Movement*, *supra* note 69, at 842 ("Even when [pharmaceutical companies] explore treatments for diseases that are dominant in less developed countries, like malaria, they tend to focus more on 'prophylaxis for travellers from developed countries rather than [on] vaccines which would be of greater relevance to sufferers in the developing world.'" (quoting COMM'N ON INTELL. PROP. RTS., INTEGRATING INTELLECTUAL PROPERTY RIGHTS AND DEVELOPMENT POLICY: REPORT OF THE COMMISSION ON INTELLECTUAL PROPERTY RIGHTS 33 (2002)) (alteration in original)).

[76] *See* Press Release, World Health Org., WHO Recommends Groundbreaking Malaria Vaccine for Children at Risk (Oct. 6, 2021), https://www.who.int/news/item/06-10-2021-who-recommends-groundbreaking-malaria-vaccine-for-children-at-risk [https://perma.cc/ZRD2-HEJF].

[77] *See* General Comment No. 25, *supra* note 4, ¶ 61; *see also* PORSDAM, SCIENCE, *supra* note 3, at 55 ("Without dissemination, translation, or curation there will be no right to science. The public can truly benefit from scientific progress only when scientific knowledge, data, and expertise are made universally accessible and when the benefits of the practice of science are universally shared.").

[78] *See* Shaver, *Right to Science and Culture*, *supra* note 3, at 128 ("Article 27 must be understood as a call for culture and science to be governed as global public goods, rather than as private property.").

[79] Farida Shaheed & Andrew Mazibrada, *On the Right to Science as a Cultural Human Right*, *in* THE RIGHT TO SCIENCE, *supra* note 1, at 107, 108 (footnote omitted); *see also* Shaver, *Right to Science and Culture*, *supra* note 3, at 171 ("Participation, as well as consumption, is the essence of the right to science and culture."). *See generally* Alexandra Xanthaki (Special Rapporteur in the Field of Cultural Rights), *Right to Participate in Science*, U.N. Doc. A/HRC/55/44 (Feb. 21, 2024) (placing right to participate in science at center of right to science, exploring meaning and contours of the former, and identifying potential obstacles to participation in science).

The drafters of the interpretative comment have been quite concerned about pseudoscience[80] and misinformation[81]—due in no small part to the high volume of pseudoscientific information disseminated both historically and during the COVID-19 pandemic. The ever-strengthening protection of clinical trial data and trade secrets in the public health arena has also garnered growing attention from human rights policymakers and commentators.[82] It is therefore no surprise that paragraph 6 of the *Human Rights Guidelines for Pharmaceutical Companies in Relation to Access to Medicines* notes explicitly "a presumption in favour of the disclosure of information, held by the [pharmaceutical] company, which relates to access to medicines."[83] Article 15(1) of the Universal Declaration on Bioethics and Human Rights states that "[b]enefits resulting from any scientific research and its applications should be shared . . . within the international community, in particular with developing countries."[84]

The third problem of strong intellectual property rights pertains to the lack of access to health products and technologies.[85] Such a lack can be further analyzed based on availability, access, and affordability.[86] While availability and access call for the development and distribution of the relevant products and

[80] Paragraph 5 of *General Comment No. 25* states:

> Although protection and promotion as a cultural right may be claimed for other forms of knowledge, knowledge should be considered as science only if it is based on critical inquiry and is open to falsifiability and testability. Knowledge which is based solely on tradition, revelation or authority, without the possible contrast with reason and experience, or which is immune to any falsifiability or intersubjective verification, cannot be considered science.

General Comment No. 25, *supra* note 4, ¶ 5; *see also id.* ¶ 44 ("States must . . . establish protective measures in relation to messages from pseudoscience, which create ignorance and false expectations among the most vulnerable sectors of the population.").

[81] *See id.* ¶ 24 (including as "barrier[] to citizen participation in scientific activities . . . misinformation intended to erode citizen understanding and respect for science and scientific research"); *see also* PORSDAM, SCIENCE, *supra* note 3, at 28-30 (discussing right to science in relation to alternative facts, post-truth, and fake news); Ranga Yogeshwar, *"Fight the Fear with the Facts!," in* THE RIGHT TO SCIENCE, *supra* note 1, at 195, 202-04 (discussing fake science).

[82] For discussions of growing protections in this direction, see generally Cynthia M. Ho, *Recalibrating Trade Secrets to Promote the Human Rights to Health and Science*, *in* A HUMAN-CENTERED APPROACH, *supra* note 3; and Peter K. Yu, *Data Exclusivities and the Limits to TRIPS Harmonization*, 46 FLA. ST. U. L. REV. 641 (2019).

[83] Paul Hunt (Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical & Mental Health), *The Right to Health*, U.N. Doc. A/63/263, annex, ¶ 6 (Aug. 11, 2008).

[84] United Nations Educational, Scientific and Cultural Organization Res. 33/36, annex, Universal Declaration on Bioethics and Human Rights art. 15(1) (Oct. 19, 2005).

[85] *See* General Comment No. 25, *supra* note 4, ¶ 61.

[86] *See id.* ¶ 47 ("Scientific progress and its applications should be, as far as possible, accessible and affordable to persons in need of specific goods or services.").

technologies, affordability requires the provision of those products and technologies at a price that would ensure ready access by the relevant segments of the population. To the extent that such products and technologies remain unaffordable, governments can improve accessibility by introducing price control, providing subsidies, or adopting other supportive measures.[87]

While making health products and technologies more affordable will certainly help reduce the tensions between intellectual property and human rights, the focus on availability and access could exacerbate those tensions, as the intellectual property framework used to support innovation give rights holders exclusive control over their inventions.[88] Nevertheless, many alternative incentive frameworks exist to ensure the availability of and access to these products and technologies.[89] It also remains debatable whether the extant intellectual property system provides an optimal framework.[90]

B. *Normative Support for Pro-Development Efforts*

In addition to highlighting the adverse impacts of strong intellectual property protection, *General Comment No. 25* has provided a much-needed boost to pro-development efforts in the intellectual property arena. In a forthcoming book chapter, I identify ten normative insights that this new interpretive comment has

[87] *See* U.N. High Comm'r for Hum. Rts., *The Impact of the Agreement on Trade-Related Aspects of Intellectual Property Rights on Human Rights: Rep. of the High Commissioner*, ¶ 46, U.N. Doc. E/CN.4/Sub.2/2001/13 (June 27, 2001) (noting countries can introduce complementary measures to improve access to essential medicines "through the exchange of price information, price competition and price negotiation with public procurement and insurance schemes, price controls, reduced duties and taxes and improved distribution efficiency, reduced distribution and dispensing costs and reduced marketing expenses"); *see also* Peter K. Yu, *China's Innovative Turn and the Changing Pharmaceutical Landscape*, 51 U. PAC. L. REV. 593, 613 n.143 (2020) (discussing use of centralized medicine procurement in China); Yu, *International Enclosure Movement*, *supra* note 69, at 843-46 (discussing use of price controls and reference pricing by health authorities in some developed countries).

[88] *See, e.g.*, 17 U.S.C. § 106 (listing exclusive rights in copyrighted works); 35 U.S.C. § 154 ("Every patent shall contain . . . a grant to the patentee, his heirs or assigns, of the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States . . . ."). Paragraph 60 of *General Comment No. 25* states:

> On one hand, intellectual property enhances the development of science and technology through economic incentives for innovation, such as patents for inventors, which stimulate the involvement of private actors in scientific research. On the other hand, intellectual property can negatively affect the advancement of science and access to its benefits . . . .

General Comment No. 25, *supra* note 4, ¶ 60.

[89] *See infra* text accompanying note 209.

[90] *See generally* MICHELE BOLDRIN & DAVID K. LEVINE, AGAINST INTELLECTUAL MONOPOLY (2008) (arguing copyrights and patents are nonessential to creativity and innovation and detrimental to common good).

provided to support these efforts.[91] Although this Section does not intend to repeat the discussion of all of these insights, it will be useful to provide a brief summary and then offer a couple of illustrative examples. It is important to keep in mind that each normative insight is not only important on its own but can also be used in combination to create synergy. The ten normative insights provided by *General Comment No. 25* are as follows:

1. The right to science "has an instrumental value, as it constitutes an essential tool for the realization of other economic, social and cultural rights, particularly the right to food and the right to health."[92]

2. The *active* undertaking of "doing science" is important and can be contrasted with the more *passive* undertaking of enjoying "the results of [the scientific] process" or the fruits of scientific advances.[93]

3. The wide dissemination of scientific knowledge, data, and other resources provide substantial benefits,[94] and it is urgent and important to "enable developing countries to build their capacity to participate in generating and sharing scientific knowledge and benefiting from its applications."[95]

4. Society should embrace "open access to scientific literature, data and content"[96] and question the default expectations in the intellectual property system that rights holders secure exclusive rights.[97]

5. "[L]arge-scale privatization of scientific research" can undermine the enjoyment of the right to science and other human rights.[98]

6. States should pay greater attention to the "social" dimension of intellectual property rights[99] and the wide array of flexibilities in international intellectual property agreements,[100] including compulsory licensing, parallel

[91] *See* Yu, *Right to Science*, *supra* note 3.

[92] General Comment No. 25, *supra* note 4, ¶ 63.

[93] *Id.* ¶ 5.

[94] *See id.* ¶ 47 ("Knowledge about scientific progress and its applications should be made broadly available and accessible to the general public . . . .").

[95] *Id.* ¶ 83.

[96] *Id.* ¶ 49.

[97] *See* sources cited *supra* note 88.

[98] General Comment No. 25, *supra* note 4, ¶ 58.

[99] *Id.* ¶ 62; *see also* General Comment No. 17, *supra* note 12, ¶ 35 ("[I]ntellectual property is a social product and has a social function.").

[100] Paragraph 69 of *General Comment No. 25* states:

> States parties should use, when necessary, all the flexibilities of the TRIPS Agreement, such as compulsory licences, to ensure access to essential medicines, especially for the most disadvantaged groups. States parties should also refrain from granting disproportionately lengthy terms of patent protection for new medicines in order to allow, within a reasonable time, the production of safe and effective generic medicines for the same diseases.

General Comment No. 25, *supra* note 4, ¶ 69; *see also* Farida Shaheed (Special Rapporteur in the Field of Cultural Rights), *Cultural Rights*, ¶¶ 63-72, U.N. Doc. A/70/279 (Aug. 4, 2015)

importation, emergency government use, durational limits, and many other limitations and exceptions (such as those for early working, experimental use, and the development of diagnostics).[101]

7. The right to science and other human rights are interdependent and interrelated, and policymakers should embrace holistic approaches and perspectives that refrain from perceiving the intellectual property regime as isolated from regimes in other areas, such as education and public health.[102]

8. States should undertake greater cooperation to tackle global challenges that could raise significant human rights concerns,[103] which range from global pandemics to climate change to major technological crises.

9. The needs for advancing science vary according to the segments of the population involved; groups such as women, persons with disabilities, individuals living in poverty, and Indigenous peoples[104] "have experienced systemic discrimination in the enjoyment of the right to [science]."[105]

10. It is important to promote cross-cultural engagement while recognizing the unique contributions of Indigenous communities,[106] including their creation of traditional knowledge and traditional cultural expressions.[107]

[hereinafter *Special Rapporteur's Report on Patent Policy*] (discussing need to promote right to science and culture through exclusions, exceptions, and flexibilities).

[101] *See* Yu, *Nonmultilateral Era*, *supra* note 13, at 1093-94 (listing limitations and exceptions to intellectual property rights countries can proactively introduce in area of access to essential medicines); *see also infra* text accompanying notes 186-188.

[102] *See* General Comment No. 25, *supra* note 4, ¶¶ 63-71 (discussing interdependence between right to science and other human rights). For discussions of cooperation between governmental agencies in the intellectual property and public health arenas, see Peter Drahos, *"Trust Me": Patent Offices in Developing Countries*, 34 AM. J.L. & MED. 151, 154-63 (2008); Peter K. Yu, *Access to Medicines, BRICS Alliances, and Collective Action*, 34 AM. J.L. & MED. 345, 378 (2008); and Peter K. Yu, *Virotech Patents, Viropiracy, and Viral Sovereignty*, 45 ARIZ. ST. L.J. 1563, 1623-25 (2013) [hereinafter Yu, *Virotech Patents*].

[103] *See* General Comment No. 25, *supra* note 4, ¶¶ 77-84 (discussing need for international cooperation); *see also* ICESCR, *supra* note 3, art. 15(4) (noting "benefits . . . derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields").

[104] *See* General Comment No. 25, *supra* note 4, ¶¶ 29-40 (discussing special protection for women, persons with disabilities, individuals living in poverty, and Indigenous peoples).

[105] *Id.* ¶ 28; *see also Special Rapporteur's Report on the Right to Science*, *supra* note 45, ¶ 42 ("Freedom of scientific research includes the right of everyone to participate in the scientific enterprise, without discrimination on the basis of race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.").

[106] *See* General Comment No. 25, *supra* note 4, ¶¶ 39-40 (noting need to protect traditional knowledge and Indigenous peoples).

[107] For the Author's discussions of traditional knowledge and traditional cultural expressions, see generally Peter K. Yu, *Cultural Relics, Intellectual Property, and Intangible Heritage*, 81 TEMP. L. REV. 433 (2008); and Peter K. Yu, *Traditional Knowledge, Intellectual Property, and Indigenous Culture: An Introduction*, 11 CARDOZO J. INT'L & COMPAR. L. 239 (2003). *See also* Symposium, *Traditional Knowledge, Intellectual Property, and Indigenous*

To illustrate how *General Comment No. 25* has provided support for pro-development efforts in the intellectual property arena, consider the first two normative insights identified above. The first insight concerns the potential use of the right to science as an "empowerment right."[108] Similar language can be found in relation to other human rights, most notably the right to education.[109] Given the important role that the right to science can play in debates ranging from education to public health to food security, it is both important and helpful that the drafters of *General Comment No. 25* have emphasized the instrumental value of the right to science.[110]

The second normative insight is equally important. Not only does the interpretive comment's emphasis on doing science remind us of the egalitarian nature of scientific advancement, but its focus on participation also calls for the creation of an enabling environment that will help facilitate the development of scientific ventures. For instance, to enable individuals to do science, countries may need to strengthen local innovation while maximizing the use of flexibilities under the Agreement on Trade-Related Aspects of Intellectual Property Rights[111] ("TRIPS Agreement") and "TRIPS-plus" bilateral, regional, and plurilateral agreements.[112]

C. *Potential Complications and Hindrances*

Despite the high hopes of public health advocates and scholars that the right to science will provide a new human rights tool for resolving the tensions and conflicts between intellectual property and human rights, *General Comment No. 25* does not anticipate resolution in all cases. In fact, just like the CESCR's earlier interpretation on the right to the protection of interests resulting from

Culture, 11 CARDOZO J. INT'L & COMPAR. L. 239 (2003) (providing first academic symposium on traditional knowledge and traditional cultural expressions in U.S. law school).

[108] CESCR, General Comment No. 13 (Twenty-First Session, 1999): The Right to Education (Article 13 of the Covenant), ¶ 1, U.N. Doc. E/C.12/1999/10 (Dec. 8, 1999) [hereinafter General Comment No. 13]; Fons Coomans, *In Search of the Core Content of the Right to Education*, *in* CORE OBLIGATIONS, *supra* note 24, at 217, 219-20.

[109] *See* General Comment No. 13, *supra* note 108, ¶ 1 ("As an empowerment right, education is the primary vehicle by which economically and socially marginalized adults and children can lift themselves out of poverty and obtain the means to participate fully in their communities.").

[110] *See* General Comment No. 25, *supra* note 4, ¶ 63 ("The right to [science] . . . is a human right with an intrinsic value, but it also has an instrumental value, as it constitutes an essential tool for the realization of other economic, social and cultural rights, particularly the right to food and the right to health.").

[111] Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299 [hereinafter TRIPS Agreement] (establishing minimum standards for intellectual property protection and enforcement within World Trade Organization).

[112] *See infra* text accompanying notes 185-188 (discussing measures countries should adopt to bolster technological capacity and support local innovation).

intellectual productions,[113] *General Comment No. 25* may preserve the extant tensions and conflicts between intellectual property and human rights. Indeed, the comment has provided textual language that can be used to further strengthen intellectual property protection in four ways and thereby undermine pro-development efforts in the intellectual property arena.

First, the right to science covers both "protection and dissemination of scientific knowledge and its applications."[114] Because *General Comment No. 25* does not privilege one position over another, its textual language supports the age-old argument that we need to advance science before we can decide who should benefit from scientific advances. Those who are eager to strengthen intellectual property protection can therefore argue that stronger protection will be needed to advance science and protect scientific knowledge and its applications, as opposed to disseminate such knowledge and applications.[115]

Second, the right to science recognizes the need to protect the moral and material interests of scientists.[116] Such protection is essential for guaranteeing financial independence and, by extension, freedom of scientific research, as provided in article 15(3) of the ICESCR.[117] Indeed, one could link this provision to article 15(1)(c), which emphasizes the need to protect authors' moral and

[113] As Laurence Helfer explains by reference to what he calls "the core zone of autonomy" protected by the ICESCR:

> A human rights framework for authors' rights is . . . both more protective and less protective than the approach endorsed by copyright and neighboring rights regimes. It is more protective in that rights within the core zone of autonomy are subject to a far more stringent limitations test than the one applicable contained in intellectual property treaties and national laws. It is also less protective, however, in that a state need not recognize any authors' rights lying outside of this zone or, if it does recognize such additional rights, it must give appropriate weight to other social, economic, and cultural rights and to the public's interest in access to knowledge.

Helfer, *Human Rights Framework*, *supra* note 13, at 997; *see also* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1131-32 (discussing how "the recognition of the human rights attributes of intellectual property rights may further strengthen the control of the work by individual authors and inventors"); Peter K. Yu, *Ten Common Questions About Intellectual Property and Human Rights*, 23 GA. ST. U. L. REV. 709, 747 (2007) [hereinafter Yu, *Ten Common Questions*] ("*General Comment No. 17* included a more stringent test than the three-step test laid out in the Berne Convention [for the Protection of Literary and Artistic Works], the TRIPs Agreement, and the WIPO Internet Treaties.").

[114] General Comment No. 25, *supra* note 4, ¶ 14.

[115] *See id.* ("States must take positive steps for the advancement of science (development) and for the protection and dissemination of scientific knowledge and its applications (conservation and diffusion).").

[116] *See id.* ¶ 12 (discussing right to science in relation to such protection).

[117] *See id.* ¶ 13 (discussing freedom indispensable for scientific research and creative activity).

material interests.[118] Nevertheless, one could point out that the moral interests, as interpreted in the human rights context, focus primarily on recognition (such as whether the patent should include the inventor's name),[119] while the material interests cover only an individual's ability "to enjoy an adequate standard of living," as stated in *General Comment No. 17*.[120] These arguments could undercut the developed countries' continuous demands for ratcheting up intellectual property standards in developing countries.

Third, *General Comment No. 25* states explicitly that the right to science can be limited for legitimate reasons, including the need to promote other important human rights—an issue widely explored in the *travaux préparatoires* of the UDHR and the ICESCR.[121] Paragraph 21 of *General Comment No. 25* declares, "Some limitations on the right to participate in and to enjoy the benefits of scientific progress and its applications might be necessary, as science and its applications can, in certain contexts, affect economic, social and cultural rights."[122]

Although the principle of human rights primacy can be easily applied to resolve the conflicts between the right to science and the non-human-rights aspects of intellectual property rights,[123] conflicts may arise between the right to science and the right to the protection of interests resulting from intellectual productions.[124] To the extent that these conflicts arise, the conflicts are internal within the human rights regime, because the UDHR and the ICESCR recognize both rights.[125] Whether the limitations on the right to science, as identified by the CESCR, will reduce or exacerbate these conflicts will depend on

[118] *See* General Comment No. 17, *supra* note 12, ¶¶ 12-16 (discussing protection of author's moral and material interests); Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1081-92.

[119] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1081-83 (discussing protection of author's moral interests).

[120] General Comment No. 17, *supra* note 12, ¶ 2; *see also* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1081-92 (discussing minimum protection of author's material interests).

[121] *See* VITULLO & WYNDHAM, *supra* note 3, at 9 ("The *travaux préparatoires* include lengthy discussions of the potential limitations on the right to enjoy the benefits of scientific progress."). For collections of the *travaux préparatoires* of the UDHR and the ICESCR, see generally THE UNIVERSAL DECLARATION OF HUMAN RIGHTS: THE TRAVAUX PRÉPARATOIRES (William A. Schabas ed., 2013); and THE INTERNATIONAL COVENANT ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS: TRAVAUX PRÉPARATOIRES 1948–1966 (Ben Saul ed., 2016).

[122] General Comment No. 25, *supra* note 4, ¶ 21.

[123] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1092-93 (discussing principle of human rights primacy).

[124] *See id.* at 1094-123 (discussing ways to resolve internal conflicts between two or more human rights).

[125] *See infra* text accompanying notes 280-287; *see also* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1094-123 (discussing ways to resolve internal conflicts within human rights regime).

interpretation. If this right is interpreted in a way that would help alleviate these conflicts, the limitations are likely to undermine the assistance that the right will provide to those criticizing or opposing efforts to increase intellectual property protection. By contrast, if the right is interpreted in a way that would strengthen those efforts, such limitations will undermine the support the right to science provides to those in need.

Finally, *General Comment No. 25* emphasizes the importance of "safety and quality of [scientific] products."[126] While it is undoubtedly important for those developing new scientific products to maintain safety and quality—whether in the public health[127] or AI context[128]—there are understandable fears that some product developers will use safety and quality as pretexts to raise the levels of intellectual property protection and enforcement.[129] Indeed, past debates on international intellectual property protection in the public health arena have shown the tendency of pharmaceutical companies to lump generic drugs together with counterfeit drugs.[130] As I have noted repeatedly, the distribution of harmful drugs should be prohibited regardless of the status of trademark protection.[131] Intellectual property protection should not be used as a proxy for drug safety.

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[126] *See* General Comment No. 25, *supra* note 4, ¶ 22 ("Limitations on the applications of science and technology can be used to guarantee the safety and quality of products used by persons."); *see also id.* ¶ 18 (discussing quality as interrelated and essential element of right to science).

[127] *See* CESCR, General Comment No. 14 (2000): The Right to the Highest Attainable Standard of Health (Article 12 of the International Covenant on Economic, Social and Cultural Rights), ¶ 12(d), U.N. Doc. E/C.12/2000/4 (Aug. 11, 2000) [hereinafter General Comment No. 14] ("[H]ealth facilities, goods and services must . . . be scientifically and medically appropriate and of good quality.").

[128] *See* General Comment No. 25, *supra* note 4, ¶ 22 ("Human rights impact assessments might be necessary to protect persons against risky applications.").

[129] *See* Yu, *Virotech Patents*, *supra* note 102, at 1575 ("[Pharmaceutical] companies have worked closely with governments to close down online pharmacies, which they claimed were selling unsafe and sub-standard drugs.").

[130] *See* Peter K. Yu, *Enforcement, Economics and Estimates*, 2 WIPO J. 1, 12 (2010) ("Policymakers and industry representatives have a high tendency to equate pirated or counterfeit products with sub-standard goods."); *see also Special Rapporteur's Report on Patent Policy*, *supra* note 100, ¶ 112 ("States should do more to distinguish between generic medications and counterfeit medications."); Xuan Li, *Ten General Misconceptions About the Enforcement of Intellectual Property Rights*, *in* INTELLECTUAL PROPERTY ENFORCEMENT: INTERNATIONAL PERSPECTIVES 14, 20-21 (Xuan Li & Carlos M. Correa eds., 2009) (discussing misconception counterfeit and piracy always pose consumer threat).

[131] *See* Yu, *Virotech Patents*, *supra* note 102, at 1575 n.51 ("While counterfeit drugs are sold in violation of intellectual property laws, sub-standard drugs fail to meet the stated quality, safety, or efficacy standards. Because of the very different focus, counterfeit drugs can be sub-standard, but not all counterfeit drugs are sub-standard.").

D. *Summary*

With the CESCR's authoritative interpretation in *General Comment No. 25*, the right to science has become a new, or at least a greatly strengthened, tool in the human rights arsenal. This interpretative comment not only identifies three negative human rights impacts of intellectual property rights but also provides normative support for pro-development efforts in the intellectual property arena. Nevertheless, the comment also suggests that the right to science could pose complications and hindrances to these efforts. In the words of Special Rapporteur Shaheed and her coauthor, this interpretive comment has "open[ed] . . . a door to a more complex, nuanced debate and, perhaps, a renewed importance for the right to science, and an evolving role in the protection of other human rights."[132]

III. APPLICATIONS OF THE RIGHT TO SCIENCE

The first half of this Article introduces the right to science as a potentially new human rights tool to help foster a more appropriate balance in the intellectual property and innovation systems. It also explores the complex interplay between intellectual property and human rights in general and between intellectual property and the right to science in particular. To illustrate the impact of the right to science on the ongoing debates in the intellectual property field, this Part turns to three new technological contexts that have emerged in the past few years: (1) the right to research; (2) the COVID-19 pandemic; and (3) generative AI. The discussion shows further how the right to science can serve three distinct functions—enabling, discursive, and constraining, all falling within a continuum.

A. *Right to Research*

Although the right to research has been explored as early as the mid-2000s,[133] recent years have seen greater efforts to push for a new right to research in the international intellectual property arena and as part of the Access to Knowledge movement.[134] For example, in April 2022, American University Washington College of Law held a pioneering symposium entitled *Right to Research in International Copyright Law*.[135] In the past few years, commentators have also

[132] Shaheed & Mazibrada, *supra* note 79, at 123.

[133] *See, e.g.*, Arjun Appadurai, *The Right to Research*, 4 GLOBALISATION SOC'YS & EDUC. 167 (2006).

[134] *See generally* ACCESS TO KNOWLEDGE IN THE AGE OF INTELLECTUAL PROPERTY (Gaëlle Krikorian & Amy Kapczynski eds., 2010) (collecting essays that discuss need for access to knowledge and Access to Knowledge movement).

[135] *See American University International Law Review Symposium on the Right to Research in International Copyright Law*, AM. UNIV., https://www.american.edu/wcl/impact/initiatives-programs/pijip/events/american-university-international-law-review-symposium-on-the-right-to-research-in-international-copyright-law.cfm [https://perma.cc/K5FJ-KHEJ] (last visited Apr. 16, 2023).

begun filling the intellectual property literature with their thoughts and analyses on how to implement this emergent right.[136] At the global level, a number of NGOs have worked together to call for the recognition of the right to research through activities conducted in the Standing Committee on Copyright and Related Rights of the World Intellectual Property Organization ("WIPO").[137]

One challenging question at the intersection of intellectual property and the right to research is as follows: If this right is to be advanced, will human rights support it? If so, which of the many human rights in the UDHR, the ICESCR, and other international and regional human rights instruments will provide support? Tackling this foundational question, commentators—most notably Christophe Geiger and Justin Jütte[138]—have located the human rights bases of the right to research in the right to take part in cultural life,[139] the right to science,[140] the right to the protection of interests resulting from intellectual productions,[141] the right to education,[142] the right to freedom of expression and information,[143] the right to vote,[144] the right to freedom of arts and sciences,[145] and the right to freedom to conduct a business.[146] Although the right to freedom

[136] *See generally* Christophe Geiger & Bernd Justin Jütte, *Conceptualizing a "Right to Research" and Its Implications for Copyright Law: An International and European Perspective*, 38 AM. U. INT'L L. REV. 1 (2023) [hereinafter Geiger & Jütte, *Conceptualizing Right to Research*] (discussing ways to conceptualize fundamental right to research and to integrate it into international copyright framework); Christophe Geiger & Bernd Justin Jütte, *The Right to Research as Guarantor for Sustainability, Innovation and Justice in EU Copyright Law* [hereinafter Geiger & Jütte, *Guarantor for Sustainability*], *in* INTELLECTUAL PROPERTY RIGHTS IN THE POST PANDEMIC WORLD: AN INTEGRATED FRAMEWORK OF SUSTAINABILITY, INNOVATION AND GLOBAL JUSTICE 138 (Taina Pihlajarinne, Jukka Mähönen & Pratyush Nath Upreti eds., 2023) [hereinafter POST PANDEMIC WORLD] (discussing right to research within integrated framework of sustainability, innovation, and global justice).

[137] *See Civil Society Coalition*, AM. UNIV., https://www.american.edu/wcl/impact/initiatives-programs/pijip/impact/right-to-research-in-international-copyright/civil-society-coalition/index.cfm [https://perma.cc/R6R5-V6S7] (last visited Apr. 16, 2025) (documenting efforts of Civil Society Coalition on the Research in International Copyright Law); *see also Standing Committee on Copyright and Related Rights (SCCR)*, WIPO, https://www.wipo.int/en/web/sccr [https://perma.cc/W23R-VRYE] (last visited Apr. 16, 2025).

[138] *See generally* Geiger & Jütte, *Conceptualizing Right to Research*, *supra* note 136; Geiger & Jütte, *Guarantor for Sustainability*, *supra* note 136.

[139] ICESCR, *supra* note 3, art. 15(1)(a).

[140] *Id.* art. 15(1)(b).

[141] *Id.* art. 15(1)(c).

[142] *Id.* art. 13.

[143] ICCPR, *supra* note 67, art. 19.

[144] *Id.* art. 25.

[145] *See* Charter of Fundamental Rights of the European Union art. 13, Oct. 26, 2012, 2012 O.J. (C 326) 391 [hereinafter EU Charter] ("The arts and scientific research shall be free of constraint. Academic freedom shall be respected.").

[146] *See id.* art. 16 ("The freedom to conduct a business in accordance with Union law and national laws and practices is recognised.").

of arts and sciences cannot be found in either the International Covenant on Civil and Political Rights ("ICCPR") or the ICESCR,[147] article 13 of the Charter of Fundamental Rights of the European Union ("EU Charter") explicitly protects this freedom.[148] Article 27(1) of the UDHR also stipulates that "[e]veryone has the right freely to . . . enjoy the arts."[149] By contrast, even though article 16 of the EU Charter recognizes the right to freedom to conduct a business, that right cannot be found in the UDHR, the ICCPR, and the ICESCR.[150]

With the authoritative interpretation that the CESCR recently provided on the right to science, efforts to locate the human rights bases of the right to research should become much easier. Paragraph 62 of *General Comment No. 25* states explicitly that "States should make every effort, in their national regulations and in international agreements on intellectual property, to guarantee the social dimensions of intellectual property, in accordance with the international human rights obligations they have undertaken."[151] Strongly supportive of open science, open data, and other open-access arrangements,[152] the general comment noted further the need to strike "[a] balance . . . between intellectual property and the open access and sharing of scientific knowledge and its applications."[153]

General Comment No. 25 is well supported by the writings of Special Rapporteur Shaheed. As she and her coauthor observe, "[h]uman development is about participation . . . [and] cannot be just about access to the benefits, or the products, of scientific advances."[154] In a way, the right to science and the right to research are two sides of the same coin; they aim to achieve similar objectives. Viewed from this perspective, the right to science will serve an important enabling function—it will facilitate the development of new norms, models, and practices that would advance the right to research.

Two questions remain, however. The first question concerns whether the right to research should be grounded in the right to science, as opposed to other forms of human rights (such as the right to freedom of expression and information).[155] This question can be answered in two parts. First, there is no need to pick which human right *alone* provides the human rights basis for the right to research. Even though it will still be important to develop a deeper understanding of the textual and normative support that the right to science provides to the right to research, policymakers, commentators, and activists are well advised to use more than one human right to support the latter.

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[147] *See* ICCPR, *supra* note 67; ICESCR, *supra* note 3.

[148] EU Charter, *supra* note 145, art. 13.

[149] UDHR, *supra* note 1, art. 27(1).

[150] *Compare* EU Charter, *supra* note 145, art. 16, *with* UDHR, *supra* note 1; ICCPR, *supra* note 67; ICESCR, *supra* note 3.

[151] General Comment No. 25, *supra* note 4, ¶ 62.

[152] *See id.* ¶¶ 49-50 (extending support to these arrangements).

[153] *Id.* ¶ 62.

[154] Shaheed & Mazibrada, *supra* note 79, at 108.

[155] Thanks to Christophe Geiger for encouraging the Author to explore this question.

Second, there remains an unfortunate divide between the protection of civil and political rights on the one hand and the protection of economic, social, and cultural rights on the other.[156] Many policymakers, commentators, and activists will likely find unsatisfactory a response that privileges the former over the latter. After all, there have been longstanding critiques of the undue focus that the international human rights system has placed on the protection of civil and political rights and the system's failure to adequately address the needs of developing countries.[157] There are, therefore, substantial benefits to using the right to science—an economic, social, or cultural right—to strengthen the right to research.

The second question pertains to the use of the right to science to support other emergent rights, such as the human right to a clean, healthy and sustainable environment.[158] Several decades ago, some pioneering scholars have already begun calling for the development of legal standing for trees, rivers, and other parts of nature to address environmental harm.[159] There has also been growing discussion of the so-called "non-human rights"—rights afforded to "[a]nimals,

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[156] As I noted in an earlier article:

> [T]he Western delegates, unlike their colleagues in the Eastern bloc countries and in Latin America, were primarily concerned with civil and political rights and considered economic, social, and cultural rights of second order. Even today, many consider this latter set of rights the "second generation" of rights, and these rights remain "the least well developed and the least doctrinally prescriptive."

Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1073-74 (footnotes omitted).

[157] *See* Ruth L. Okediji, *Does Intellectual Property Need Human Rights?*, 51 N.Y.U. J. INT'L L. & POL. 1, 4 (2018) (encouraging "caution about the contemporary construction of the IP/human rights interface and its sanguine embrace by well-meaning scholars and policymakers alike"); Yu, *IPHR 2.0*, *supra* note 13, at 1448-52 (exploring whether international human rights system will provide benefits to development of intellectual property regime in developing countries).

[158] *See* G.A. Res. 76/300, The Human Right to a Clean, Healthy and Sustainable Environment (July 28, 2022) (recognizing "[t]he human right to a clean, healthy and sustainable environment"). *See generally* THE RIGHT TO A HEALTHY ENVIRONMENT IN AND BEYOND THE ANTHROPOCENE: A EUROPEAN PERSPECTIVE (Hendrik Schoukens & Farah Bouquelle eds., 2024) (collecting essays that discuss this new human right). Thanks to Abbe Brown for encouraging the Author to explore this question.

[159] For discussions of efforts to develop the legal standing for parts of the environment to address environmental harm, see generally Christopher D. Stone, *Should Trees Have Standing?—Toward Legal Rights for Natural Objects*, 45 S. CAL. L. REV. 450 (1972); Daniel C. Esty, *Should Humanity Have Standing? Securing Environmental Rights in the United States*, 95 S. CAL. L. REV. 1345 (2022); and David Takacs, *Standing for Rivers, Mountains—and Trees—in the Anthropocene*, 95 S. CAL. L. REV. 1469 (2022). *See also* Daniel Benoliel & Sacha Bourgeois-Gironde, *Ecosystem Services IP: Exploiting Natural Resources for Innovation*, 2025 U. ILL. L. REV. (forthcoming) (on file with author) (advancing new intellectual property model based on view that nature can serve as legitimate rights-bearing entity).

rivers, mountains, rainforests, ecosystems and synthetic or artificial entities such as machines, AI and robots."[160] In this context, the right to science can provide a major boost to efforts at the intersection of intellectual property and climate change, including the need to develop climate change mitigation technologies and to enable such development through transfer of technology.[161] While I appreciate the benefits of using the right to science to advance the development of new rights to serve the public interest, I join other human rights experts in pleading for caution. After all, a proliferation of new human rights that have not yet received international consensus could easily backfire on human rights protections in general. Section IV.A further explains why it may not be a good idea to use human rights, including the right to science, as trump cards in debates on intellectual property and innovation.[162]

B. *COVID-19 Pandemic*

The second example concerns the COVID-19 pandemic, which has wreaked havoc around the world, costing over 7 million human lives[163] and tens of trillions of dollars in economic damage.[164] An interesting question in the human rights context is, why did advocates of intellectual property reforms during the COVID-19 pandemic not use human rights arguments more widely? Except for the CESCR's general comment and statements,[165] the International Commission

[160] Alexis Alvarez-Nakagawa, *A Critical Introduction to Non-Human Rights*, *in* NON-HUMAN RIGHTS: CRITICAL PERSPECTIVES 1, 1 (Alexis Alvarez-Nakagawa & Costas Douzinas eds., 2024) [hereinafter NON-HUMAN RIGHTS]. *See generally* NON-HUMAN RIGHTS, *supra* (collecting essays that discuss trend of affording protection to nonhumans).

[161] For book-length treatments of issues at the intersection of intellectual property and climate change, see generally ABBE E.L. BROWN, INTELLECTUAL PROPERTY, CLIMATE CHANGE AND TECHNOLOGY: MANAGING NATIONAL LEGAL INTERSECTIONS, RELATIONSHIPS AND CONFLICTS (2019); ENVIRONMENTAL TECHNOLOGIES, INTELLECTUAL PROPERTY AND CLIMATE CHANGE: ACCESSING, OBTAINING AND PROTECTING (Abbe E.L. Brown ed., 2013); INTELLECTUAL PROPERTY AND CLEAN ENERGY: THE PARIS AGREEMENT AND CLIMATE JUSTICE (Matthew Rimmer ed., 2018); RESEARCH HANDBOOK ON INTELLECTUAL PROPERTY AND CLIMATE CHANGE (Joshua D. Sarnoff ed., 2016); JOY Y. XIANG, CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT AND CLEANTECH: A PATHWAY FOR DEVELOPING COUNTRIES (2022); and WEI ZHUANG, INTELLECTUAL PROPERTY RIGHTS AND CLIMATE CHANGE: INTERPRETING THE TRIPS AGREEMENT FOR ENVIRONMENTALLY SOUND TECHNOLOGIES (2017).

[162] *See infra* Section IV.A (discussing limitations of using human rights as trump cards in international intellectual property debates).

[163] *WHO COVID-19 Dashboard*, *supra* note 15.

[164] *See* Yu, *Deferring Intellectual Property Rights*, *supra* note 18, at 491 n.2 (collecting studies that provide estimates of global economic toll of COVID-19 pandemic).

[165] *See* General Comment No. 25, *supra* note 4, ¶ 82 (devoting entire paragraph to subject of global pandemics); CESCR, Statement on Universal Affordable Vaccination Against Coronavirus Disease (COVID-19), International Cooperation and Intellectual Property, ¶ 13, U.N. Doc. E/C.12/2021/1 (Apr. 23, 2021) [hereinafter CESCR Statement on Universal

of Jurists' expert legal opinion,[166] and a few academic articles,[167] human rights language has been sparsely used at the intersection of intellectual property and public health during the pandemic.[168] Both the original and revised proposal for the COVID-19 TRIPS waiver, which are further discussed below, did not mention human rights at all.[169]

The standard response to such underutilization is that the human rights problems generated by the pandemic were so obvious that human rights

Affordable Vaccination] ("[T]he Committee strongly recommends that States support the proposals of this temporary waiver, including by using their voting rights within WTO."); CESCR, Statement on Universal and Equitable Access to Vaccines for the Coronavirus Disease (COVID-19), ¶ 6, U.N. Doc. E/C.12/2020/2 (Dec. 15, 2020) ("The [COVID-19 TRIPS waiver] proposal, supported by a number of special procedures of the Human Rights Council, should be considered and implemented in order to facilitate the prevention, containment and treatment of COVID-19 through the global affordability of vaccines." (footnote omitted)). An earlier version of paragraph 82 of *General Comment No. 25* appeared as paragraph 23 of the statement the CESCR released in the early days of the COVID-19 pandemic. *Compare* General Comment No. 25, *supra* note 4, ¶ 82, *with* CESCR, Statement on the Coronavirus Disease (COVID-19) Pandemic and Economic, Social and Cultural Rights, ¶ 23, U.N. Doc. E/C.12/2020/1 (Apr. 17, 2020).

[166] *See* INT'L COMM'N OF JURISTS, HUMAN RIGHTS OBLIGATIONS OF STATES TO NOT IMPEDE THE PROPOSED COVID-19 TRIPS WAIVER: EXPERT LEGAL OPINION ¶¶ 45-53 (2021), https://www.icj.org/wp-content/uploads/2021/11/Human-Rights-Obligations-States-Proposed-COVID-19-TRIPS-Waiver.pdf [https://perma.cc/UVY6-UXCN] (outlining States parties' international obligations not to obstruct or impede COVID-19 TRIPS waiver proposal).

[167] *See generally* Tolulope Anthony Adekola & Faith O. Majekolagbe, *Human Rights Law, Intellectual Property and Vaccine Nationalism: Lessons for the Post-COVID-19 World*, 29 AUSTLN. J. HUM. RTS. 375 (2023) (discussing potential lessons on intellectual property and human rights drawn from COVID-19 pandemic); Lisa Forman & Jillian Clare Kohler, *Global Health and Human Rights in the Time of COVID-19: Response, Restrictions, and Legitimacy*, 19 J. HUM. RTS. 547 (2020) (discussing human rights implications of policy responses to COVID-19 pandemic); Duncan Matthews, *Reappraising the Relationship Between Intellectual Property Rights and Human Rights: A COVID-19 Pandemic Response*, *in* REFORMING INTELLECTUAL PROPERTY 152 (Gustavo Ghidini & Valeria Falce eds., 2022) (examining relationship between intellectual property rights and human rights in COVID-19-context).

[168] *See* Matthews, *supra* note 167, at 162 ("[N]either side in the pro-waiver and anti-waiver [intellectual property] debate has deployed human rights arguments to substantiate its arguments.").

[169] *See* Council for Trade-Related Aspects of Intellectual Property Rights, *Waiver from Certain Provisions of the TRIPS Agreement for the Prevention, Containment and Treatment of COVID-19: Communication from India and South Africa*, WTO Doc. IP/C/W/669 (Oct. 2, 2020) [hereinafter *TRIPS Waiver Proposal*] (providing original proposal); Council for Trade-Related Aspects of Intellectual Property Rights, *Waiver from Certain Provisions of the TRIPS Agreement for the Prevention, Containment and Treatment of COVID-19: Revised Decision Text*, WTO Doc. IP/C/W/669/Rev.1 (May 25, 2021) [hereinafter *Revised TRIPS Waiver Proposal*] (providing revised proposal).

language did not need to be invoked. One could certainly take "judicial notice" of these problems. Not only has the lack of access to COVID-19 vaccines, treatments, medical devices, and other health products and technologies threatened the rights to life and health, the introduction of stay-at-home orders, quarantine and monitoring measures, and travel restrictions have implicated many other human rights,[170] such as the right to freedom of movement, the right to protection against interference with individual privacy, and the right to peaceful assembly.[171]

Drawing on insights provided by *General Comment No. 25* as described in Part II, this Section offers a different, and an arguably more controversial, answer. There were significant limits to using human rights arguments to advance the debate on access to health products and technologies during the COVID-19 pandemic.[172] Consider, for instance, the COVID-19 TRIPS waiver mentioned above.[173] Proposed by India and South Africa and endorsed by more than sixty WTO members, this instrument called for the temporary suspension of more than thirty TRIPS provisions to facilitate the "prevention, containment or treatment of COVID-19."[174]

In relation to this proposed waiver, human rights arguments can serve two primary functions. First, they legitimize the demands made by those in need of vaccines and other medications[175]—in particular, countries that have proposed, endorsed, or otherwise supported the waiver. Second, they call for actions that

[170] Sophia A. Zweig, Alexander J. Zapf, Chris Beyrer, Debarati Guha-Sapir & Rohini J. Haar, *Ensuring Rights While Protecting Health: The Importance of Using a Human Rights Approach in Implementing Public Health Responses to COVID-19*, HEALTH & HUM. RTS. J., Dec. 2021, at 173, 176; *Human Rights Dimensions of COVID-19 Response*, HUM. RTS. WATCH (Mar. 19, 2020, 12:01 AM), https://www.hrw.org/news/2020/03/19/human-rights-dimensions-covid-19-response [https://perma.cc/N6RH-CNG6]. *See generally* COVID-19 AND HUMAN RIGHTS (Morten Kjaerum, Martha F. Davis & Amanda Lyons eds., 2021) (collecting essays that discuss protection of human rights and lack thereof during COVID-19 pandemic).

[171] *See* Zweig et al., *supra* note 170, at 176.

[172] For limits of human rights, see generally ERIC A. POSNER, THE TWILIGHT OF HUMAN RIGHTS LAW (2014); and THE LIMITS OF HUMAN RIGHTS (Bardo Fassbender & Knut Traisbach eds., 2019).

[173] For the Author's discussions of the proposed waiver, see generally Peter K. Yu, *A Critical Appraisal of the COVID-19 TRIPS Waiver*, *in* POST PANDEMIC WORLD, *supra* note 136, at 11; Peter K. Yu, *China, the TRIPS Waiver, and the Global Pandemic Response*, *in* INTELLECTUAL PROPERTY, COVID-19, AND THE NEXT PANDEMIC: DIAGNOSING PROBLEMS, DEVELOPING CURES 343 (Haochen Sun & Madhavi Sunder eds., 2024); and Peter K. Yu, *The COVID-19 TRIPS Waiver and the WTO Ministerial Decision*, *in* INTELLECTUAL PROPERTY RIGHTS IN TIMES OF CRISIS 1 (Jens Schovsbo ed., 2024).

[174] *TRIPS Waiver Proposal*, *supra* note 169, annex, ¶ 1; *Revised TRIPS Waiver Proposal*, *supra* note 169, annex, ¶ 1.

[175] *See* Lea Shaver [now Bishop], *The Right to Read*, 54 COLUM. J. TRANSNAT'L L. 1, 43 (2015) [hereinafter Shaver, *Right to Read*] ("Human rights language can bring greater legitimacy or perceived urgency to a cause.").

support the protections guaranteed under international human rights instruments, including the rights to life and health. As the International Commission of Jurists declared in its expert legal opinion, "the rights to life, health, equality and science are directly engaged from the outset of the development, production, acquisition and distribution of COVID-19 diagnostics, medications, vaccines, therapeutics and other relevant health products."[176] The opinion further stated that the proposed waiver "should be understood . . . as an effort by the States proposing and supporting the waiver to comply with their human rights obligations to guarantee the rights to health, equality, science and life by initiating necessary cooperation in line with their obligations relating to international assistance and cooperation."[177]

Notwithstanding these important functions, human rights arguments do not specifically answer the difficult policy questions involved in the COVID-19 TRIPS waiver debate, such as whether we should focus on those health innovations that would enable us to better prepare for new variants of the SARS-CoV-2 virus or forgo such innovations to maximize the number of people vaccinated with the then-current state of technology. Although these two goals are not mutually exclusive in an ideal world, they were in direct competition in a resource-constrained world during the COVID-19 pandemic. The choice between these two goals had also raised difficult moral, policy, and practical questions that human rights arguments could not easily resolve.[178]

Although the debate on the COVID-19 TRIPS waiver has been one of the most difficult intellectual property policy debates in the past two decades,[179] this debate is only one of many confronting policymakers during the COVID-19 pandemic. During the pandemic, policymakers frequently "ha[d] to make difficult choices that come with both major benefits and significant drawbacks."[180] Even worse, they were "not always . . . able to tell in advance whether one choice [wa]s significantly better than another."[181] Oftentimes, they had to pick the lesser of two or more evils.

To be sure, the right to science and *General Comment No. 25* could provide some support for efforts to promote local development of vaccines and the transfer of technology needed for such development. Paragraph 5 of the interpretive comment reminds us of the importance of "doing science"—an *active* undertaking that contrasts significantly with the more *passive* undertaking of enjoying "the results of [the scientific] process" or the fruits of scientific

[176] INT'L COMM'N OF JURISTS, *supra* note 166, ¶ 17.

[177] *Id.* ¶ 33.

[178] One recent attempt to address these moral questions is Thomas Pogge, *When Do Patents Violate Human Rights?*, *in* A HUMAN-CENTERED APPROACH, *supra* note 3.

[179] *See* Peter K. Yu, Editorial, *Intellectual Property Paradoxes in Pandemic Times*, 71 GRUR INT'L 293, 294 (2022) (stating "there are simply no easy answers" to many difficult questions confronting policymakers and commentators).

[180] *Id.*

[181] *Id.*

advances.[182] Paragraph 47 also emphasizes the benefits of wide dissemination of scientific knowledge, data, and other resources.[183] In addition, paragraph 83 underscores the need to "enable developing countries to build their capacity to participate in generating and sharing scientific knowledge and benefiting from its applications."[184]

To bolster such capacity, countries will need to introduce measures that would support local innovation,[185] such as the issuance of compulsory licenses,[186] the adoption of local working requirements,[187] and the greater utilization of limitations and exceptions in the patent system.[188] Apart from developing countries adopting internal intellectual property reforms, developed and emerging countries will also need to transfer technology to their less developed counterparts. Article 66.2 of the TRIPS Agreement explicitly states that "[d]eveloped 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."[189] Paragraph 11.2 of the

[182] General Comment No. 25, *supra* note 4, ¶ 5.

[183] *See id.* ¶ 47.

[184] *Id.* ¶ 83; *see also* Human Rights Council Res. 50/13, Access to Medicines, Vaccines, and Other Health Products in the Context of the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, ¶ 6(d) (July 14, 2022) ("To promote the transfer of technology and know-how on mutually agreed terms, and to encourage research, innovation, and commitment, where possible, to voluntary licensing in all agreements in which public funding has been invested in research and development . . . ."); *id.* ¶ 6(e) ("To assist in efforts to build capacity through training and financial support for developing countries to produce health technologies, including mRNA vaccine technology . . . .").

[185] *See Special Rapporteur's Report on the Right to Science*, *supra* note 45, ¶ 74(k) ("Developing countries should prioritize the development, importation and dissemination of simple and inexpensive technologies that can improve the life of marginalized populations."); Rochelle Cooper Dreyfuss, *Human Rights in a Technological Age: The Right to Participate in Science*, 55 N.Y.U. J. INT'L L. & POL. 581, 611-25 (2023) (discussing use of right to science to support policies fostering local innovation); *see also* Ruth L. Okediji, *Reframing International Copyright Limitations and Exceptions as Development Policy*, *in* COPYRIGHT LAW IN AN AGE OF LIMITATIONS AND EXCEPTIONS 429, 488 (Ruth L. Okediji ed., 2017) ("Economic growth is potentiated . . . because knowledge helps to shape the structural conditions in society, making it better equipped to absorb new ideas and to leverage them productively.").

[186] *See* TRIPS Agreement, *supra* note 111, art. 31 (laying out conditions for WTO member states to introduce compulsory licenses).

[187] *See* Emmanuel Kolawole Oke, *Patent Rights, the Right to Health, and the WTO Dispute Settlement System*, *in* A HUMAN-CENTERED APPROACH, *supra* note 3 (using human rights arguments to justify introduction of local working requirements in patent system).

[188] *See* TRIPS Agreement, *supra* note 111, art. 30 (providing three-step test for reviewing new limitations and exceptions WTO members have introduced to their patent systems).

[189] *Id.* art. 66.2.

Ministerial Decision on Implementation-Related Issues and Concerns also states that "the provisions of Article 66.2 of the TRIPS Agreement are mandatory."[190]

One could go even further to suggest that paragraphs 5, 47, and 83 of *General Comment No. 25* provide some support for the COVID-19 TRIPS waiver,[191] especially if one views intellectual property protection—and, by extension, the TRIPS Agreement[192]—as a major barrier to such local development. As the supporters of the COVID-19 TRIPS waiver explained, the proposed waiver would help product and technology developers secure the needed "freedom to operate without the risk of litigation or the fear that exported vaccines or other technologies could be seized in transit and impounded for alleged infringement."[193] They further justified the need for the waiver by pointing out that the issuance of compulsory licenses under the TRIPS Agreement "do[es] not address the need for technology transfer and the sharing of know-how needed to build local and regional manufacturing capacity."[194]

Notwithstanding the normative support that *General Comment No. 25* has provided for the adoption of the COVID-19 TRIPS waiver, one could advance strong human rights arguments—based on the rights to life, health, equality, and science—to justify the need for countries to maintain robust intellectual property systems to facilitate the development of health innovations that would address

[190] World Trade Organization, Implementation-Related Issues and Concerns, ¶ 11.2, WTO Doc. WT/MIN(01)/17, 41 I.L.M. 757 (2002); *see also* World Trade Organization, Declaration on the TRIPS Agreement and Public Health, ¶ 7, WTO Doc. WT/MIN(01)/DEC/2, 41 I.L.M. 755 (2002) [hereinafter Doha Declaration] ("We reaffirm the commitment of developed-country members to provide incentives to their enterprises and institutions to promote and encourage technology transfer to least-developed country members pursuant to Article 66.2.").

[191] *See* General Comment No. 25, *supra* note 4, ¶ 5 ("[S]cience . . . refers both to a process following a certain methodology ('doing science') and to the results of this process (knowledge and applications)."); *id.* ¶ 47 (emphasizing benefits of wide dissemination of scientific knowledge, data, and other resources); *id.* ¶ 83 (underscoring need to "enable developing countries to build their capacity to participate in generating and sharing scientific knowledge and benefiting from its applications").

[192] As the CESCR declares:

> The current restrictions imposed by the intellectual property rules in the TRIPS Agreement make it very difficult to achieve the international cooperation needed for the massive scale up in production and distribution of vaccines to the levels that are now technically possible and urgently required to achieve herd immunity as soon as possible.

CESCR Statement on Universal Affordable Vaccination, *supra* note 165, ¶ 11.

[193] Siva Thambisetty, Aisling McMahon, Luke McDonagh, Hyo Yoon Kang & Graham Dutfield, *Addressing Vaccine Inequity During the COVID-19 Pandemic: The TRIPS Intellectual Property Waiver Proposal and Beyond*, 81 CAMBRIDGE L.J. 384, 399 (2022).

[194] HYO YOON KANG, AISLING MCMAHON, GRAHAM DUTFIELD, LUKE MCDONAGH & SIVA THAMBISETTY, ACADEMIC OPEN LETTER IN SUPPORT OF THE TRIPS INTELLECTUAL PROPERTY WAIVER PROPOSAL 3 (2021), https://ssrn.com/abstract=3885568.

other diseases or help prepare for the next pandemic.[195] In addition, many policymakers and commentators remain unconvinced that the major barrier to access to vaccines comes from the intellectual property system, as opposed to the lack of manufacturing capacity and know-how, raw material shortages, delivery and logistical challenges, and deficiencies in public health infrastructure.[196] Indeed, the longer view one takes—for example, a view spanning several decades and a few pandemics—the greater hesitation one will have over drastic disruptions to the existing intellectual-property-based incentive framework.[197] After all, many pre-pandemic products and

[195] *See* Bryan Mercurio, *WTO Waiver from Intellectual Property Protection for COVID-19 Vaccines and Treatments: A Critical Review*, 62 VA. J. INT'L L. ONLINE 9, 16-18 (2021) (discussing how proposed waiver would undermine R&D and innovation), https://www.vjil.org/wto-waiver-from-intellectual-property-protection [https://perma.cc/L8KP-DZMM]; Yu, *Deferring Intellectual Property Rights*, *supra* note 18, at 506-07 (discussing potential for proposed waiver to undermine incentive frameworks for developing medical products and technologies needed to combat COVID-19); Reto M. Hilty, Pedro Henrique D. Batista, Suelen Carls, Daria Kim, Matthias Lamping & Peter R. Slowinski, *Covid-19 and the Role of Intellectual Property: Position Statement of the Max Planck Institute for Innovation and Competition of 7 May 2021*, MAX PLANCK INST. FOR INNOVATION & COMPETITION 5 (May 7, 2021), https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/2021_05_25_Position_statement_Covid_IP_waiver.pdf [https://perma.cc/4W3N-PGF8] ("A waiver of [intellectual property] protection would not serve the interest of . . . society, as it would create a disincentive for companies to pursue research in those areas.").

[196] *See* Mercurio, *supra* note 195, at 15-16 ("Other major factors—such as infrastructure, supply chains, production capabilities and capacity—may prove to be a major stumbling block in distributing medicines and vaccines."); Hilty et al., *supra* note 195, at 1 ("The holdups in vaccine manufacturing and distribution have been caused mainly by the shortage in raw materials, insufficient production capacity and highly complex manufacturing process[es] (in the case of mRNA and vector vaccines)." (citation omitted)); Justin Hughes, *Biden Decision on COVID Vaccine Patent Waivers Is More About Global Leadership than IP*, USA TODAY, https://www.usatoday.com/story/opinion/2021/05/06/covid-vaccine-patents-biden-boosts-american-leadership-column/4932766001 (last updated May 6, 2021, 7:04 PM) ("Practically everyone agrees that the issue in production of these drugs – whether conventional vaccines or the new mRNA vaccines – is not the patented technology, but (a) proper manufacturing facilities, (b) raw materials, (c) production know-how, and (d) logistical hurdles in administering the shots."); Ana Santos Rutschman & Julia Barnes-Weise, *The COVID-19 Vaccine Patent Waiver: The Wrong Tool for the Right Goal*, PETRIE-FLOM CTR. (May 5, 2021), https://blog.petrieflom.law.harvard.edu/2021/05/05/covid-vaccine-patent-waiver [https://perma.cc/Q54D-SMVD] ("[E]ven if all types of legal restrictions on the use of vaccine technology were lifted — or had never existed in the first place — there is simply not enough infrastructure . . . nor raw materials . . . to produce and distribute COVID-19 vaccines as predicted under current waiver proposals.").

[197] *Cf.* Jorge L. Contreras, *Expanding Access to Patents for COVID-19*, *in* PUB. HEALTH L. WATCH, ASSESSING LEGAL RESPONSES TO COVID-19 158, 158 (Scott Burris, Sarah de Guia, Lance Gable, Donna E. Levin, Wendy E. Parmet & Nicolas P. Terry eds., 2020), https://scholarshare.temple.edu/server/api/core/bitstreams/260c4175-e26a-46db-a212-

technologies, including those relating to the Severe Acute Respiratory Syndrome ("SARS"), have been used or repurposed to accelerate the effort to combat COVID-19.[198] In addition, article 12(1) of the ICESCR "recognize[s] the right of everyone to the enjoyment of the highest attainable standard of physical and mental health."[199] As much as the right to health supports access to vaccines that respond to preexisting variants of SARS-CoV-2, the same right also supports access to vaccines that would respond to potential new variants of that virus. Whether a country should focus its R&D and production on the former, as opposed to the latter, is another policy question that human rights arguments cannot easily resolve.

Moreover, as Section II.C has noted, paragraph 14 of *General Comment No. 25* emphasizes the somewhat conflicting need for states to "take positive steps for the advancement of science (development) and for the protection and dissemination of scientific knowledge and its applications (conservation and diffusion)."[200] The concepts of conservation, development, and diffusion can be traced back to article 15(2) of the ICESCR.[201] To a large extent, the interpretive comment has remained neutral over whether countries should focus on "advancement of science" and "the protection . . . of scientific knowledge and its applications" on the one hand or the "dissemination of [this] knowledge and its applications" on the other.[202] Nor is it clear that the phrase "advancement of science" refers to present or future inventors.[203] Based on this neutral position, advocates of strong protection and enforcement of intellectual property rights can easily invoke the right to science to demand an increased level of intellectual property protection to promote the development of health innovations that would address other diseases or help prepare for the next pandemic.

Whether this argument is ultimately supported from a human rights standpoint depends on two sets of circumstances. The first concerns the level of fatalities and serious illnesses. To the extent that global access to vaccines and other health products and technologies is needed to meet the minimum core

db8ed2f994f2/content [https://perma.cc/LY87-JYXR] (distinguishing between "[a]llocative considerations [that] relate to the distribution of existing resources among potential users" and "dynamic considerations [that] relate to the creation of new technologies over time").

198 *See* WIPO, COVID-19-RELATED VACCINES AND THERAPEUTICS: PRELIMINARY INSIGHTS ON RELATED PATENTING ACTIVITY DURING THE PANDEMIC 7 (2022) (stating "[m]ost COVID-19 drug candidates are repurposed"); *id.* at 20 ("Companies including Moderna, BioNTech and Curvac designed their first generation of COVID vaccines using 2P S protein as antigen, based on the data from other betacorona viruses, SARS and MERS, which resulted in higher protein (antigen) expression and elicited potent immune responses . . . ."); Mercurio, *supra* note 195, at 17 (discussing incentives needed to support development of synthetic mRNA technology, which dates back to more than a decade before COVID-19 pandemic).

199 ICESCR, *supra* note 3, art. 12(1).

200 General Comment No. 25, *supra* note 4, ¶ 14.

201 ICESCR, *supra* note 3, art. 15(2).

202 General Comment No. 25, *supra* note 4, ¶ 14.

203 *Id.*

obligations under the ICESCR for the rights to life and health,[204] there are strong human rights arguments on the side of equitable global distribution. Article 22 of the UDHR states that "[e]veryone . . . is entitled to realization, through . . . international co-operation . . . , of the economic, social and cultural rights indispensable for his dignity and the free development of his personality."[205] Likewise, article 2 of the ICESCR requires each contracting party "to take steps, . . . through international assistance and co-operation, . . . to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means."[206] In prior work, I also emphasized the importance of utilizing the core minimum approach to realize human rights, which are discussed in Section IV.B below.[207]

The second set of circumstances pertains to the availability of alternative models to drive these innovations. For instance, if non-intellectual-property models that equally promote such innovations exist and would raise fewer human rights concerns,[208] one would have difficulty arguing that the right to science provides strong support for intellectual-property-based models. In the past two decades, policymakers, commentators, intergovernmental bodies, and NGOs have continued to embrace the greater use of alternative incentive frameworks.[209] Although there remains a live debate concerning the

[204] *See* UDHR, *supra* note 1, arts. 3, 25(1); ICESCR, *supra* note 3, art. 12(1).

[205] UDHR, *supra* note 1, art. 22.

[206] ICESCR, *supra* note 3, art. 2.

[207] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1105-13 (discussing core minimum approach); *see also supra* text accompanying notes 284-285.

[208] *See generally* Pogge, *supra* note 178 (arguing from morality standpoint that intellectual property system should not be maintained when alternative options, such as Health Impact Fund, exist and raise fewer human rights concerns).

[209] *See* General Comment No. 25, *supra* note 4, ¶ 62 ("States could . . . resort to other incentives, such as so-called market entry rewards, which delink remuneration of successful research from future sales, thus fostering research by private actors in these otherwise neglected fields."); Farida Shaheed (Special Rapporteur in the Field of Cultural Rights), *Copyright Policy and the Right to Science and Culture*, ¶ 82, U.N. Doc. A/HRC/28/57 (Dec. 24, 2014) [hereinafter *Special Rapporteur's Report on Copyright Policy*] ("Open access publishing is emerging as a significant alternative model for disseminating scientific knowledge."); Rochelle Cooper Dreyfuss, *Patents and Human Rights: Where Is the Paradox*?, *in* INTELLECTUAL PROPERTY AND HUMAN RIGHTS: A PARADOX 72, 81 (Willem Grosheide ed., 2010) ("Other methods of assuring payment include lead time advantages, government or private contracts and research grants, contests, bonuses, prizes, tenure, and professorial chairs."); Yu, *Nonmultilateral Era*, *supra* note 13, at 1077-78 (outlining different nonpatent options, including "grants, subsidies, prizes, advance market commitments, reputation gains, open source drug discovery, patent pools, public-private partnerships, or equity-based systems built upon liability rules"). As Special Rapporteur Shaheed explains:

> [Alternative] mechanisms avoid two liabilities of the patent-focused approach to research and innovation: they can be tied to social benefit rather than market demand,

effectiveness and viability of these frameworks,[210] this debate has shifted quite a bit since the beginning of the COVID-19 pandemic, due in large part to the wide use of public funding to stimulate innovation through Operation Warp Speed in the United States and government-driven initiatives in other parts of the world.[211] It is therefore no surprise that paragraph 62 of *General Comment No. 25* calls on states to "provide adequate financial support for research that is important for the enjoyment of economic, social and cultural rights, either through national efforts or, if necessary, by resorting to international and technical cooperation."[212] This recommendation is consistent with the CESCR's earlier authoritative comment on the right to health, which obliges state parties "to use the maximum of its available resources for the realization of [that] right."[213]

In sum, the right to science can serve an important discursive function to help legitimize and advance policies in the debates on intellectual property and innovation. Yet, unlike the enabling function, the discursive function does not dictate a specific outcome. A diverse array of proposals exists to address disparate segments of the world population and different public health targets, including both short-term and long-term ones. While the human rights

> and they do not require legal restrictions on the diffusion of the resulting technologies. . . . [These] mechanisms need to be carefully crafted to ensure that they meet their purpose, especially in areas of essential technologies where the patent system does not work well.

Special Rapporteur's Report on Patent Policy, *supra* note 100, ¶ 57 (footnote omitted).

[210] For discussions of alternative innovation models, see generally GENE PATENTS AND COLLABORATIVE LICENSING MODELS: PATENT POOLS, CLEARINGHOUSES, OPEN SOURCE MODELS AND LIABILITY REGIMES (Geertrui Van Overwalle ed., 2009); and INCENTIVES FOR GLOBAL PUBLIC HEALTH: PATENT LAW AND ACCESS TO ESSENTIAL MEDICINES 133-283 (Thomas Pogge, Matthew Rimmer & Kim Rubenstein eds., 2010).

[211] *See* WIPO, WORLD INTELLECTUAL PROPERTY REPORT 2022: THE DIRECTION OF INNOVATION 15 (2022) (underscoring important role government policy can play in setting the direction of innovation, especially when confronted with "'grand challenges,' such as global warming and future pandemics"). As the report declares:

> Government policies and the innovation decisions made by private companies coexist in a complex innovation ecosystem that includes individuals—such as scientists—government agencies and multinational companies, among others. Government and private companies can complement each other or otherwise compete for the limited resources devoted to innovation. In either case, they are continuously influencing one another.

Id.; *see also Special Rapporteur's Report on the Right to Science*, *supra* note 45, ¶ 71 ("States should not rely entirely on the private sector; they should make all efforts possible to ensure publicly funded research, enter into partnerships with the private sector, and ensure that private companies respect human rights.").

[212] General Comment No. 25, *supra* note 4, ¶ 62.

[213] General Comment No. 14, *supra* note 127, ¶ 47.

arguments have been well developed in the area of access to medicines[214] since the adoption of the Declaration on the TRIPS Agreement and Public Health,[215] these arguments alone would not have transformed the debate on the COVID-19 TRIPS waiver and caused the holdout countries in the developed world to support their needy counterparts in the developing world.[216]

C. *Generative Artificial Intelligence*

The last example pertains to the growing attention on generative AI. Although AI developments can be traced back to a summer gathering at Dartmouth College in the mid-1950s,[217] there has recently been a wide public debate on AI, especially after the arrival of ChatGPT, Dall-E, Midjourney, Stable Diffusion, Copilot, and other new generative AI products and services since spring 2023.[218] Policymakers quickly called for hearings, listening sessions, and public comments to better understand the challenges posed by these technologies. In the United States, for instance, the Senate Judiciary Committee held ten public hearings on AI-related issues during the Biden Administration, covering intellectual property, human rights, regulatory issues, governance and oversight, journalism, criminal investigations and prosecutions, and deepfakes during

[214] For discussions of the interplay between human rights and access to medicines, see generally AUDREY R. CHAPMAN, GLOBAL HEALTH, HUMAN RIGHTS, AND THE CHALLENGE OF NEOLIBERAL POLICIES (2016); ANGELINA SNODGRASS GODOY, OF MEDICINES AND MARKETS: INTELLECTUAL PROPERTY AND HUMAN RIGHTS IN THE FREE TRADE ERA (2013); LAURENCE R. HELFER & GRAEME W. AUSTIN, HUMAN RIGHTS AND INTELLECTUAL PROPERTY: MAPPING THE GLOBAL INTERFACE 90-170 (2011); HOLGER HESTERMEYER, HUMAN RIGHTS AND THE WTO: THE CASE OF PATENTS AND ACCESS TO MEDICINES (2007); and LEE, *supra* note 13.

[215] Doha Declaration, *supra* note 190.

[216] *See* D. Ravi Kanth, *EU, Switzerland, UK Continue Opposition, amid Support for TRIPS Waiver*, THIRD WORLD NETWORK (Sept. 16, 2021), https://www.twn.my/title2/wto.info/2021/ti210913.htm [https://perma.cc/8NLM-6RG7] ("[T]he European Union led by Germany, Switzerland, and the United Kingdom . . . seem determined to undermine an expeditious decision on the temporary waiver for combating the COVID-19 pandemic . . . ."); *see also* Ashleigh Furlong, Sarah Anne Aarup & Samuel Horti, *Who Killed the COVID Vaccine Waiver?*, POLITICO (Nov. 10, 2022, 12:00 AM), https://www.politico.eu/article/covid-vaccine-poor-countries-waiver-killed/ [https://perma.cc/RJ29-R5PY] (providing investigative report on lobbying against COVID-19 TRIPS waiver).

[217] *See Artificial Intelligence Coined at Dartmouth*, DARTMOUTH, https://home.dartmouth.edu/about/artificial-intelligence-ai-coined-dartmouth [https://perma.cc/D9JS-DX3B] (last visited Apr. 16, 2025) ("In 1956, a small group of scientists gathered for the Dartmouth Summer Research Project on Artificial Intelligence, which was the birth of this field of research.").

[218] *See ChatGPT — Release Notes*, OPENAI, https://help.openai.com/en/articles/6825453-chatgpt-release-notes (last visited Apr. 16, 2025) (documenting releases of OpenAI's products).

political elections.[219] Building on past consultations in the AI area,[220] the U.S. Copyright Office and the U.S. Patent and Trademark Office have also established public listening sessions and new consultation processes.[221] Since then, AI has become a major issue in other areas, including some unexpected places. Frequently mentioned in the mainstream media are the debates on using generative AI tools in educational environments[222] and the concerns among actors and writers over AI-induced competition and job displacement, as revealed in the 2023 writers' and actors' strikes in Hollywood.[223]

In view of the many potential dangers of generative AI, policymakers, commentators, scientists, and AI developers have pleaded for greater caution and regulation in this area. For example, Sam Altman, the CEO of Open AI and the developer of ChatGPT, "call[ed] for coordinated international regulation of

[219] *See* Peter K. Yu, *Artificial Intelligence, Autonomous Creation, and the Future Path of Copyright Law*, 50 BYU L. REV. (forthcoming 2025), https://ssrn.com/abstract=4762915 (providing list of these hearings).

[220] *See, e.g.*, U.S. PAT. & TRADEMARK OFF., PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY (2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf [https://perma.cc/3PG7-8X5H] (collecting public views at intersection of intellectual property and AI).

[221] *See* U.S. COPYRIGHT OFF., COPYRIGHT AND ARTIFICIAL INTELLIGENCE: PART 1: DIGITAL REPLICAS (2025), https://copyright.gov/ai/Copyright-and-Artificial-Intelligence-Part-1-Digital-Replicas-Report.pdf [https://perma.cc/8MP3-RKSL] (providing U.S. Copyright Office's first report on copyright and AI); U.S. COPYRIGHT OFF., COPYRIGHT AND ARTIFICIAL INTELLIGENCE: PART 2: COPYRIGHTABILITY (2025), https://www.copyright.gov/ai/Copyright-and-Artificial-Intelligence-Part-2-Copyrightability-Report.pdf [https://perma.cc/5PES-GHJ4] (providing U.S. Copyright Office's second report on copyright and AI); *Copyright and Artificial Intelligence*, U.S. COPYRIGHT OFF., https://www.copyright.gov/ai/ [https://perma.cc/GV8C-NYL2] (last visited Apr. 16, 2025) (listing public listening sessions in relation to literary works, visual arts, audiovisual works, and music and sound recordings); *Latest AI News and Reports*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/initiatives/artificial-intelligence/artificial-intelligence-reports [https://perma.cc/4UP9-3AT7] (last updated Feb. 26, 2025, 1:45 PM) (collecting *Federal Register* notices on its request for comments and public listening sessions).

[222] *See* Danny Liu, Adam Bridgeman & Cecilia Ka Yuk Chan, *'Please Do Not Assume the Worst of Us': Students Know AI Is Here to Stay and Want Unis to Teach Them How to Use It*, CONVERSATION (May 15, 2023, 4:05 PM), https://theconversation.com/please-do-not-assume-the-worst-of-us-students-know-ai-is-here-to-stay-and-want-unis-to-teach-them-how-to-use-it-203426 [https://perma.cc/YB66-FHBS] (noting concern in higher education that wide use of generative AI such as ChatGPT would promote cheating among students).

[223] *See* Holly Willis, *What Are Hollywood Actors and Writers Afraid of? A Cinema Scholar Explains How AI Is Upending the Movie and TV Business*, CONVERSATION (Aug. 7, 2023, 9:03 AM), https://theconversation.com/what-are-hollywood-actors-and-writers-afraid-of-a-cinema-scholar-explains-how-ai-is-upending-the-movie-and-tv-business-210360 [https://perma.cc/S7YB-EUKU] (relaying concerns of actors and writers over generative AI).

generative artificial intelligence."[224] Nobel laureate Geoffrey Hinton, a British computer scientist to whom some have referred as "the godfather of AI," left Google to warn how AI could outperform humans.[225] In addition, Italy briefly banned ChatGPT in April 2023 due to privacy concerns.[226] Two months later, the European Parliament adopted its negotiating position on the EU AI Act,[227] paving the way for the regulation's adoption in its final form.[228] A month later, China also issued its Interim Measures for the Management of Generative Artificial Intelligence Services.[229]

One therefore cannot help but wonder how the right to science will affect AI-related policy debates. At first glance, the right to science will call for greater development in the AI area, due to the need of individuals to "share in scientific advancement and its benefits"[230] or to "enjoy the benefits of scientific progress

[224] Michelle Toh & Yoonjung Seo, *OpenAI CEO Calls for Global Cooperation to Regulate AI*, CNN (June 9, 2023, 7:47 AM), https://www.cnn.com/2023/06/09/tech/korea-altman-chatgpt-ai-regulation-intl-hnk/index.html [https://perma.cc/839F-UYCB].

[225] Bobby Allyn, *"The Godfather of AI" Warns of AI Possibly Outperforming Humans*, NPR (May 27, 2023, 8:17 AM), https://www.npr.org/2023/05/27/1178575886/-the-godfather-of-ai-warns-of-ai-possibly-outperforming-humans [https://perma.cc/9WUF-HYT8].

[226] *See* Shiona McCallum, *ChatGPT Banned in Italy over Privacy Concerns*, BBC (Apr. 1, 2023), https://www.bbc.com/news/technology-65139406 [https://perma.cc/F4PK-64TG] (reporting ban of ChatGPT in Italy); Shiona McCallum, *ChatGPT Accessible Again in Italy*, BBC (Apr. 28, 2023), https://www.bbc.com/news/technology-65431914 [https://perma.cc/L36V-XWS2] (reporting removal of the ban of ChatGPT in Italy).

[227] *EU AI Act: First Regulation on Artificial Intelligence*, EUR. PARLIAMENT, https://www.europarl.europa.eu/news/en/headlines/society/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence [https://perma.cc/5MMC-RJY3] (Feb. 19, 2025, 5:46 PM); Press Release, Eur. Parliament, MEPs Ready to Negotiate First-Ever Rules for Safe and Transparent AI (June 14, 2023, 12:52 PM), https://www.europarl.europa.eu/news/en/press-room/20230609IPR96212/meps-ready-to-negotiate-first-ever-rules-for-safe-and-transparent-ai [https://perma.cc/HUB8-6S3T]; *see also Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts*, COM (2021) 206 final (Apr. 21, 2021) (providing proposal for EU AI Act).

[228] Regulation 2024/1689, of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence and Amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), 2024 O.J. (L 144) 1 (providing finalized version of EU AI Act).

[229] Interim Measures for the Management of Generative Artificial Intelligence Services (promulgated by the State Admin. of Radio & Television, July 10, 2023, effective Aug. 15, 2023) (China), CLI.4.5171165(EN), https://www.pkulaw.com/en_law/6dc227b9153496c2bdfb.html.

[230] UDHR, *supra* note 1, art. 27(1).

and its applications."[231] There is no doubt that greater advancement of generative AI will provide these benefits.[232]

However, when one looks deeper into *General Comment No. 25*, one will recall that the right to science was developed partly to prevent the future abuse of science and technology. That right was a direct response to the trauma caused by the aggression and atrocities committed during the Second World War and the inhumane practices in Nazi Germany and Stalinist Russia.[233] It is therefore no surprise that this interpretive comment calls explicitly for the regulation of those scientific endeavors that will raise human rights concerns.[234] Paragraph 21 of the interpretive comment declares:

> Some limitations on the right to participate in and to enjoy the benefits of scientific progress and its applications might be necessary, as science and its applications can, in certain contexts, affect economic, social and cultural rights. Nevertheless, limitations on the right must respect the requirements of article 4 of the Covenant: first, limitations have to be determined by law; second, they must promote "the general welfare in a democratic society"; and third, any restriction must be compatible with the nature of the right restricted.[235]

General Comment No. 25 further warns that changes brought about by emerging technologies "might intensify social inequalities by increasing unemployment and segregation in the labour market, and algorithms incorporated in artificial intelligence can reinforce discrimination."[236] Examples of emerging technologies that might raise significant human rights concerns are genetic engineering, AI, and robotics, including the use of AI and robotics to develop lethal autonomous weapons.[237]

To address these potential challenges, the CESCR recommends three courses of action. First, *General Comment No. 25* calls for international cooperation in the development of global regulation. As the interpretive comment explains, "[f]ragmented national responses to these transnational technologies would create governance gaps detrimental to the enjoyment of economic, social and cultural rights and would perpetuate technological divides and economic disparities."[238] Second, "decisions concerning the development and use of these technologies should be taken within a human rights framework and from a

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[231] ICESCR, *supra* note 3, art. 15(1)(b).

[232] *See* General Comment No. 25, *supra* note 4, ¶ 73 ("[A]pplications of artificial intelligence in industry or services can lead to enormous gains in productivity and efficiency . . . .").

[233] *See* sources cited *supra* note 26.

[234] *See* General Comment No. 25, *supra* note 4, ¶ 21 (noting need for "[s]ome limitations" on right to science).

[235] *Id.*

[236] *Id.* ¶ 73.

[237] *See id.* ¶¶ 72-76.

[238] *Id.* ¶ 74.

holistic and inclusive perspective."[239] Paragraph 75 states explicitly that "[a]ll cross-cutting human rights principles, such as transparency, non-discrimination, accountability and respect for human dignity, become crucial in this field."[240] Third, "some aspects related to these new technologies deserve special attention because of their particular impact on the enjoyment of economic, social and cultural rights."[241] The committee continues:

> States parties should adopt policies to ensure that those vulnerable to temporary and long-term job loss as a result of scientific and technological advances are provided with and encouraged to pursue vocational training and other job placement opportunities. Moreover, taking into account that many of the emerging inequalities are strongly linked to the capacity of some business entities to access, store and exploit massive data, it is crucial to regulate the ownership and control of data according to human rights principles.[242]

General Comment No. 25 further underscores the role the precautionary principle can play.[243] As the CESCR declares, "This principle demands that, in the absence of full scientific certainty, when an action or policy may lead to unacceptable harm to the public or the environment, actions will be taken to avoid or diminish that harm."[244] Paragraph 57 adds that, "in controversial cases, participation and transparency become crucial because the risks and potential of some technical advances or some scientific research should be made public in order to enable society, through informed, transparent and participatory public deliberation, to decide whether or not the risks are acceptable."[245] Nevertheless, the interpretive comment warns that the precautionary principle can "limit[] . . . the freedom of scientific research" and, in turn, "hinder and prevent scientific progress [that] is beneficial for humanity."[246]

In her recent report, Alexandra Xanthaki, the Special Rapporteur since 2021, also notes the importance of having "the right not to participate [in science]."[247] As she explains:

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[239] *Id.* ¶ 75.

[240] General Comment No. 25, *supra* note 4, ¶ 75.

[241] *Id.* ¶ 76.

[242] *Id.*

[243] *Id.* ¶ 56; *see also* Charles P. Trumbull IV, *Autonomous Weapons: How Existing Law Can Regulate Future Weapons*, 34 EMORY INT'L L. REV. 533, 585-87 (2020) (discussing precautionary principle in context of autonomous weapons). *See generally* PHOEBE LI, HEALTH TECHNOLOGIES AND INTERNATIONAL INTELLECTUAL PROPERTY: A PRECAUTIONARY APPROACH (2014) (calling for use of precautionary approach to enhance access to medicines during public health exigencies).

[244] General Comment No. 25, *supra* note 4, ¶ 56.

[245] *Id.* ¶ 57.

[246] *Id.*

[247] Xanthaki, *supra* note 79, ¶¶ 60-63; *see also* General Comment No. 25, *supra* note 4, ¶ 44 ("States parties must guarantee everyone the right to choose or *refuse* the treatment they

> An important aspect of the right to participate in science is the right not to participate. The issue of consent is an important one and must always be taken into consideration, based in particular on article 7 of the International Covenant on Civil and Political Rights, providing that no one shall be subjected without one's free consent to medical or scientific experimentation. Guaranteeing informed consent is also a fundamental dimension of the right to health and requires adopting policies, practices and protocols that are respectful of autonomy, self-determination and human dignity.[248]

In her view, "[t]he possibility for people to refuse to give data or to undergo a specific medical treatment or vaccines, or to submit themselves to any specific scientific innovation labelled as 'progress' is crucial."[249]

When all of these recommended actions are taken into consideration, the right to science can be seen as serving more of a constraining function, although this right can also be characterized as playing an enabling function. Because the emerging technologies can provide both benefits and risks, they can both enhance and undermine the enjoyment of the right to science—and, by extension, other human rights.[250] From a human rights standpoint, the debate on generative AI has sparked both an internal debate within the right to science as well as a larger debate between various rights in the international human rights regime.

D. *Summary*

This Part has shown that the functions the right to science can play are best seen as falling within a continuum. Depending on the subject at hand, this right can play an enabling function, a constraining function, or both. It can also play roles that lie somewhere in between, as illustrated by the examples of efforts in support of the proposed COVID-19 TRIPS waiver and the ongoing and future

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want with the full knowledge of the risks and benefits of the relevant treatment, subject to any limitations that meet the criteria of article 4 of the Covenant." (emphasis added)). *See generally* Rebecca Crootof, Margot E. Kaminski & W. Nicholson Price II, *Humans in the Loop*, 76 VAND. L. REV. 429 (2023) (discussing regulation of "human in the loop" systems); Aziz Z. Huq, *A Right to a Human Decision*, 106 VA. L. REV. 611 (2020) (discussing whether individuals have "right to a human decision"); Meg Leta Jones, *The Right to a Human in the Loop: Political Constructions of Computer Automation and Personhood*, 47 SOC. STUD. SCI. 216 (2017) (tracing historical roots of "[t]he right to a human in the loop" back to rights protecting dignity of data subjects).

[248] Xanthaki, *supra* note 79, ¶ 60.

[249] *Id.* ¶ 63.

[250] *See* General Comment No. 25, *supra* note 4, ¶ 73 ("[E]merging technologies might, on the one hand, enhance the enjoyment of economic, social and cultural rights. . . . On the other hand, these changes might intensify social inequalities by increasing unemployment and segregation in the labour market, and algorithms incorporated in artificial intelligence can reinforce discrimination, and so forth."); *see also id.* ¶ 74 ("[T]here are no easy solutions given the varied nature of these new technologies and their complex effects.").

development of generative AI. It is therefore important to recognize the multifaceted, nonbinary debate about the different functions of the right to science—and, by extension, other human rights.

IV. REFLECTIONS ON HUMAN RIGHTS STRATEGIES AND PRACTICES

The previous Part discusses the complex interplay between intellectual property and the right to science. Based on this discussion, one could draw helpful insights into the relationship between intellectual property and human rights. Developing a deeper understanding of this relationship is particularly important, given the human rights challenges brought about by the COVID-19 pandemic and the growing questions and issues raised by such fast-evolving technologies as genetic engineering, AI, and robotics. Although the discussion of the complex interplay between intellectual property and the right to science in the previous Part provides many reflections on human rights strategies and practices, this Part focuses on only three, due to brevity.

A. *Human Rights as Trump Cards*

The first reflection concerns the limitations of using human rights as trump cards in international intellectual property debates—whether they are about the right to research or access to medicines. The important role played by human rights and the rhetorical effects they generate[251] are sometimes comparable to invoking property rights in the United States. As Mary Ann Glendon observes: "In America, when we want to protect something, we try to get it characterized as a right. To a great extent, . . . when we *specially* want to hold on to something . . . , we try to get the object of our concern characterized as a property right."[252] Likewise, Canadian political scientist C.B. Macpherson declares, "We have made property so central to our society that any thing and any rights that are not property are very apt to take second place."[253] He goes

[251] *See* LAURA S. UNDERKUFFLER, THE IDEA OF PROPERTY: ITS MEANING AND POWER 65 (2003) ("A declaration of right clothes an interest with awesome rhetorical, political, and legal power."); Yu, *IPHR 2.0*, *supra* note 13, at 1430-31 (discussing how "a robust human rights discourse in the intellectual property area [can] provide the much-needed rhetorical force to help strengthen limitations, safeguards, and flexibilities in the intellectual property system"); *see also* Lisa Forman, *"Rights" and Wrongs: What Utility for the Right to Health in Reforming Trade Rules on Medicines?*, HEALTH & HUM. RTS. J., Dec. 2008, at 37, 45 ("Rights-based discourse, litigation, and action appear to have played significant roles in shifting policy, price, and perception around AIDS medicines."); Shaver, *Right to Read*, *supra* note 175, at 44 ("[A] human rights frame can help to rally human rights institutions and supporters to an issue.").

[252] MARY ANN GLENDON, RIGHTS TALK: THE IMPOVERISHMENT OF POLITICAL DISCOURSE 31 (1991).

[253] C.B. Macpherson, *Human Rights as Property Rights*, DISSENT, Winter 1977, at 72, 77.

even further to advocate for the treatment of "the right to a quality of life" as a property right, as opposed to "a human right separate from the property right."[254]

While it is understandable why people are eager to invoke human rights as trump cards, the previous Part has shown that the right to science can serve both an enabling function and a constraining function. This right can also play roles that fall somewhere in between. Thus, it remains unclear whether using the right to science—and, for that matter, other human rights—to support policy demands in the intellectual property arena will always provide substantial tactical advantages. Indeed, commentators and activists calling for greater public access in the intellectual property system have found disappointingly that the CESCR's general comments do not always take positions favoring such access. While *General Comment No. 17* emphasizes the need to strengthen the protection of authors, in particular their moral and material interests,[255] *General Comment No. 25* calls for greater regulation of technology when such development may not benefit society at large.[256]

Using human rights proactively as trump cards—or, worse, actively introducing new human rights—can be quite dangerous and may also create unintended consequences. First, commentators have warned against "conjuring up" new human rights, especially those that have yet to receive international consensus.[257] For instance, Philip Alston expressed concern that the continuous proclamation of new human rights would undermine both the fundamental nature of human rights and the integrity of the process of recognizing those

[254] *Id.*

[255] *See supra* notes 113 and 116-120 (discussing *General Comment No. 17* in relation to protection of author's moral and material interests).

[256] *See supra* text accompanying notes 121-128.

[257] *See* Philip Alston, *Conjuring Up New Human Rights: A Proposal for Quality Control*, 78 AM. J. INT'L L. 607, 607 (1984) (discussing "growing tendency on the part of a range of United Nations and other international bodies, including in particular the UN Commission on Human Rights, to proceed to the proclamation of new human rights without reference to the Assembly" and way that "the ease with which such innovation has been accomplished in these bodies has in turn encouraged or provoked the nomination of additional candidates . . . at such a rate that the integrity of the entire process of recognizing human rights is threatened"). Notwithstanding the need for caution in developing new human rights, commentators have called for new rights to improve human rights protection in the technology area. *See generally* HAOCHEN SUN, TECHNOLOGY AND THE PUBLIC INTEREST (2022) (using human and constitutional rights to promote corporate social responsibility among technology companies); Molly Land, *Toward an International Law of the Internet*, 54 HARV. INT'L L.J. 393, 396 (2013) (making case for use of "right to the technology of connection" to reorient the effect of technology on human rights); Shaver, *Right to Read*, *supra* note 175 (calling for creation of right to read); Haochen Sun, *Reinvigorating the Human Right to Technology*, 41 MICH. J. INT'L L. 279 (2020) (making case for human right to technology and calling for reformulation of right to science as collective right to advance this emergent right).

rights.[258] When the rights at issue have not achieved international consensus, they could also raise unnecessary tensions, conflicts, or even controversies that could backfire on human rights protections in general.[259]

Second, actively embracing human rights can create a right-based culture that could undermine efforts to reform the intellectual property system, such as through the development of new limitations and exceptions. As Carys Craig observes in the copyright context:

> The inherently individualizing and obfuscatory nature of right-based reasoning—whether employed in respect of authors, owners or users—has the potential to obscure the public interests, social values, and relationships that should inform copyright's development in the digital age. At the same time, the escalation of rights rhetoric in the copyright debate threatens to compound rather than to contest the moral or proprietary claims to right made o[n] behalf of copyright owners.[260]

Writing in a broader context, Professor Glendon laments how the proliferation of rights and the overreliance on "rights talk" will impoverish American democratic discourse.[261] As she observes, "[a] tendency to frame nearly every social controversy in terms of a clash of rights . . . impedes compromise, mutual understanding, and the discovery of common ground."[262]

Third, not every policymaker or commentator believes that reform to the intellectual property system should be taken externally—such as through the use of safeguards provided by international and regional human rights instruments. Indeed, some leading commentators strongly believe that problems in the intellectual property system are best addressed internally within the system. For example, Annette Kur, who co-led a multiyear research project seeking to

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[258] *See* Alston, *supra* note 257, at 614 (noting "UN organs will be under considerable pressure to proclaim new human rights without first having given adequate consideration to their desirability, viability, scope or form" and resulting "proliferation of new rights would be much more likely to contribute to a serious devaluation of the human rights currency than to enrich significantly the overall coverage provided by existing rights"); *see also* Shaver, *Right to Read*, *supra* note 175, at 44 (collecting sources that discuss problem of "'rights proliferation,' 'rights inflation,' or . . . 'overproduction'" in human rights context).

[259] *Cf.* GLENDON, *supra* note 252, at xi ("A rapidly expanding catalog of rights . . . multiplies the occasions for collisions . . . .").

[260] Carys J. Craig, *Globalizing User Rights-Talk: On Copyright Limits and Rhetorical Risks*, 33 AM. U. INT'L L. REV. 1, 8 (2017). Niva Elkin-Koren has offered a similar critique in relation to the Creative Commons licensing arrangement. *See* Niva Elkin-Koren, *What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 FORDHAM L. REV. 375, 378 (2005) ("[I]n the absence of a shared sense of free access, [Creative Commons'] reliance on property rights may strengthen the proprietary regime in creative works . . . [and] may actually reinforce the property discourse as a conceptual framework and a regulatory scheme for creative works.").

[261] *See generally* GLENDON, *supra* note 252.

[262] *Id.* at xi.

reform the TRIPS Agreement,[263] "remains uncomfortable in bringing doctrines from other international regimes to address problems in the intellectual property system."[264] As she and Henning Grosse Ruse-Khan observe in relation to the TRIPS Agreement: "[*I*]*nternalising* non-trade concerns into TRIPS appears to be a sensible way of ensuring greater coherence, security and predictability in the process of applying [intellectual property] rules. It may also provide more tailored solutions to potential conflicts and leave fewer open questions on how to resolve them."[265] To them, focusing on internal reform has noted strengths:

> [A]ccording to experience, interests which have to be imported from other (external) rule-systems to become part of the recognised context for interpretation cannot compete effectively with detailed "codifications" of [intellectual property] right holders' (or more generally: trade) interests. If properly drafted and implemented, internalisation of ceilings could thus lead to a more balanced international system of economic regulation, and would support synchronisation between distinct areas of public international law.[266]

To Professors Kur and Grosse Ruse-Khan and other similarly minded policymakers and commentators, internal reform within the intellectual property system will provide more coherence and effective adjustments than external reform.[267] After all, "the latter often implicate[s] differing justifications, concepts, values, and policy preferences" that are not currently found in the intellectual property system.[268]

B. *Different Balancing Processes*

The second reflection relates to the need for different balancing processes to address tensions and conflicts within the intellectual property system (such as between proprietary control and public access), between intellectual property

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[263] *See* INTELLECTUAL PROPERTY RIGHTS IN A FAIR WORLD TRADE SYSTEM: PROPOSALS FOR REFORM OF TRIPS 359, 377 (Annette Kur with Marianne Levin eds., 2011) [hereinafter FAIR WORLD TRADE SYSTEM] (providing recommendations from this project).

[264] Peter K. Yu, *An Intellectual Property Structural Engineer Extraordinaire and Her Lifelong Quest for Coherence*, *in* TRANSITION AND COHERENCE IN INTELLECTUAL PROPERTY LAW: ESSAYS IN HONOUR OF ANNETTE KUR 232, 239-40 (Niklas Bruun, Graeme B. Dinwoodie, Marianne Levin & Ansgar Ohly eds., 2021) [hereinafter Yu, *Structural Engineer*].

[265] Annette Kur & Henning Grosse Ruse-Khan, *Enough Is Enough—the Notion of Binding Ceilings in International Intellectual Property Protection*, *in* FAIR WORLD TRADE SYSTEM, *supra* note 263, at 359, 377.

[266] *Id.*

[267] *See* Yu, *Structural Engineer*, *supra* note 264, at 240 (noting concern that reform relying on use of external safeguards "will not only undermine the internal coherence of the intellectual property system, but may also generate new questions and unintended consequences").

[268] *Id.*

and human rights, and between various human rights (including the right to take part in cultural life, the right to science, and the right to the protection of interests resulting from intellectual productions).

Searching for balance is a common task in intellectual property law and "has been the subject of a perennial scholarly and policy debate,"[269] yet it is not a simple binary debate about whether to add or subtract rights. As Daniel Gervais reminds us, "balance . . . is not, contrary to what one often reads or hears in policy debates concerning intellectual property, a simple axis with rights holders at one end and users of intellectual property on the other."[270] How one balances the intellectual property system will vary considerably according to the form of intellectual property right, the type of economic sector, the location of the intellectual property system (whether the system resides in developed or developing countries), as well as culture, legal tradition, and other variants.[271]

When intellectual property rights are to be balanced against human rights, the balancing becomes even more complicated because "some aspects of intellectual property rights are recognized as human rights while the other aspects do not have any human rights basis."[272] Traditionally, policymakers, commentators, intergovernmental organizations, and NGOs have advocated for the application of the principle of human rights primacy to ensure that human rights will prevail over intellectual property rights and other economic rights.[273] Endorsed by the U.N. Subcommission on Human Rights in Resolution 2000/7 and reaffirmed in Resolution 2001/21, this principle subordinates the non-human-rights aspects of intellectual property rights to human rights obligations.[274] Such subordination is

[269] *Id.* at 232.

[270] Daniel J. Gervais, *TRIPS and Development*, *in* INTELLECTUAL PROPERTY, TRADE AND DEVELOPMENT: STRATEGIES TO OPTIMIZE ECONOMIC DEVELOPMENT IN A TRIPS-PLUS ERA 3, 49 (Daniel J. Gervais ed., 1st ed. 2007).

[271] *See* Yu, *IPHR 2.0*, *supra* note 13, at 1428 ("[B]alance cannot be struck without a deep and thorough understanding of the local environment.").

[272] Yu, *Anatomy*, *supra* note 3, at 54; *see also Special Rapporteur's Report on Copyright Policy*, *supra* note 209, ¶ 26 ("Some elements of intellectual property protection are indeed required—or at least strongly encouraged—by reference to the right to science and culture. Other elements . . . go beyond what the right to protection of authorship requires, and may even be incompatible with the right to science and culture."); Peter K. Yu, *Digital Copyright Enforcement Measures and Their Human Rights Threats*, *in* RESEARCH HANDBOOK ON HUMAN RIGHTS AND INTELLECTUAL PROPERTY 455, 461 (Christophe Geiger ed., 2015) (noting need to "engag[e] in a proper analysis of the conflicts between intellectual property rights and the non-human rights aspects of intellectual property rights"); Yu, *Nonmultilateral Era*, *supra* note 13, at 1048 (underscoring "the importance of distinguishing the human rights attributes of intellectual property rights from the non-human rights aspects of intellectual property protection").

[273] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1092-93 (discussing principle of human rights primacy).

[274] *See* Sub-Commission on Human Rights Res. 2000/7, U.N. Doc. E/CN.4/Sub.2/RES/2000/7, ¶¶ 3-4 (Aug. 17, 2000) (reminding governments "of the primacy

generally referred to as the "conflict approach."[275] As *General Comment No. 17* reminds us:

> Human rights are fundamental as they are inherent to the human person as such, whereas intellectual property rights are first and foremost means by which States seek to provide incentives for inventiveness and creativity, encourage the dissemination of creative and innovative productions, as well as the development of cultural identities, and preserve the integrity of scientific, literary and artistic productions for the benefit of society as a whole.[276]

Today, however, many human rights bodies and commentators recognize the complexities in the tensions and conflicts between intellectual property and human rights. Because intellectual property rights have both human-rights and non-human-rights aspects,[277] many commentators, myself included, find the use of the conflict approach alone unsatisfactory. Instead, one has to further separate the conflicts between human rights and intellectual property rights based on whether they are external or internal.[278] With respect to external conflicts, one could still use the conflict approach and apply the principle of human rights primacy.[279] With respect to internal conflicts, however, commentators and intergovernmental organizations have noted the need to develop new balancing approaches. As I stated in an earlier article:

> [Commentators] have discussed the distinction between true conflicts and false conflicts, drawing on conflict-of-law jurisprudence and scholarship. They have also explored the use of hierarchies, balancing techniques, the proportionality doctrine, and interpretations by reference to external norms—such as scientific norms in relation to the right to enjoy the benefits of scientific progress and its applications. In addition, the Ontario Human Rights Commission introduced a Policy on Competing Human Rights, which outlines a process for reconciling competing human rights claims

of human rights obligations over economic policies and agreements" and requesting them "to take international human rights obligations and principles fully into account in international economic policy formulation"); Sub-Commission on Human Rights Res. 2001/21, U.N. Doc. E/CN.4/Sub.2/RES/2001/21, ¶ 3 (Aug. 16, 2001).

[275] *See* Yu, *Ten Common Questions*, *supra* note 113, at 710 ("[T]he conflict approach views the two sets of rights as being in fundamental conflict . . . ."); *see also* Laurence R. Helfer, *Human Rights and Intellectual Property: Conflict or Coexistence?*, 5 MINN. INTELL. PROP. REV. 47, 48-49 (2003) (discussing conflict and coexistence approaches).

[276] General Comment No. 17, *supra* note 12, ¶ 1.

[277] *See supra* text accompanying note 272.

[278] For discussions of the distinction between internal and external conflicts, see Yu, *Nonmultilateral Era*, *supra* note 13, at 1091-96; Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1075-123; Yu, *Ten Common Questions*, *supra* note 113, at 711.

[279] *See supra* text accompanying notes 273-275.

> and providing case-by-case accommodation of individual and group rights.[280]

In an earlier work, I also outlined three distinct approaches that can be used to resolve these conflicts: (1) just remuneration; (2) core minimum; and (3) progressive realization.[281] "The just remuneration approach is ideal for situations involving an inevitable conflict between two human rights,"[282] such as those that can be addressed by issuing human-rights-based compulsory licenses.[283] By contrast, the core minimum approach "provides guidance on the minimum essential levels of protection a state has to offer to comply with its human rights obligations."[284] It recognizes the inevitable constraints created by a scarcity of natural and economic resources, which continue to pose challenges to the protection of economic, social, and cultural rights.[285] "Finally, the progressive realization approach offers insight into the non-competing relationship amongst the different rights protected in international or regional human rights treaties."[286] This approach enables protections for economic, social, and cultural rights to grow beyond what international and regional human rights treaties have recognized as minimum core obligations.[287]

When all of these conflict-resolution approaches are considered, one can see that human rights bodies, practitioners, and commentators deploy very different approaches from those taken by intellectual property policymakers and commentators. What works in the intellectual property field does not always work in the human rights field, and vice versa. In light of the wide contrasts between intellectual property and human rights approaches, one cannot help but wonder whether and what the two groups of practitioners can learn from each other.[288]

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[280] Yu, *Anatomy*, *supra* note 3, at 78-79 (footnotes omitted).

[281] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1094-123.

[282] Yu, *Ten Common Questions*, *supra* note 113, at 712.

[283] *See* Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1096-99 (discussing human-rights-based compulsory licenses); *see also Special Rapporteur's Report on the Right to Science*, *supra* note 45, ¶ 72 ("Initiatives to influence the actions of private companies for better realization of the right to science include 'socially responsible' or 'humanitarian' licensing . . . .").

[284] Yu, *Ten Common Questions*, *supra* note 113, at 712.

[285] *See infra* text and accompanying note 296.

[286] Yu, *Ten Common Questions*, *supra* note 113, at 712.

[287] As I noted in an earlier article: "Under the ICESCR, contracting parties are required to provide the 'minimum essential levels' of protection of all of the human rights covered. Once they have satisfied these minimum core obligations, they have to take 'deliberate, concrete and targeted' steps toward the full realization of the rights covered." Yu, *IPHR 2.0*, *supra* note 13, at 1420 (footnote omitted).

[288] *See id.* at 1428-30, 1432-33 (discussing how intellectual property discourse highlights challenges of balancing different types of rights in human rights regime and how human rights discourse highlights challenges of balancing different types of rights in intellectual property regime).

In the intellectual property field, for instance, many consider the conflicts between proprietary control and public access to be of different weight. The conflicts resemble the earlier discussion about the external conflict between human rights and the non-human-rights aspects of intellectual property rights.[289] If conflicts between proprietary control and public access arise, intellectual property policymakers and industries tend to privilege the protection and enforcement of intellectual property rights over efforts to conserve and enrich the public domain.[290] After all, as David Vaver reminds us in the copyright context, up until the early twentieth century, "[u]sers had plenty of rights because copyright owners had so few."[291] However, as intellectual property rights continued to expand in the past few decades—most notably after the adoption of the TRIPS Agreement—the default position privileging intellectual property rights over public access has been called into question from the standpoints of both human rights protection and intellectual property policy.[292] Indeed, the more policymakers, commentators, and intergovernmental bodies are willing to use human rights balancing approaches to address these two equally powerful competing interests, the more we can harness the intellectual property system to support those creative and inventive endeavors that are not undertaken by members of the intellectual property industries.

Similarly, human rights bodies, practitioners, and commentators can observe the more flexible approach in balancing the conflicts between proprietary control and public access in the intellectual property system. Although the prevailing wisdom is that human rights are absolute and are not to be balanced against each other,[293] the level of human rights protection varies significantly based on the

[289] *Cf.* David Vaver, *Copyright Defenses as User Rights*, 60 J. COPYRIGHT SOC'Y U.S.A. 661, 669 (2013) ("The idea that users have rights just as owners do and that users are equals whose rights deserve the same respect as owners' rights is of course anathema to copyright holders and those who act for them.").

[290] *See generally* JAMES BOYLE, THE PUBLIC DOMAIN: ENCLOSING THE COMMONS OF THE MIND (2008) (criticizing use of intellectual property rights to enclose public domain).

[291] David Vaver, *User Rights: Fair Use and Beyond*, 68 J. COPYRIGHT SOC'Y U.S.A. 337, 340 (2021).

[292] *See, e.g.*, *id.* at 339 ("Could not copyright itself plausibly be the exception, and freedom the rule? . . . Can copyright not be viewed as an island in a sea of user rights: the land stops where the sea begins?"); L. RAY PATTERSON & STANLEY F. BIRCH, JR., A UNIFIED THEORY OF COPYRIGHT (Craig Joyce ed., 2009), *in* 46 HOUS. L. REV. 215, 237 (2009) ("[C]opyright makes the most sense when viewed as a temporary marketing easement in material taken from the public domain, which leaves room for an easement of use by those to whom copies of the works are marketed."); Rochelle Cooper Dreyfuss, *TRIPS-Round II: Should Users Strike Back?*, 71 U. CHI. L. REV. 21, 27 (2004) ("User access did not need specific delineation when it was the background rule; only the exceptionalism of intellectual property rights required express definition. But if the new background is proprietary control, then the exceptionalism of user rights now needs to be embedded into positive law.").

[293] *But see* Yu, *IPHR 2.0*, *supra* note 13, at 1416 ("While human rights discussions are frequently framed in terms of absolutes, reality does call for greater recognition of the varying

type of rights protected.[294] In the United States, for example, the protection for civil and political rights tends to be stronger than the protection for economic, social, and cultural rights.[295] Moreover, as far as these rights are concerned, such as in situations involving the right to science, how they are implemented often depends on resources available to the country at issue.[296] To the extent that human rights practitioners are to implement the right to science using the progressive realization approach mentioned above and supported by article 22 of the UDHR and article 2 of the ICESCR,[297] these practitioners may be able to glean helpful insights from the way intellectual property practitioners balance conflicts between proprietary control and public access.

C. *Interrelationship Within Article 27 of the UDHR and Article 15(1) of the ICESCR*

The final reflection pertains to the importance of appreciating the interrelationship between the different human rights recognized in article 27 of the UDHR and article 15(1) of the ICESCR—namely, the right to take part in cultural life, the right to science, and the right to the protection of interests resulting from intellectual productions.[298]

There has been a longstanding debate about the appropriate approach to interpreting historical texts, such as the U.S. Constitution, the UDHR, and the

levels of human rights protection. Even among developed countries, significant variations exist with respect to the protection of different human rights.").

[294] *See id.* at 1433-34 (exploring "debate on a potential hierarchy of human rights"); *see also* Shaver, *Right to Read*, *supra* note 175, at 48 n.158 (collecting sources that discuss "hierarchy" of rights within international human rights regime). *See generally* HIERARCHY IN INTERNATIONAL LAW: THE PLACE OF HUMAN RIGHTS (Erika de Wet & Jure Vidmar eds., 2012) (collecting essays that discuss tensions and conflicts between human rights norms and obligations in other areas of law); Theodor Meron, *On a Hierarchy of International Human Rights*, 80 AM. J. INT'L L. 1 (1986) (discussing significance and implications of trend toward hierarchy of international human rights).

[295] *See generally* CASS R. SUNSTEIN, THE SECOND BILL OF RIGHTS: FDR'S UNFINISHED REVOLUTION AND WHY WE NEED IT MORE THAN EVER (2004) (discussing protection of economic, social, and cultural rights and lack thereof).

[296] *See* UDHR, *supra* note 1, art. 22 (stating "the economic, social and cultural rights indispensable for [one's] dignity and the free development of his personality" are to be realized "in accordance with the organization and resources of each State"); ICESCR, *supra* note 3, art. 2(1) (requiring each state party "to take steps . . . to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means, including particularly the adoption of legislative measures").

[297] *See* UDHR, *supra* note 1, art. 22; ICESCR, *supra* note 3, art. 2(1); *see also supra* text accompanying notes 286-287.

[298] UDHR, *supra* note 1, art. 27; ICESCR, *supra* note 3, art. 15(1).

ICESCR. Should we take the originalist approach,[299] or should we engage in dynamic or evolutive interpretation?[300] In the human rights context, evolutive interpretation is important. As Laurence Helfer and Graeme Austin explain:

> Human rights law and intellectual property law are both famously dynamic, readily adapting to changing circumstances through new rounds of treaty making, interpretations by international tribunals, and revisions of national laws. A framework that privileges the original understanding of Articles 27 and 15 fails to engage with this dynamism and with the evolutions in law, politics, social values, and technology that engendered these adaptations.[301]

After all, societies change, and historical texts that were developed shortly after the Second World War, such as the UDHR, may no longer meet our needs. Consider, for instance, the effort to strengthen the protection of traditional knowledge and traditional cultural expressions, including the recent adoption of the WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge.[302] The word "indigenous" is nowhere to be found in the UDHR, and the drafters of that declaration were highly sensitive to postwar colonial arrangements,[303] notwithstanding their "diverse cultural and religious backgrounds."[304] Even worse, these drafters did not value group rights the same way we do today.[305] By contrast, the U.N. Declaration on the Rights of

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[299] *See generally* ANTONIN SCALIA, A MATTER OF INTERPRETATION: FEDERAL COURTS AND THE LAW (Amy Gutmann ed., 1997) (providing originalist view of statutory interpretation).

[300] *See* Audrey R. Chapman & Sage Russell, *Introduction* to CORE OBLIGATIONS, *supra* note 24, at 1, 13 ("[H]uman rights standards evolve over time and in the direction of expansiveness."); *see also* M. MAGDALENA SEPÚLVEDA, THE NATURE OF THE OBLIGATIONS UNDER THE INTERNATIONAL COVENANT ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS 81-84 (2003) (discussing evolutive interpretation of human rights treaties).

[301] HELFER & AUSTIN, *supra* note 214, at 507.

[302] WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, WIPO Doc. GRATK/DC/7 (May 24, 2024). *See generally* PROTECTING TRADITIONAL KNOWLEDGE: THE WIPO INTERGOVERNMENTAL COMMITTEE ON INTELLECTUAL PROPERTY AND GENETIC RESOURCES, TRADITIONAL KNOWLEDGE AND FOLKLORE (Daniel F. Robinson, Ahmed Abdel-Latif & Pedro Roffe eds., 2017) (collecting essays that offer detailed analyses of efforts taken by WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore); Peter K. Yu, *WIPO Negotiations on Intellectual Property, Genetic Resources and Associated Traditional Knowledge*, 57 AKRON L. REV. 277 (2024) (discussing WIPO negotiations in run-up to adoption of new WIPO Treaty).

[303] *See* MORSINK, *supra* note 1, at 269-80 (noting historical memories, political circumstances, concerns of colonial powers, and lack of political organization had caused UDHR drafters to omit provision on right to protect minorities).

[304] Yu, *Reconceptualizing Intellectual Property Interests*, *supra* note 13, at 1143.

[305] *See* General Comment No. 17, *supra* note 12, ¶ 7 (pointing out, by using words such as "everyone," "he," and "author," "the drafters of [article 15(1)(c) of the ICESCR] seemed to have believed authors of scientific, literary or artistic productions to be natural persons, without at that time realizing that they could also be groups of individuals" (footnote

Indigenous Peoples, which the U.N. General Assembly adopted close to six decades later, clearly spells out the protection of Indigenous communities.[306] Article 31(1) of the Declaration provides:

> Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.[307]

It will therefore be a good idea to utilize this new instrument to improve the protection of Indigenous communities and their traditional knowledge and traditional cultural expressions. It will also be useful to update the interpretations of the UDHR and the ICESCR. Although *General Comment No. 17* recognizes that "the drafters of [article 15(1) of the ICESCR] seemed to have believed authors of scientific, literary or artistic productions to be natural persons, without at that time realizing that they could also be groups of individuals,"[308] it nonetheless calls on states to "adopt measures to ensure the effective protection of the interests of indigenous peoples relating to their productions, which are often expressions of their cultural heritage and traditional knowledge."[309] *General Comment No. 25* also devotes an entire section to the protection of the right to science in relation to traditional knowledge and Indigenous peoples.[310]

Notwithstanding the need to recognize the continuous adaptations in the international human rights system, there are benefits to viewing the obligations in this system in its historical context. As Rhona Smith observes, "[h]uman rights research can benefit from historical approaches to research. Understanding why things are as they are, learning from past experiences of a situation, identifying trends and providing perspectives on current issues are examples of the richness historical approaches can bring to human rights research."[311] In addition, studying human rights obligations in the historical

omitted)); Peter K. Yu, *Intellectual Property, Human Rights, and Methodological Reflections*, *in* HANDBOOK OF INTELLECTUAL PROPERTY RESEARCH: LENSES, METHODS, AND PERSPECTIVES 182, 190 (Irene Calboli & Maria Lillà Montagnani eds., 2021) ("When [the UDHR and the ICESCR] were drafted, group rights were underdeveloped, and their drafters did not have indigenous communities in mind.").

[306] G.A. Res. 61/295, Declaration on the Rights of Indigenous Peoples (Sept. 13, 2007).

[307] *Id.* art. 31(1).

[308] General Comment No. 17, *supra* note 12, ¶ 7 (footnote omitted).

[309] *Id.* ¶ 32.

[310] General Comment No. 25, *supra* note 4, ¶¶ 39-40.

[311] Rhona Smith, *Human Rights Based Approaches to Research*, *in* RESEARCH METHODS IN HUMAN RIGHTS 6, 12 (Lee McConnell & Rhona Smith eds., 2018).

context will help us "focus [our] attention on the slow but active evolution of human rights protection in the past few decades."[312] As Maria Green observes in her widely cited study of the drafting history of article 15(1)(c) of the ICESCR:

> In the context of modern human rights issues, articles 15(1)(b) and 15(1)(c) of the ICESCR raise very real questions of interpretation and implementation. We face a world with issues that the drafters of the ICESCR could never have envisaged, from an AIDS epidemic reigning in one part of the world while the drugs that could help are largely owned in another, to scientifically engineered non-reproducing crops, to scientists "bio-prospecting" for traditional knowledge whose ownership does not fit into existing patent definitions. Then, too, with the recent tying of intellectual property to trade law, international intellectual property rights have undergone a sea-change, becoming universal, compulsory, and enforceable in ways that were never dreamt of in the middle of the last century.[313]

Her observation focuses on the right to science and the right to the protection of interests resulting from intellectual productions in article 15(1)(b) and (c), respectively.[314]

More importantly, this Article argues that we may not need to worry too much about whether article 27 of the UDHR and article 15 of the ICESCR can adapt to the changing economic, social, cultural, and technological conditions. When article 27 was developed, the UDHR drafters had clearly engaged in debates reflecting the tensions and conflicts between intellectual property and human rights that continue today.[315] For instance, they explored the need to balance the three rights in article 27.[316] They also noted the special role played by intellectual property rights and addressed concerns about singling out creators and inventors as a special group for protection.[317] As a result, the three rights

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[312] Yu, *IPHR 2.0*, *supra* note 13, at 1417.

[313] Green, *supra* note 41, ¶ 44 (footnote omitted).

[314] *See id.*; *see also* ICESCR, *supra* note 3, art. 15(1)(b), (c).

[315] As Mikel Mancisidor observes:

> A careful reading of the background and the historical context of the Universal Declaration, supplemented by a study of the *travaux préparatoires*, will reveal to us that many of the debates, dilemmas, and challenges that we face today were already known in an inchoate form and discussed by our predecessors.

Mancisidor, *supra* note 26, at 17.

[316] *See supra* text accompanying notes 45-46.

[317] *See* MORSINK, *supra* note 1, at 220 (noting objection of U.S. delegate Eleanor Roosevelt and British delegate Geoffrey Wilson to inclusion of moral rights protection in René Cassin's draft of the UDHR and the observation from Indian delegate Hansa Metha and Wilson that "no special group should be singled out for attention"); *id.* at 221 (recounting British delegate Freda Corbet noted "[t]he declaration of human rights should be universal in nature and only recognize general principles that were valid for all men" and "copyright was dealt with by special legislation and in international conventions"); Yu, *Reconceptualizing Intellectual*

were drafted broadly so that they were both "at the same time mutually reinforcing and reciprocally limitative," as stated in *General Comment No. 17*.[318]

Moreover, given the fact that these three rights have close linkage to each other and should be read together as a collective whole, it may be useful to read article 27(1) as a clause instrumental in advancing the human rights interests protected under article 27(2), and vice versa.[319] In doing so, the intellectual property and human rights systems will be better developed to minimize tensions and conflicts between the right to take part in cultural life, the right to science, and the right to the protection of interests resulting from intellectual productions. The development in this area could also affect developments in other areas of the international human rights regime. As Special Rapporteur Shaheed observes, these three rights, when understood as a collective, "offer[] a particularly promising framework for reconciling the tensions between human rights and intellectual property laws."[320] By studying the complex interplay between the three rights in article 27 of the UDHR and article 15(1) of the ICESCR, we will be in a better position to respect, protect, and fulfill the different human rights in these two foundational instruments.

CONCLUSION

Through the CESCR's authoritative interpretation, the right to science has emerged as a potentially new development tool to help foster a more appropriate balance in the intellectual property and innovation systems. *General Comment No. 25* documents the negative human rights impacts of intellectual property rights, provides the normative support for pro-development efforts in the intellectual property arena, and reveals the potential complications for and hindrances to those efforts.[321] As seen in the contexts of the right to research, the COVID-19 TRIPS waiver, and generative AI, the interpretative comment also shows that the functions that the right to science can play fall within a continuum.[322] The right can play an enabling, discursive, or constraining function, or some or all of the above.

Property Interests, *supra* note 13, at 1052 (discussing inclusion of moral rights protection in René Cassin's draft of UDHR). *But see* Shaver, *Right to Science and Culture*, *supra* note 3, at 149 ("[T]he framers of Article 27 did not perceive a fundamental tension between its two elements because the state of copyright law at the time was markedly different from its condition today in ways that have important implications for the impact of copyright on public access.").

[318] General Comment No. 17, *supra* note 12, ¶ 4.

[319] *See* Peter K. Yu, *Intellectual Property and the Information Ecosystem*, 2005 MICH. ST. L. REV. 1, 18-19 (discussing need to read article 27(1) and 27(2) of UDHR as fulfilling two noncompeting objectives).

[320] *Special Rapporteur's Report on Patent Policy*, *supra* note 100, ¶ 5.

[321] *See* discussion *supra* Part II.

[322] *See* discussion *supra* Part III.

With the celebration of the UDHR's seventy-fifth anniversary in December 2023 and as we begin to prepare for new grand challenges at the global level—be it a new pandemic, danger posed by AI and AI-driven lethal autonomous weapons, or a climate-change-induced natural calamity—a deeper understanding of the right to science is in order. Although *General Comment No. 25* was released only a few years ago, many proposals seeking to implement this newly interpreted right have emerged.[323] If this Article can help bring the much-needed policy and scholarly attention to the many possible uses of the right to science in the intellectual property context, it will have done its job. It is my hope that this Article will not only deepen our understanding of the complex interplay between intellectual property and the right to science, but also spark a debate on how best to use this right to promote pro-development efforts in the intellectual property arena.

[323] *See* sources cited *supra* note 3.