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The Fundamental Right to Technology

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Waves of technological progress in recent decades have tremendously improved quality of life. Meanwhile, concerns about technology-driven injustices, such as unfair distribution of wealth and racial discrimination, have deepened. Experts have cautioned that new technologies could have potentially devastating effects, claiming for instance that artificial intelligence may lead to World War III. We are at a crossroads, and how we harness technology now will determine the future of humanity.

This Article presents a thought experiment, proposing that a new fundamental right to technology be recognized under the U.S. Constitution. Given that technology is of fundamental importance to human dignity and equality, this new constitutional right is designed to promote equitable distribution of technological benefits and to prevent harmful applications of technologies. This proposal is made with the hope that other countries may also recognize this fundamental right in constitutional law, ensuring global protection of the right to technology.

Based on an overview of fundamental rights protection under the U.S. Constitution, the Article first discusses how the U.S. Supreme Court has developed a liberal approach to identifying fundamental rights not enumerated by the Constitution. It then applies this liberal approach to a consideration of why the right to technology should be deemed an unenumerated fundamental right. This Article further canvasses how this new fundamental right would protect collective interests in technological benefits. It also explores how to resolve the potential tension between the Intellectual Property Clause and protection of the right to technology.

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"The identification and protection of fundamental rights is an enduring part of the judicial duty to interpret the Constitution. . . . The dynamic of our constitutional system is that individuals need not await legislative action before asserting a fundamental right."[1]

Justice Anthony Kennedy

I. INTRODUCTION

We are at a crossroads with respect to harnessing technology to determine the future of humanity. Waves of technological progress in recent decades have resulted in breakthroughs such as 3D printing, artificial intelligence ("AI"), new medicines, and renewable energy, among many others, tremendously improving our quality of life.[2] However, some technological breakthroughs have also raised serious concerns about their potentially devastating effects. For example, leading

1. Obergefell v. Hodges, 135 S. Ct. 2584, 2598, 2605 (2015).
2. *10 Breakthrough Technologies 2018*, MIT TECH. REV., https://www.technologyreview.com/lists/technologies/2018 (last visited Jan. 25, 2020).

experts have cautioned that the rapid development of AI may lead to World War III[3] or even bring about humanity's end.[4]

Humanity's future thus depends in large part on the betterment of technology justice.[5] How to address the deepening injustice caused by technological progress is a pressing issue confronting the United States.[6] Hence, it is high time to decide whether the general public or a small group of elites has the final say over distribution of the benefits of technological progress.

Against this backdrop, this Article argues that a new fundamental right to technology should be recognized under the U.S. Constitution.[7] Given that technology is of fundamental importance to human dignity and equality, the new constitutional right, as envisioned herein, is designed to promote equal distribution of the benefits of technological progress.[8]

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3. Ryan Browne, *Alibaba's Jack Ma Suggests Technology Could Result in a New World War*, CNBC (Jan. 25, 2019, 9:31 AM), https://www.cnbc.com/2019/01/23/alibaba-jack-ma-suggests-technology-could-result-in-a-new-world-war.html; Alex Hern, *Elon Musk Says AI Could Lead to Third World War*, THE GUARDIAN (Sept. 4, 2017, 6:58 AM), https://www.theguardian.com/technology/2017/sep/04/elon-musk-ai-third-world-war-vladimir-putin.

4. *See* BRETT FRISCHMANN & EVAN SELINGER, RE-ENGINEERING HUMANITY 1 (2018) ("As we collectively race down the path toward smart techno-social systems that efficiently govern more and more of our lives, we run the risk of losing ourselves along the way.").

5. *See* AMBER MIEKLE, TECHNOLOGY JUSTICE: A CALL TO ACTION 3, 7, 15, 19, 25 (2016), https://infohub.practicalaction.org/bitstream/handle/11283/593323/Technology%20Justice%20a%20call%20to%20action%20web%20links.pdf?sequence=9.

6. *See* FRANK PASQUALE, THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION 191-92 (2015) (arguing that the black box society is unjust because "[d]ata is becoming staggering in its breadth and depth, yet often the information most important to us is out of our reach, available only to insiders"); Noel Sharkey, *End Technological Injustice! Is Your Face Safe?*., FORBES (Dec. 11, 2018, 10:44 AM), https://www.forbes.com/sites/noelsharkey/2018/12/11/end-technological-injustice-make-the-safe-face-pledge-today/#754275769af8 ("Everywhere new technology is being exploited to oppress the already oppressed. Whether you're a woman, poor, an ethnic minority or just from the wrong side of the zip code, there's an algorithm to oppress you."); Gillian Tett, *The Digital World's Other Equality Problem*, FIN. TIMES (Nov. 22, 2013), https://www.ft.com/content/5d444c84-523d-11e3-8c42-00144feabdc0.

7. Several articles published online have suggested creating a constitutional right to technology. But the nature of that right entirely differs from that of the fundamental right to technology I propose in this Article. For articles discussing the constitutional right to technology see Marc Jonathan Blitz, *A Constitutional Right to Use Thought-Enhancing Technology*, *in* COGNITIVE ENHANCEMENT: ETHICAL AND POLICY IMPLICATIONS IN INTERNATIONAL PERSPECTIVES 293, 297 (Fabrice Jotterand & Veljko Dubljević eds., 2016); Nancy Leong, *Constitutional Rights in the Digital Age*, HUFFPOST (Sept. 18, 2014, 4:22 PM), https://www.huffpost.com/entry/constitutional-rights-in-first-amendment_b_5601216; David Rothkopf, *Is Unrestricted Internet Access a Modern Human Right?*, FOREIGN POL'Y (Feb. 2, 2015, 11:26 AM), https://foreignpolicy.com/2015/02/02/unrestricted-internet-access-human-rights-technology-constitution; *Time to Recognize Technology as a Constitutionally Protected Right*, CANADIAN LAWYER (Feb. 9, 2015), https://www.canadianlawyermag.com/author/na/time-to-recognize-technology-as-a-constitutionally-protected-right-2773.

8. *See infra* Part III.B.

To date, the U.S. courts have relied on the fundamental rights to free speech, to bear arms, and to property in dealing with critical cases pertaining to law and technology.[9] For example, the Supreme Court has prohibited injustices arising from the use of speech-censoring technologies on the basis of the First Amendment.[10] The lower courts have dealt with an array of cases concerned with issues of law and technology justice, ranging from the use of 3D printers to manufacture guns[11] to police requests for cell-site location information[12] and for cell phone owners to reveal their passcodes.[13] Should such hard cases appear before the Supreme Court, it would likely tackle them by resorting to the First, Second, and Fifth Amendments, according to some commentators.[14]

This Article shows that a fundamental right to technology offers an alternative approach to dealing with technology-related issues under constitutional law. It considers how the Due Process Clause of the Fourteenth Amendment could protect this fundamental right to technology as a new liberty. Such a right would allow the Constitution to keep pace with legal demands created by new technologies and enable courts to tackle new forms of injustice arising from them.[15]

My proposal to create a new fundamental right to technology makes three original contributions to the discourse on law, technology, and

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9. *See infra* notes 10-14 and accompanying text.

10. Elonis v. United States, 135 S. Ct. 2001, 2006, 2011-12 (2015); United States v. Am. Library Ass'n, 539 U.S. 194, 205-06 (2003).

11. Washington v. U.S. Dep't of State, 318 F. Supp. 3d 1247, 1251, 1263-64 (W.D. Wash. 2018); *see also* Gina Martinez, *Why the Legal Battle over 3D-Printed Guns May Prove Futile*, TIME (Aug. 1, 2018), http://time.com/5354963/3d-printed-guns-hard-to-stop.

12. Carpenter v. United States, 138 S. Ct. 2206, 2217-20 (2018); *see also* Adam Liptak, *In Ruling on Cellphone Location Data, Supreme Court Makes Statement on Digital Privacy*, N.Y. TIMES (June 22, 2018), https://www.nytimes.com/2018/06/22/us/politics/supreme-court-warrants-cell-phone-privacy.html.

13. *In re* Grand Jury Investigation, 88 N.E.3d 1178, 1180 (Mass. App. Ct. 2017); *see also* Tim Cushing, *Another Court Says Compelled Password Production Doesn't Violate the Fifth Amendment*, TECHDIRT (Dec. 18, 2017, 1:29 PM), https://www.techdirt.com/articles/20171214/09340938810/another-court-says-compelled-password-production-doesnt-violate-fifth-amendment.shtml.

14. *See* S.M., *The Supreme Court Takes a Public-Access TV Case*, ECONOMIST (Oct. 17, 2018), https://www.economist.com/democracy-in-america/2018/10/17/the-supreme-court-takes-a-public-access-tv-case ("*Manhattan Community Access Corp. v. Halleck*. At first glance, the case looks like a minor dispute between a local cable station and a pair of aggrieved videographers whose work was banned from the airwaves. But the conflict goes to the heart of a fraught area of First Amendment law that could have significant implications for media companies—from Twitter to National Public Radio—that curate content on their platforms."); Laurence H. Tribe & Joshua Matz, *How the New Supreme Court May Tackle Tech's Big Questions*, WIRED (Feb. 6, 2017, 7:00 AM), https://www.wired.com/2017/02/new-supreme-court-may-tackle-techs-big-questions; Danny Yadron et al., *Apple Accuses FBI of Violating Constitutional Rights in iPhone Battle*, GUARDIAN (Feb. 25, 2016, 4:18 PM), https://www.theguardian.com/technology/2016/feb/25/apple-fbi-iphone-encryption-request-response.

15. *See infra* Part II.

justice. First, such a right would revitalize the Constitution and enable the courts to rely upon it in tackling new forms of injustice arising from technological breakthroughs. This Article identifies technology-based discrimination as a new form of injustice in which conventional fundamental rights lack the constitutional basis to intervene.[16] It is concerned with the unfair distribution of the benefits of technological progress through the administrative and legislative actions of the government.[17] This Article further demonstrates how the Due Process Clause of the Fourteenth Amendment would empower the new fundamental right to technology to deal with such discrimination and the injustices it causes.[18]

Technology justice is also an issue for the international community.[19] The Universal Declaration of Human Rights ("UDHR") established the human right to technology in 1948, stating that "[e]veryone has the right . . . to share in scientific advancement and its benefits."[20] However, more than seventy years later, this human right remains obscure, dormant, and ineffective.[21] This Article proposes a constitutional, rights-based

16. *See infra* Part IV.A.

17. *See infra* Part IV.A.

18. *See infra* Part III.B.2.

19. UNITED NATIONS ESCAP, INEQUALITY IN ASIA AND THE PACIFIC IN THE ERA OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT 62-77 (2018), https://www.unescap.org/sites/default/files/publications/ThemeStudyOnInequality.pdf; Erik Brynjolfsson et al., *New World Order: Labor, Capital, and Ideas in the Power Law Economy*, FOREIGN AFF. (July/Aug. 2014), https://www.foreignaffairs.com/articles/united-states/2014-06-04/new-world-order (arguing that "superstar-based technical change . . . is upending the global economy"); Cory Doctorow, *Technology Is Making the World More Unequal. Only Technology Can Fix This*, THE GUARDIAN (May 31, 2017, 4:00 AM), https://www.theguardian.com/inequality/2017/may/31/technology-is-making-the-world-more-unequal-only-technology-can-fix-this-cory-doctorow; Wim Naudé & Paula Nagler, *Is Technological Innovation Making Society More Unequal?*, UNITED NATIONS U. (Dec. 21, 2016), https://unu.edu/publications/articles/is-technological-innovation-making-society-more-unequal.html; Zia Qureshi, *Globalization, Technology, and Inequality: It's the Policies, Stupid*, BROOKINGS (Feb. 16, 2018), https://www.brookings.edu/blog/up-front/2018/02/16/globalization-technology-and-inequality-its-the-policies-stupid; Jeremy Williams, *How Digital Technology Drives Inequality*, EARTHBOUND REP. (Oct. 11, 2017), https://earthbound.report/2017/10/11/how-digital-technology-drives-inequality.

20. G.A. Res. 217 (III) A, Universal Declaration of Human Rights, at 76 (Dec. 10, 1948).

21. Yvonne Donders, *The Right to Enjoy the Benefits of Scientific Progress: In Search of State Obligations in Relation to Health*, 14 MED. HEALTH CARE & PHIL. 371, 371 (2011), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3190088 ("After having received little attention over the past decades, one of the least known human rights provisions in international human rights law—the right to enjoy the benefits of scientific progress and its applications—has had its dust blown off.") (citations omitted); Jessica M. Wyndham & Margaret Weigers Vitullo, *Why the Right to Science Matters for Everyone*, OPENDEMOCRACY (Apr. 20, 2017), https://www.opendemocracy.net/jessica-m-wyndham-margaret-weigers-vitullo/why-right-to-science-matters-for-everyone ("Although nearly 70 years have passed since this right to science was first [articulated], the implications of the right and its meaning for individuals and governments have never been fully articulated.").

approach to address the global neglect of the human right to technology.[22] Such an approach would not only raise awareness of the public's collective interest in technology but also encourage individual members of the public to take legal action to assert their fundamental right to technology under the U.S. Constitution. The involvement of the U.S. courts in adjudicating such legal disputes would enhance the protection afforded by the new right. Were the proposed constitutional, rights-based approach to be adopted by other countries, it would ultimately usher in a global revolution in protecting the human right to technology.

The fundamental right to technology also offers a novel means of addressing the tension between intellectual property ("IP") protection and distributive justice. This Article argues that a core problem with the IP Clause of the U.S. Constitution[23] is its protection of IP rights without considering how to distribute the benefits of technological progress equitably. In creating distributive justice mandates, the fundamental right to technology would require that legislators and judges take seriously the public's collective interests in its benefits, and, accordingly, reshape IP legislation and adjudication to render them more conducive to the equal distribution of these benefits.

The remainder of this Article proceeds as follows. Based on an overview of fundamental rights protection under the U.S. Constitution, Part II discusses how the U.S. Supreme Court has developed a liberal approach to identifying fundamental rights not enumerated by the Constitution.[24] Part III applies this liberal approach to a consideration of why the right to enjoy technological benefits should be deemed an unenumerated fundamental right.[25] It further canvasses how this new fundamental right would protect collective interests in technological benefits.[26] Part IV explores how to resolve the potential tension between the IP Clause and protection of the right to technology.[27]

22. *See infra* Part III.

23. The IP Clause empowers Congress "[t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." U.S. CONST. art. I, § 8, cl. 8.

24. *See infra* Part II.

25. *See infra* Part III.

26. *See infra* Part III.

27. *See infra* Part IV.

II. THE LIBERAL APPROACH TO FUNDAMENTAL RIGHTS PROTECTION

A. *Constitutional Bases for Fundamental Rights*

Under the U.S. Constitution, some liberties are so important that they can be deemed fundamental rights.[28] The Constitution guards against any encroachment upon such rights unless the government provides compelling reasons for doing so.[29] The first ten Amendments of the Constitution, known as the Bill of Rights, enumerate certain fundamental rights, such as freedom of expression and religion, the right to keep and bear arms, freedom from unreasonable searches and seizures, and the right to property.[30]

The Constitution also allows courts to recognize unenumerated fundamental rights as liberties protected by the Due Process Clause of the Fourteenth Amendment.[31] The Clause prescribes that no State shall "deprive any person of life, liberty, or property, without due process of law."[32] To follow this constitutional mandate, courts circumspectly analyze whether an unenumerated right constitutes a liberty deserving due process protection as a fundamental constitutional right.[33] For example, nothing in the text of the Constitution expressly protects marriage as a fundamental right. Yet, the Supreme Court has ventured to interpret marriage as a liberty that merits due process protection and therefore should be identified and protected as an unenumerated fundamental

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28. *See* ERWIN CHEMERINSKY, CONSTITUTIONAL LAW: PRINCIPLES AND POLICIES 812 (4th ed. 2011).

29. *See* Regents of the Univ. of Cal. v. Bakke, 438 U.S. 265, 357 (1978) (Brennan, White, Marshall, & Blackmun, JJ., concurring in the judgment in part and dissenting in part) ("[A] government practice or statute which restricts 'fundamental rights' . . . is to be subjected to 'strict scrutiny' and can be justified only if it furthers a compelling government purpose and, even then, only if no less restrictive alternative is available.").

30. U.S. CONST. amends. I, II, IV, V; *see* Planned Parenthood of Se. Pa. v. Casey, 505 U.S. 833, 847 (1992) ("The most familiar of the substantive liberties protected by the Fourteenth Amendment are those recognized by the Bill of Rights."); Gitlow v. New York, 268 U.S. 652, 666 (1925) ("[F]reedom of speech and of the press—which are protected by the First Amendment from abridgment by Congress—are among the fundamental personal rights and 'liberties' protected by the due process clause of the Fourteenth Amendment from impairment by the States.").

31. U.S. CONST. amend. XIV; *see* Griswold v. Connecticut, 381 U.S. 479, 486 (1965) (Goldberg, J., concurring) ("[T]he concept of liberty protects those personal rights that are fundamental, and is not confined to the specific terms of the Bill of Rights.").

32. U.S. CONST. amend. XIV, § 1.

33. *See, e.g.*, *Planned Parenthood*, 505 U.S. at 926-27 (Blackmun, J., concurring in part, concurring in judgment in part, and dissenting in part) ("[T]he fundamental right of privacy protects citizens against governmental intrusion in such intimate family matters as procreation, childrearing, marriage, and contraceptive choice."); *Griswold*, 381 U.S. at 488 (Goldberg, J., concurring) ("[T]here are additional fundamental rights, protected from governmental infringement, which exist alongside those fundamental rights specifically mentioned in the first eight constitutional amendments.").

right.[34] In *Loving v. Virginia*,[35] the Supreme Court struck down a statute that prohibited interracial marriage, declaring that "[t]he freedom to marry has long been recognized as one of the vital personal rights essential to the orderly pursuit of happiness by free men."[36] Because the statute in question prejudiced freedom of marriage—"one of the 'basic civil rights of man,' fundamental to our every existence and survival"[37]—the statute "surely . . . deprive[d] all the State's citizens of liberty without due process of law."[38]

The Supreme Court has embraced the identification and protection of unenumerated fundamental rights as one of its core duties.[39] Over the course of a century of adjudication, rights so identified and protected in addition to the right to marriage[40] include the right to interstate travel[41] and the right to parent one's children,[42] among others.

The way in which the Supreme Court identifies fundamental rights "has not been reduced to any formula."[43] Rather, it has stated that it is necessary to vigilantly identify and justify individual interests that are so fundamental that the government must afford them adequate protection.[44] This recognition process follows broad constitutional principles.[45]

B. A Liberal Approach to Protecting Fundamental Rights

Through a series of watershed cases, the Supreme Court has harnessed and developed a liberal approach to interpreting the nature and scope of liberties protected by the Due Process Clause as unenumerated fundamental rights. This approach dynamically improves the separation of powers by shedding new light on the role of the judiciary in protecting fundamental rights, and revitalizes constitutional commitments to

34. *Griswold*, 381 U.S. at 495 (Goldberg, J., concurring).

35. 388 U.S. 1 (1967).

36. *Id.* at 12.

37. *Id.*

38. *Id.*

39. Obergefell v. Hodges, 135 S. Ct. 2584, 2598 (2015) ("The identification and protection of fundamental rights is an enduring part of the judicial duty to interpret the Constitution."); *see also* Washington v. Glucksberg, 521 U.S. 702, 759, 772 (1997) (Souter, J., concurring) ("After the ratification of the Fourteenth Amendment, with its guarantee of due process protection against the States, interpretation of the words 'liberty' and 'property' as used in Due Process Clauses became a sustained enterprise, with the Court generally describing the due process criterion in converse terms of reasonableness or arbitrariness.").

40. *Loving*, 388 U.S. at 12.

41. Saenz v. Roe, 526 U.S. 489, 501 (1999).

42. Troxel v. Granville, 530 U.S. 57, 66 (2000).

43. Poe v. Ullman, 367 U.S. 497, 542 (1961) (Harlan, J., dissenting).

44. *Obergefell*, 135 S. Ct. at 2598.

45. *Id.* ("That process is guided by many of the same considerations relevant to analysis of other constitutional provisions that set forth broad principles rather than specific requirements.").

protecting interests that are of the utmost value to individuals and society as a whole. The liberal approach to identifying unenumerated fundamental rights embodies three major components.

First, the liberal approach advocates a dynamic interpretation of the nature and scope of liberty protected by the Due Process Clause, which empowers courts to identify unenumerated fundamental rights. Starting with its *Meyer v. Nebraska*[46] decision in 1923, the Supreme Court attempted to provide a sweeping definition of liberty under the Due Process Clause.[47] Drawing on its previous rulings on the Clause, the Court stated that liberty

> denotes not merely freedom from bodily restraint but also the right of the individual to contract, to engage in any of the common occupations of life, to acquire useful knowledge, to marry, establish a home and bring up children, to worship God according to the dictates of his own conscience, and generally to enjoy those privileges long recognized at common law as essential to the orderly pursuit of happiness by free men.[48]

Liberty, according to this statement, has two dimensions. First, it protects bodily integrity, shielding individuals against harm caused to their bodies.[49] Second, liberty allows individuals to choose actions that are essential to their achievement of happiness in orderly societies.[50] Despite providing such a broad-based definition, the Court took a common law approach to protecting those liberties so long as they were recognized as privileges.[51] It did not, however, expressly elevate those liberties to fundamental rights directly pursuant to the Due Process Clause.[52]

Justice Harlan's dissenting opinion in *Poe v. Ullman*[53] in 1961 marks a critical turning point for the Supreme Court's jurisprudence of fundamental rights protection[54]:

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46. 262 U.S. 390 (1923).

47. *Id.* at 399.

48. *Id.*

49. Then-Judge Cardozo argued that "[e]very human being of adult years and sound mind has a right to determine what shall be done with his own body" in relation to his medical needs. Schloendorff v. Soc'y of N.Y. Hosp., 105 N.E. 92, 93 (N.Y. 1914).

50. *See Meyer*, 262 U.S. at 401, 403.

51. *Id.* at 400 ("[Plaintiff's] right to teach and the right of parents to engage him so to instruct their children, we think, are within the liberty of the amendment.").

52. *See* Laurence H. Tribe, Lawrence v. Texas*: The "Fundamental Right" That Dare Not Speak Its Name*, 117 HARV. L. REV. 1893, 1934 (2004).

53. 367 U.S. 497, 522 (1961) (Harlan, J., dissenting).

54. *See, e.g.*, Moore v. City of East Cleveland, 431 U.S. 494, 544-45 (1977) (White, J., dissenting) ("[N]o one was more sensitive than Mr. Justice Harlan to any suggestion that his approach to the Due Process Clause would lead to judges 'roaming at large in the constitutional field.'").

> [T]he full scope of the liberty guaranteed by the Due Process Clause cannot be found in or limited by the precise terms of the specific guarantees elsewhere provided in the Constitution. This "liberty" is not a series of isolated points pricked out in terms of the taking of property; the freedom of speech, press, and religion; the right to keep and bear arms; the freedom from unreasonable searches and seizures; and so on. It is a rational continuum which, broadly speaking, includes a freedom from all substantial arbitrary impositions and purposeless restraints . . . .[55]

This opinion asserts a broad and dynamic understanding of the nature and scope of the liberty protected by the Due Process Clause. It forthrightly affirms that the constitutional protection of the Due Process Clause stretches to fundamental rights not specifically identified by the Constitution.[56] This is because liberty, according to Justice Harlan, is a broad-based concept not confined to the rights itemized by the Constitution.[57] Instead, it is a "rational continuum" that confers upon courts the judicial power to recognize new fundamental rights.

Relying on this robust understanding of liberty, the Supreme Court revolutionized constitutional rights protection by elevating privacy and abortion to the status of unenumerated fundamental rights.[58] The Court in *Roe v. Wade*,[59] while acknowledging that the Constitution is silent on the right to privacy, held that privacy should be deemed a liberty under the Due Process Clause and therefore protected as a fundamental right.[60] It further founded women's fundamental right to abortion upon the right to privacy, ruling that the latter "is broad enough to encompass a woman's decision whether or not to terminate her pregnancy."[61] In other words, the right to abortion entitles women to make decisions for their privacy interests. Without protection of this right to abortion, women could suffer severe physical and psychological harm.[62]

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55. *Poe*, 367 U.S. at 543 (Harlan, J., dissenting).

56. *Id.*

57. *Id.* at 544, 549-52.

58. *See infra* notes 59-62 and accompanying text.

59. 410 U.S. 113 (1973).

60. *Id.* at 152-53 ("[O]nly personal rights that can be deemed 'fundamental' or 'implicit in the concept of ordered liberty,' are included in this guarantee of personal privacy . . . . This right of privacy . . . [is] founded in the Fourteenth Amendment's concept of personal liberty and restrictions upon state action . . . .") (citation omitted).

61. *Id.* at 153.

62. *Id.* ("The detriment that the State would impose upon the pregnant woman by denying this choice altogether is apparent. Specific and direct harm medically diagnosable even in early pregnancy may be involved. Maternity, or additional offspring, may force upon the woman a distressful life and future. Psychological harm may be imminent. Mental and physical health may be taxed by child care. There is also the distress, for all concerned, associated with the unwanted child, and there is the problem of bringing a child into a family already unable, psychologically and otherwise, to care for

Second, by applying the liberal approach, the Supreme Court posits that reasoned judgment must be applied in determining what personal interests of utmost value to individuals could amount to unenumerated fundamental rights.[63] This reasoned judgment standard can be traced back to Justice Harlan's dissenting opinion in *Poe v. Ullman*,[64] where he stated that the liberty protected by the Due Process Clause "recognizes, what a reasonable and sensitive judgment must, that certain interests require particularly careful scrutiny of the state needs asserted to justify their abridgment."[65] Later in *Planned Parenthood of Southeastern Pennsylvania v. Casey*,[66] the Supreme Court spelled out how reasoned judgment should be applied to determine whether an unenumerated right could be recognized as a liberty that merits due process protection.[67] This interpretive process, as the Court pointed out, is intended to "define the liberty of all" rather than enforce the judges' "moral code."[68] Guided by this caveat, the Court explicated its reasoning in defining the nature of the liberty that triggers fundamental rights protection:

> [Matters] involving the most intimate and personal choices a person may make in a lifetime, choices central to personal dignity and autonomy, are central to the liberty protected by the Fourteenth Amendment. At the heart of liberty is the right to define one's own concept of existence, of meaning, of the universe, and of the mystery of human life. Beliefs about these matters could not define the attributes of personhood were they formed under compulsion of the State.[69]

Following this choice-oriented conception of liberty, the Court considered various reasons why prohibition of abortion severely harmed women's dignity and autonomy in controlling and enjoying their lives.[70]

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it. In other cases, as in this one, the additional difficulties and continuing stigma of unwed motherhood may be involved. All these are factors the woman and her responsible physician necessarily will consider in consultation.").

63. *See infra* notes 64-96 and accompanying text.

64. 367 U.S. 497 (1961).

65. *Id.* at 543 (Harlan, J., dissenting); *see also* Washington v. Glucksberg, 521 U.S. 702, 769 (1997) (Souter, J., concurring) ("The *Poe* dissent . . . reminds us that the process of substantive review [is] by reasoned judgment.").

66. 505 U.S. 833 (1992).

67. *Id.* at 834 ("[T]he adjudication of substantive due process claims may require this Court to exercise its reasoned judgment in determining the boundaries between the individual's liberty and the demands of organized society.").

68. *Id.* at 850 ("Our obligation is to define the liberty of all, not to mandate our own moral code.").

69. *Id.* at 851.

70. *Id.* at 852 ("The mother who carries a child to full term is subject to anxieties, to physical constraints, to pain that only she must bear. That these sacrifices have from the beginning of the human race been endured by woman with a pride that ennobles her in the eyes of others and gives to the infant a bond of love cannot alone be grounds for the State to insist she make the sacrifice. Her

Given that decisions on abortion are so fundamental to women's interests, abortion must be protected as a fundamental right allowing women to choose the personal and social life that they wish to live.[71]

Later in *Lawrence v. Texas*,[72] the Supreme Court also applied the reasoned judgment standard to justify homosexuals' fundamental right to consensual sodomy.[73] Liberty, according to the Court, protects personal freedom in two dimensions.[74] Physically, it shields the boundaries of private spaces, preventing unwarranted interferences by the government.[75] Mentally, it affords individuals the autonomy to choose what they wish to do.[76] Relying upon *Casey*'s choice-oriented characterization of liberty,[77] the Court invalidated the anti-sodomy law of Texas on the ground that it prevented homosexuals from enjoying the same autonomy to engage in intimate acts as heterosexuals.[78]

The Supreme Court recently reaffirmed this jurisprudence on the recognition of fundamental rights when it tackled same-sex marriage.[79] In *Obergefell v. Hodges*,[80] the Court took pains to identify the right to marriage as of fundamental importance to all, stating that "[c]hoices about marriage shape an individual's destiny. . . . [B]ecause 'it fulfils yearnings for security, safe haven, and connection that express our common humanity, civil marriage is an esteemed institution, and the decision whether and whom to marry is among life's momentous acts of self-definition.'"[81]

Third, the Supreme Court has also reinforced the justification for the constitutional protection of unenumerated fundamental rights on the basis of societal interests. If a constitutional right is central to achieving larger

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suffering is too intimate and personal for the State to insist, without more, upon its own vision of the woman's role, however dominant that vision has been in the course of our history and our culture.").

71. *Id.* ("The destiny of the woman must be shaped to a large extent on her own conception of her spiritual imperatives and her place in society.").

72. 539 U.S. 558 (2003).

73. *Id.* at 564-65, 574, 578-79.

74. *See infra* notes 75-76 and accompanying text.

75. *Lawrence*, 539 U.S. at 567, 578.

76. *Id.* at 562 ("Liberty protects the person from unwarranted government intrusions into a dwelling or other private places. In our tradition the State is not omnipresent in the home. And there are other spheres of our lives and existence, outside the home, where the State should not be a dominant presence. Freedom extends beyond spatial bounds. Liberty presumes an autonomy of self that includes freedom of thought, belief, expression, and certain intimate conduct. The instant case involves liberty of the person both in its spatial and in its more transcendent dimensions.").

77. *Id.* at 573-74.

78. *Id.* at 574 ("Persons in a homosexual relationship may seek autonomy for these purposes, just as heterosexual persons do. The decision in *Bowers* would deny them this right.").

79. *See infra* notes 80-81 and accompanying text.

80. 135 S. Ct. 2584 (2015).

81. *Id.* at 2599 (quoting *Goodridge v. Department of Public Health*, 798 N.E.2d 941, 955 (Mass. 2003)).

interests in maintaining a free and ordered society, it could be recognized as a fundamental right. According to Justice Harlan's dissenting opinion in *Poe v. Ullman*,[82] the identification and protection of fundamental rights through the Due Process Clause must be weighed with "the demands of organized society."[83] He indicated that fundamental rights should be rooted in societal interests, without which those rights would hallow in symbolic and practical value.[84] Similarly, the majority opinion in *Obergefell v. Hodges*[85] treats societal interest as another justification for marriage as a fundamental right. Citing Tocqueville's view[86] and the Supreme Court's *Maynard v. Hill*[87] ruling, the Court in *Obergefell* states that "marriage is a keystone of our social order."[88] It further discusses ways in which marriage as a public institution plays a fundamental role in maintaining the legal and social order by allocating benefits and responsibilities to married couples.[89] Relying on the social justification posited by *Obergefell*, the U.S. District Court for the District of Oregon recently rendered a pathbreaking decision on environmental protection.[90] The Court identified "the right to a climate system capable of sustaining human life" as a fundamental right under the Due Process Clause because of this right's fundamental role in maintaining a free and ordered society.[91]

With these three interpretive methods, the liberal approach defies the originalist approach. The latter asserts that any fundamental right must be "deeply rooted in this Nation's history and tradition,"[92] rendering the meaning of "liberty" fixed and static under the Due Process Clause. On

82. 367 U.S. 497, 522 (1961) (Harlan, J., dissenting).

83. *Poe*, 367 U.S. at 542 (Harlan, J., dissenting) ("The best that can be said is that through the course of this Court's decisions it has represented the balance which our Nation, built upon postulates of respect for the liberty of the individual, has struck between that liberty and the demands of organized society.").

84. *See Poe*, 367 U.S. at 542 (Harlan, J., dissenting).

85. 135 S. Ct. 2584 (2015).

86. *Obergefell*, 135 S. Ct., at 2601 ("[W]hen the American retires from the turmoil of public life to the bosom of his family, he finds in it the image of order and of peace. . . . [H]e afterwards carries [that image] with him into public affairs.") (citing ALEXIS DE TOCQUEVILLE, 1 DEMOCRACY IN AMERICA 304 (Phillips Bradley ed., Henry Reeve transl., Vintage Books ed. 1990) (1945)).

87. 125 U.S. 190, 211, 213 (1888) (holding that marriage is "the foundation of the family and of society, without which there would be neither civilization nor progress" and also stating that marriage is "a great public institution, giving character to our whole civil polity").

88. *Obergefell*, 135 S. Ct. at 2601.

89. *Id.* ("[J]ust as a couple vows to support each other, so does society pledge to support the couple, offering symbolic recognition and material benefits to protect and nourish the union. . . . The States have contributed to the fundamental character of the marriage right by placing that institution at the center of so many facets of the legal and social order.").

90. *See* Juliana v. United States, 217 F. Supp. 3d 1224, 1250 (D. Or. 2016).

91. *Id.*

92. Washington v. Glucksberg, 521 U.S. 702, 703 (1997) (quoting Moore v. East Cleveland, 431 U.S. 494 (plurality opinion)).

the basis of this approach, protection of abortion as an unenumerated fundamental right for women was rejected[93] as was homosexuals' right to privately engage in consensual sodomy.[94]

The liberal approach has removed these legal stigmas from abortion and consensual sodomy. Compared with the originalist approach, it has proven better at promoting personal and public freedoms through its robust interpretation of the scope of liberty protected as a fundamental right under the Due Process Clause. Such a robust interpretation is a crucial step towards conception of the Constitution as a supreme and dynamic law capable of adapting itself in response to new necessities in the US.[95] As Justice Frankfurter has observed of the Constitution, "[g]reat concepts like . . . 'liberty' . . . were purposely left to gather meaning from experience. For they relate to the whole domain of social and economic fact, and the statesmen who founded this Nation knew too well that only a stagnant society remains unchanged."[96]

III. RECOGNIZING THE FUNDAMENTAL RIGHT TO TECHNOLOGY

In this Part, I apply the liberal approach to a consideration of why the right to technology could fall within the scope of liberty under the Due Process Clause and thereby be recognized as a fundamental right. To do so, I demonstrate that technology is of fundamental importance to all individuals in contemporary societies. I further argue that this new right ought to protect two kinds of collective interests in technological benefits—societal interests and group interests.

93. Roe v. Wade, 410 U.S. 113, 174 (1973) ("The fact that a majority of the States reflecting, after all the majority sentiment in those States, have had restrictions on abortions for at least a century is a strong indication, it seems to me, that the asserted right to an abortion is not 'so rooted in the traditions and conscience of our people as to be ranked as fundamental.'") (Rehnquist, J., dissenting) (quoting Snyder v. Massachusetts, 291 U.S. 97, 105 (1934)).

94. Bowers v. Hardwick, 478 U.S. 186, 192-94 (1986) (refusing to "extend a fundamental right to homosexuals to engage in acts of consensual sodomy" because "[p]roscriptions against sodomy have 'ancient roots'" and concluding that "to claim that a right to engage in such conduct is 'deeply rooted in this Nation's history and tradition' or 'implicit in the concept of ordered liberty' is, at best, facetious").

95. *See, e.g.*, DAVID A. STRAUSS, THE LIVING CONSTITUTION 1 ("A 'living constitution' is one that evolves, changes over time, and adapts to new circumstances, without being formally amended.") (2010).

96. Nat'l Mut. Ins. Co. v. Tidewater Transfer Co., 337 U.S. 582, 646 (1949) (Frankfurter, J., dissenting).

A. *Fundamental Importance of Technology*

1. Technology and Personal Well-Being

In contemporary societies, technology plays an essential role in maintaining the quality of individuals' material lives. Advances in medical technology have led to lower infant mortality rates, cures for diseases, and many more improvements in the physical well-being of all.[97] More and more household and personal home healthcare apparatuses are being rolled out in the market, resulting in a reduction in repeat admissions to hospitals.[98] Similarly, advances in biological technology have improved the quantity and quality of food.[99] The most striking example is the introduction of genetically modified products.[100] Genetic modification technology can be harnessed to produce more food with higher nutritional value at a lower cost.[101] The invention of environmentally friendly technologies has equipped us with tools to better protect water, air, and land essential to our survival.[102] Various renewable energy generating devices, such as solar roof tiles, Smartflower solar panels, and wind turbines, have been developed to provide forms of energy alternative to traditional fossil fuels and combat climate change.[103] Biodegradable materials capable of consumption by marine organisms have been invented and applied to products, such as straws and six-pack rings, to

97. *See, e.g.*, David Weatherall et al., *Science and Technology for Disease Control: Past, Present, and Future*, *in* DISEASE CONTROL PRIORITIES IN DEVELOPING COUNTRIES 119, 120-21 (Dean T. Jamison et al. eds., 2d ed. 2006) (discussing the role of medical technology in disease control); Eva Alberman, *Why Are Stillbirth and Neonatal Mortality Rates Continuing to Fall?*, 92 BRIT. J. OBSTETRICS & GYNAECOLOGY 559, 563 (1985) (discussing fall of stillbirth and neonatal mortality rates).

98. Mayank Pratap, *How Is Technology Transforming Healthcare at Home*, HACKER NOON (Jan. 4, 2019), https://hackernoon.com/how-is-technology-transforming-healthcare-at-home-1ce827b355b9.

99. *See, e.g.*, Malik G. Mustafa et al., *Techniques in Biotechnology: Essential for Industry*, *in* 2 OMICS TECHNOLOGIES AND BIO-ENGINEERING: TOWARDS IMPROVING QUALITY OF LIFE 233, 245-46 (Debmalya Barh & Vasco Azevedo eds., 2018) (discussing food processing biotechnology); Rajat P. Singh et al., *Biotechnological Tools to Enhance Sustainable Production*, *in* BIOTECHNOLOGY FOR SUSTAINABLE AGRICULTURE: EMERGING APPROACHES AND STRATEGIES 19, 20-21 (Ram Lakhan Singh & Sukanta Mondal eds., 2018) (discussing food production biotechnology); Arslan Butt, *What Is Green Technology and Its Benefits?*, U.S. GREEN TECH. (July 26, 2016), https://usgreentechnology.com/green-technology.

100. Meera Kaur, *Genetically Modified Products*, *in* GREEN ISSUES AND DEBATES: AN A-TO-Z GUIDE 249, 249-51, 254 (Howard S. Schiffman & Paul Robbins eds., 2011).

101. *Frequently Asked Questions on Genetically Modified Foods*, WHO (May 2014), https://www.who.int/foodsafety/areas_work/food-technology/faq-genetically-modified-food/en.

102. Butt, *supra* note 99.

103. Gertie Goddard, *Exciting New Green Technology of the Future*, SCI. FOCUS (Aug. 1, 2017), https://www.sciencefocus.com/future-technology/exciting-new-green-technology-of-the-future.

alleviate water pollution.[104] The rapid development of AI has brought convenience to daily life. It has empowered digital devices like smartphones and smart speakers with voice assistants, capable of performing a variety of tasks, including playing music, composing messages, answering questions, and turning lights on and off.[105] Self-driving cars can not only save fuel and reduce accident rates, but they also permit drivers and passengers to spend their time on productive activities during their journeys.[106]

Moreover, technology plays an essential role in promoting the quality of mental and spiritual life.[107] In contemporary societies, new technologies have made it vastly easier for people to locate and obtain information on various aspects of their lives, thereby helping them to make better-informed decisions.[108] Undoubtedly, the availability of adequate information is necessary for decision-making about issues of long-term impact.

Advances in information technology have fueled the invention of both hardware and software capable of producing and disseminating information faster than ever before. The invention of satellites, computers, and fiber-optic cables, for example, has led to unprecedented improvements in the scope of communicative activities.[109] The contemporary global telecommunications network relies on seamlessly integrated fiber-optic cables,[110] which enable rapid transmission of high volumes of data, audio, voice, and video to an extent that no other technologies, including copper cables, microwaves, and satellites, can offer.[111] In 2018, the worldwide average download speed on fixed broadband increased by nearly twenty-seven percent from the previous year to 46.12 Mbps, making it 800 times faster than dial-up.[112] The number

104. *Id.*

105. *Voice Assistants: How Artificial Intelligence Assistants Are Changing Our Lives Every Day*, SMARTSHEET, https://www.smartsheet.com/voice-assistants-artificial-intelligence (last visited Jan. 25, 2020).

106. Michelle L.D. Hanlon, *Self-Driving Cars: Autonomous Technology That Needs a Designated Duty Passenger*, 22 BARRY L. REV. 1, 3-6 (2016).

107. Gideon Kimbrell, *How Artificial Intelligence Will Improve Our Spiritual Life*, OBSERVER (Jan. 9, 2017, 2:20 PM), https://observer.com/2017/01/is-there-space-for-ai-in-a-spiritual-world.

108. *See, e.g.*, Hassan Mansoor, *How Technology Advancement Is Delivering Value to Customers in 2018*, CUSTOMERTHINK (Aug. 8, 2018), http://customerthink.com/how-technology-advancement-is-delivering-value-to-customers-in-2018 (stating that customers can get more information to make more informed decisions).

109. *Reading: Computer Network*, LUMEN LEARNING, https://courses.lumenlearning.com/computerapps/chapter/reading-computer-network (last visited Jan. 25, 2020).

110. Barney Warf, *Telecommunications and Geography*, *in* 6 ENCYCLOPEDIA OF GEOGRAPHY 2782, 2783, 2784 fig.1, 2785 (Barney Warf ed., 2010).

111. *See id.*

112. *See Differences Between Dial Up and High Speed Internet Connections*, PLUG THINGS IN,

of countries with gigabit fixed broadband networks is growing.[113] Audio and video streaming, in contrast with downloading, is made possible by "advances in bandwidth availability, computer processing power and digital compression techniques."[114]

Similarly, software developments have led to the creation of search engines and social media. The Internet stores an unprecedented amount of data and information. As of August 2019, there were more than 1.27 billion websites.[115] Search engines play a pivotal role in finding information among these websites by indexing webpages and enabling Internet users to make search queries.[116] Social media is characterized by a participatory culture, emphasizing user participation and interactive communication. Users can take an active role in creating content and freely share others' content. With an Internet connection, they can post text, images, sound, video, or any combination thereof, to report events instantly at the scene.

2. Technology and Societal Well-Being

From the societal standpoint, technology plays an increasingly vital role in economic development. Technological progress creates new tools and methods of production, thereby improving efficiency and productivity. In doing so, it transforms a society's mode of production and employment structure of a society may be disrupted rapidly as a result. In the mid-eighteenth century, the Industrial Revolution transformed Britain from a largely agrarian economy into an industrial economy. Textile, metal, shipbuilding, and many other industries began to boom.[117] The employment share and output of the agricultural sector declined while those of the industry sector grew after the Industrial Revolution.[118] Global gross domestic product growth per person since 1750 has surged to 1.5%

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http://www.plugthingsin.com/internet/connection/dialup-vs-high-speed-internet (last visited Jan. 25, 2020); Isla McKetta, *The World's Internet in 2018: Faster, Modernizing and Always On*, SPEEDTEST (Dec. 10, 2018), https://www.speedtest.net/insights/blog/2018-internet-speeds-global.

113. McKetta, *supra* note 112.

114. Lokman Tsui, *Streaming Media*, *in* ENCYCLOPEDIA OF JOURNALISM 1345, 1345 (Christopher H. Sterling ed., 2009).

115. *August 2019 Web Server Survey*, NETCRAFT (Aug. 15, 2019), https://news.netcraft.com/archives/2019/08/15/august-2019-web-server-survey.html.

116. Craig W. Walker, *Application of the DMCA Safe Harbor Provisions to Search Engines*, VA. J.L. & TECH., Winter 2004, at 1, 5.

117. Artemis Manolopoulou, *The Industrial Revolution and the Changing Face of Britain*, BRIT. MUSEUM, https://www.britishmuseum.org/research/publications/online_research_catalogues/paper_money/paper_money_of_england__wales/the_industrial_revolution.aspx (last visited Jan. 25, 2020).

118. N.F.R. Crafts, *The Industrial Revolution: Economic Growth in Britain, 1700–1860*, *in* NEW DIRECTIONS IN ECONOMIC AND SOCIAL HISTORY 64, 70 tbl.7, 71 (Anne Digby & Charles Feinstein eds., 1989).

per year on average, as opposed to 0.01% per year for nearly 3000 years up to 1750.[119]

With the rise of the Internet and advances in information and communications technology, e-commerce has transformed the traditional way of doing business. Brick-and-mortar stores are no longer the only choice available to businesses and consumers making everyday purchases. Some retailers have had to move at least some portion of their business from offline to online[120] and close some stores in response to e-commerce pressure.[121] Online retail sales are surging. In 2017, retail e-commerce accounted for 10.4% of all retail sales in the world, projected to double to 22% in 2023.[122]

Technology also shapes cultural development. Technological development and advancement change people's working styles and lifestyles dramatically. The invention of machinery during the Industrial Revolution drove people working in home cottages to factories. The technology of automobility that powers cars, ferries, trains, and airplanes shorten the time, space, and distance that travelers experience. It facilitates long-distance travel to places previously inaccessible. Automobility provided by the car "gave Americans an opportunity to express their individualism and to have geographical freedom."[123] With cars, people could live in suburban and rural areas to distance themselves from each other and their workplaces. More and more consumer and leisure activities were organized in association with cars including car camping, staying in motels, watching movies in drive-in cinemas, and buying food from drive-in restaurants. A new unique form of culture, which is called car culture, has been formed among car owners.

One of the most influential impacts of technology on culture is through the development of mass media. Since the invention of cameras and projectors in the late nineteenth and early twentieth centuries and the formation of major studios in the 1920s, such as MGM and Paramount, the U.S. film industry has thrived.[124] Guglielmo Marconi developed radio

119. *How Has Growth Changed Over Time?*, BANK OF ENG., https://www.bankofengland.co.uk/knowledgebank/how-has-growth-changed-over-time (last visited Jan. 25, 2020).

120. *See, e.g.*, Geoffrey Smith, *H&M and Zara Are Closing Stores to Get Ahead*, FORTUNE (Aug. 11, 2019), https://fortune.com/2019/08/11/hm-zara-store-closing (reporting that H&M and Zara are closing their physical stores and putting more resources into online sales).

121. Alistair Gray, *US Retailers Shut up Shop as Amazon's March Continues*, FIN. TIMES (Mar. 8, 2019), https://www.ft.com/content/93c602a4-4155-11e9-9bee-efab61506f44.

122. Andrew Lipsman, *Global Ecommerce 2019*, EMARKETER (Jan. 25, 2020), https://www.emarketer.com/content/global-ecommerce-2019.

123. GARY CROSS & RICK SZOSTAK, TECHNOLOGY AND AMERICAN SOCIETY: A HISTORY 272 (2d ed. 2005).

124. Patrick Trey Brady, *The Celluloid Advocate: The Evolution of the Twentieth Century Cinematic Lawyer*, 27 S. CAL. INTERDISC. L.J. 165, 167 (2017).

telegraphy for long-distance communication in 1896.[125] The first public radio broadcast was made in Canada in 1906,[126] and the first U.S. radio station, KDKA Pittsburgh, was set up in 1920.[127] Radio arrived in Britain with the British Broadcasting Corporation ("BBC") in 1922.[128] Radio flourished before the advent of television broadcasting, which was developed in the 1930s with the interruption of World War II.[129] The BBC began the first regularly scheduled television service in 1936.[130] By 1954, approximately fifty-five percent of American homes had television.[131] It remains one of the most accessible mediums for disseminating information and providing entertainment, though the impact of the Internet on culture has increased massively since the development of the World Wide Web and web browsers in the late 1980s and early 1990s.[132]

Mass media is an agent of socialization presenting common, more or less standardized, views of culture and norms to the public. Upon entering World War II, the U.S. government coordinated with the Hollywood film industry to produce films with patriotic messages to boost the morale of Americans at the home front.[133] Through television and social media, Korean entertainment and pop music have spread to other parts of the world including Japan, China, Taiwan, Hong Kong, and the U.S., giving Korean culture global popularity in a phenomenon known as the "Korean Wave."[134]

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125. Transmitting Electrical Signals, U.S. Patent No. 586,193 (filed Dec. 7, 1896) (issued July 13, 1897).

126. James E. O'Neal, *Dec. 21, 1906: A Very Significant Date in Radio*, RADIOWORLD (Dec. 22, 2016), https://www.radioworld.com/columns-and-views/dec-21-1906-a-very-significant-date-in-radio.

127. Jorge A. Camacho & Roger Manvell, *Broadcasting*, ENCYCLOPAEDIA BRITANNICA (Aug. 10, 2018), https://www.britannica.com/technology/broadcasting#ref270980.

128. *History of the BBC - 1920s*, BBC, https://www.bbc.com/timelines/zxqc4wx (last visited Jan. 25, 2020).

129. Camacho & Manvell, *supra* note 127.

130. *History of the BBC - 1930s*, BBC, https://www.bbc.com/timelines/zqbfyrd (last visited Aug. 14, 2019).

131. *Number of TV Households in America*, BUFFALO HIST. MUSEUM, http://www.buffalohistory.org/explore/exhibits/virtual_exhibits/wheels_of_power/educ_materials/television_handout.pdf (last visited Aug. 14, 2019).

132. *See* Graham T.T. Molitor, *Communication Technologies That Will Change Our Lives*, USA TODAY, Jan. 2003, at 60, 64.

133. *See* Philip M. Taylor, *Propaganda in World War II*, *in* THE INTERNATIONAL ENCYCLOPEDIA OF COMMUNICATION 3925, 3927-28 (Wolfgang Donsbach ed., 2008); Robert Sklar & David A. Cook, *History of the Motion Picture*, ENCYCLOPAEDIA BRITANNICA (Jan. 25, 2020), https://www.britannica.com/art/history-of-the-motion-picture.

134. Yeojin Kim, *A Possibility of the Korean Wave Renaissance Construction Through K-Pop: Sustainable Development of the Korean Wave as a Cultural Industry*, 36 HASTINGS COMM. & ENT. L.J. 59, 62-70, 75-76, 79 (2013).

3. Summary

The liberal approach shows that "liberty" as protected by the Due Process Clause is a dynamic concept. It is able to encompass new fundamental rights, provided that their intrinsic worth in terms of ensuring basic individual freedoms and promoting social interests has been established through reasoned judgment. As I have demonstrated in the above discussion, technology is of intrinsic worth in both respects. Therefore, it is time to consider whether the right to technology should be recognized as a new fundamental right under the Due Process Clause. The potential expansion of fundamental rights protection to technology is echoed by a recent survey asking Americans what has contributed to the greatest improvement in their lives in the past five decades.[135] Respondents afforded technology greater credit than either the expansion of civil rights or economic improvement[136] and also predicted that technology would be the most important force for improvements in their lives over the next five decades.[137] Another recent survey shows that more than an absolute majority of Americans believe technology has made their overall life better and expect technology to continue improving the quality of life of their children.[138]

B. Protecting Collective Interests

What is the nature and scope of the fundamental right to technology? In this Subpart, I argue that the new fundamental right to technology ought to protect two kinds of collective interests in the benefits of technological progress, namely societal interests and group interests. In this way, the fundamental right to technology gives rise to distributive justice agendas for achieving substantive equality in the sharing of such benefits as well as preventing technology from harming the common good.

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135. Mark Strauss, *Four-in-Ten Americans Credit Technology with Improving Life Most in the Past 50 Years*, PEW RES. CTR. (Oct. 12, 2017), http://www.pewresearch.org/fact-tank/2017/10/12/four-in-ten-americans-credit-technology-with-improving-life-most-in-the-past-50-years.

136. *Id.* ("In an open-ended question, respondents were asked, 'What would you say was the biggest improvement to life in America over the past 50 years or so?' Technology was cited most (42%), while far fewer respondents mentioned medicine and health (14%), civil and equal rights (10%) or other advancements. Technology was identified as the biggest improvement by whites (47%) and Hispanics (35%), while blacks were about as likely to name technology (26%) as they were civil and equal rights (21%).").

137. *Id.* ("Another open-ended question in the same 2017 survey asked Americans to predict the biggest improvements to life over the next 50 years. The top responses were expected improvements from technology (22%) or from medicine and health (20%).").

138. Press Release, Ipsos, GET Creative/USA Today Network, Charles Koch Institute–Technology Survey (Mar. 1, 2019), https://www.ipsos.com/sites/default/files/ct/news/documents/2019-03/technology_press_release.pdf.

1. Societal Interests in Technological Benefits

The fundamental right to technology protects societal interests in technological benefits in two ways. It serves societal interests in enjoying the benefits accrued from the progress of fundamental technologies. In practice, it entitles everyone to enjoy the benefits of the technologies that are fundamental to the sustainability of their lives and freedoms. Such *fundamental technologies* may include electricity, transportation, telephones, and the Internet, to name a few,[139] and set a minimum core for the technology sector. However, they do not include *derivative technologies* that embody improvements to the fundamental technologies and offer extra benefits. For instance, a local government should provide public transportation services to protect residents' right to enjoy the benefits of transportation technology. However, the government by no means needs to procure Mercedes Benz buses for public transportation, nor attempt to allocate public funds to distribute a car to every resident.

The benefits conferred by the Internet are the epitome of collective interests in the benefits accrued from the progress of fundamental technologies. In *Reno v. American Civil Liberties Union*,[140] the U.S. Supreme Court held that the Internet as a whole had served as a "vast democratic forum[]."[141] The Court further explained how the Internet had begun to play a vital role in promoting societal interests in political communications:

> [The Internet] provides relatively unlimited, low-cost capacity for communication of all kinds. . . . Th[e] dynamic, multifaceted category of communication includes not only traditional print and news services, but also audio, video, and still images, as well as interactive, real-time dialogue. Through the use of chat rooms, any person with a phone line can become a town crier with a voice that resonates farther than it could from any soapbox. Through the use of Web pages, mail exploders, and newsgroups, the same individual can become a pamphleteer.[142]

Based on this explication of the public benefits of the early-stage Internet, the Supreme Court in *Packingham v. North Carolina*[143] considered the societal interests generated by the contemporary

139. *See* Rochelle Cooper Dreyfuss, *Patents and Human Rights: The Paradox Re-Examined*, in INTELLECTUAL PROPERTY AND ACCESS TO SCIENCE AND CULTURE: CONVERGENCE OR CONFLICT? 65, 65 (Christophe Geiger ed., 2016) (arguing that the right to technology "extends only to basic technologies, such as medicines, transportation, telephones, and computers—as opposed to Ferraris, smartphones, high-definition televisions, Roombas or Fitbits").

140. 521 U.S. 844 (1997).

141. *Id.* at 851, 868.

142. *Id.* at 870.

143. 137 S. Ct. 1730 (2017).

Internet.[144] First, the Court suggested that the Internet is as important as public streets and parks, the traditional public forums that merit the full spectrum of free speech protection.[145] Second, it demonstrated that social media outlets, the most dynamic new additions to the Internet, have become vehicles for socially beneficial communicative activities:

> Social media offers "relatively unlimited, low-cost capacity for communication of all kinds." On Facebook, for example, users can debate religion and politics with their friends and neighbors or share vacation photos. On LinkedIn, users can look for work, advertise for employees, or review tips on entrepreneurship. And on Twitter, users can petition their elected representatives and otherwise engage with them in a direct manner. Indeed, Governors in all 50 States and almost every Member of Congress have set up accounts for this purpose. In short, social media users employ these websites to engage in a wide array of protected First Amendment activity on topics "as diverse as human thought."[146]

In this passage, the Supreme Court shows that the new social media technologies have significantly increased the power of the Internet to produce a collective interest in the public exchange of information and knowledge.[147] Not only have these social media technologies engaged many more people in communicative activities, but they also offer a more dynamic means of creating and sharing information. This, in turn, is conducive to the economic, cultural, and political development of the United States.

While the U.S. Supreme Court has considered the social functions of the Internet as a whole, the lower courts have examined how specific technological ingredients of the Internet can serve societal interests.[148] In *Field v. Google Inc.*,[149] Google had used an automated web crawler to cache Field's personal website containing his copyrighted works and displayed the cached content of that website when users clicked on cached links in Google search results.[150] The District Court of Nevada held that Google's provision of cached links constituted fair use largely on the grounds that such links "serve[] different and socially important purposes

144. *See id.* at 1735-36.

145. *Id.* at 1735 ("While in the past there may have been difficulty in identifying the most important places (in a spatial sense) for the exchange of views, today the answer is clear. It is cyberspace—the 'vast democratic forums of the Internet' in general, and social media in particular.") (citation omitted) (citing *Reno*, 521 U.S. at 868).

146. *Id.* at 1735-36 (citations omitted) (quoting *Reno*, 521 U.S. at 870).

147. *See id.*

148. *Packingham*, 137 S. Ct. at 1735-36; *see infra* notes 149-55 and accompanying text.

149. 412 F. Supp. 2d 1106 (D. Nev. 2006).

150. *Id.* at 1110-14.

in offering access to copyrighted works . . . ."[151] In *Kelly v. Arriba Soft Corp.*[152] and *Perfect 10, Inc. v. Amazon.com, Inc.*,[153] the Ninth Circuit Court of Appeals ruled that the reproduction in their entirety of numerous photographs or web pages to create and operate Internet search engines constitutes fair use.[154] The court held that because such reproductions are created by search engines in their capacity as an electronic reference tool, they benefit society as a whole by improving public access to information.[155]

The fundamental right to technology also protects societal interests in preventing seriously harmful uses of all technologies, both fundamental and derivative. Therefore, it prohibits people from utilizing any technology that may cause serious harm to societal interests in maintaining a democratic political system, improving environmental protection, enhancing innovation capacity, and securing food security, among other interests. For example, when a government utilizes digital technologies to unduly filter the Internet, it prevents citizens from gaining access to the information on filtered websites, thereby defeating the purposes of the Internet as identified in the above judicial rulings. Ultimately, such pervasive filtering jeopardizes the collective interest in the Internet's use as a vehicle for maintaining an open and democratic society.[156]

2. Group Interests in Technological Benefits

The fundamental right to technology also protects group interests in enjoying the benefits accrued from the progress of fundamental technologies and preventing seriously harmful uses of all technologies on

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151. *Id.* at 1119. The Court summarized its fair use ruling as follows:

> [T]he first fair use factor weighs heavily in Google's favor because its "Cached" links are highly transformative. The second fair use factor weighs only slightly against fair use because Field made his works available in their entirety for free to the widest possible audience. The third fair use factor is neutral, as Google used no more of the copyrighted works than was necessary to serve its transformative purposes. The fourth fair use factor cuts strongly in favor of fair use in the absence of any evidence of an impact on a potential market for Field's copyrighted works. A fifth factor, a comparison of the equities, likewise favors fair use. A balance of all of these factors demonstrates that if Google copies or distributes Field's copyrighted works by allowing access to them through "Cached" links, Google's conduct is fair use of those works as a matter of law.

Id. at 1123.

152. 336 F.3d 811 (9th Cir. 2003).

153. 508 F.3d 1146 (9th Cir. 2007).

154. *Perfect 10*, 508 F.3d at 1166-68; *Kelly*, 336 F.3d at 815, 818-22.

155. *Perfect 10*, 508 F.3d at 1165 (ruling that "a search engine provides social benefit by incorporating an original work into a new work, namely, an electronic reference tool").

156. *See* JONATHAN ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT 9, 117-18 (2008).

the basis of the shared identity of the group members taking advantage of technological benefits to pursue various social and cultural activities.[157] Examples of groups whose collective interests merit legal protection include educators, journalists, researchers, and students. The importance of protecting group-based interests in technological benefits can be inferred from a number of judicial rulings. In *Sega Enterprises Ltd. v. Accolade, Inc.*,[158] for example, the Ninth Circuit Court applied the fair use doctrine to protect the public interest in reverse engineering technology that allows software engineers as a group of users to achieve interoperability of different software programs.[159] In *Righthaven LLC v. Realty One Group, Inc.*,[160] fair use was invoked by the Nevada District Court to protect the interests of bloggers as a group of users in copying limited amounts of copyrighted work to create blog posts on the Internet.[161]

Meanwhile, new technological developments could result in serious harm to group-based interests. This would trigger the invocation of the group right to technology to prevent or eliminate harm to a certain group of people. For example, the use of algorithms in facial recognition technology has been found to introduce systematic bias in classifying race-based information.[162] Google Photos has misclassified black people as gorillas,[163] and Amazon's Rekognition falsely identified many

157. *See* GEORGE W. RAINBOLT, THE CONCEPT OF RIGHTS 205-07 (2006) ("Many group rights seem to be rights to participatory goods."); Denise Réaume, *Individuals, Groups, and Rights to Public Goods*, 38 U. TORONTO L.J. 1, 1 (1988) ("[A]ny rights to participatory goods must be held by groups rather than individuals.").

158. 977 F.2d 1510 (9th Cir. 1992).

159. *Id.* at 1523 (ruling that reverse engineering "has led to an increase in the number of independently designed video game programs offered for use with the [plaintiff's] console"); *see also* Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 YALE L.J. 1575, 1608–09 (2002) ("From this approximation of source code, reverse engineers can discern or deduce internal design details of the program, such as information necessary to develop a program that will interoperate with the decompiled or disassembled program.").

160. No. 2:10-cv-1036-LRH-PAL, 2010 WL 4115413 (D. Nev. Oct. 19, 2010).

161. *Id.* at *1, *3.

162. Ali Breland, *How White Engineers Built Racist Code – and Why It's Dangerous for Black People*, THE GUARDIAN (Dec. 4, 2017, 4:00 EST), https://www.theguardian.com/technology/2017/dec/04/racist-facial-recognition-white-coders-black-people-police ("Experts such as Joy Buolamwini, a researcher at the MIT Media Lab, think that facial recognition software has problems recognizing black faces because its algorithms are usually written by white engineers who dominate the technology sector. These engineers build on pre-existing code libraries, typically written by other white engineers.").

163. Tom Simonite, *When It Comes to Gorillas, Google Photos Remains Blind*, WIRED (Jan. 11, 2018, 7:00 AM), https://www.wired.com/story/when-it-comes-to-gorillas-google-photos-remains-blind; Maggie Zhang, *Google Photos Tags Two African-Americans as Gorillas Through Facial Recognition Software*, FORBES (July 1, 2015, 1:42 PM), https://www.forbes.com/sites/mzhang/2015/07/01/google-photos-tags-two-african-americans-as-gorillas-through-facial-recognition-software/#b22c542713d8.

Congressmen of color as crime suspects.[164] A recent study found that the problems with facial recognition technology are even more alarming than those isolated cases suggest. It reported that "Asian and African American people were up to 100 times more likely to be misidentified than white men, . . . [and] Native Americans had the highest false-positive rate of all ethnicities."[165] Without swift action to correct its algorithms, facial recognition technology could profoundly deteriorate group-based interests in racial equality.

3. Summary

Legally, the fundamental right to technology, as shown above, affords two dimensions of legal protection. It protects the public's fair share of the technological benefits that are key to fulfilment of the overall economic, political, and cultural needs of a society or a group to which that public belongs. At the same time, it disallows the uses of technology that would seriously imperil societal and group interests.

Ethically, the fundamental right to technology would induce public discourse about how to achieve equitable distribution of technological benefits and proactive prevention of seriously harmful uses of technologies. Further, the intensification of such discourse would further bring these issues to the forefront of the decision-making process operated by the relevant administrative and legislative agencies.

IV. PROTECTING THE FUNDAMENTAL RIGHT TO TECHNOLOGY THROUGH IP LAW

This Part explores the legal and policy implications of the fundamental right to technology. I argue that this right could play an

164. Sasha Ingber, *Facial Recognition Software Wrongly Identifies 28 Lawmakers as Crime Suspects*, NPR (July 26, 2018, 6:42 PM ET), https://www.npr.org/2018/07/26/632724239/facial-recognition-software-wrongly-identifies-28-lawmakers-as-crime-suspects; Natasha Singer, *Amazon's Facial Recognition Wrongly Identifies 28 Lawmakers, A.C.L.U. Says*, N.Y. TIMES (July 26, 2018), https://www.nytimes.com/2018/07/26/technology/amazon-aclu-facial-recognition-congress.html; Jacob Snow, *Amazon's Face Recognition Falsely Matched 28 Members of Congress with Mugshots*, ACLU (July 26, 2018, 8:00 AM), https://www.aclu.org/blog/privacy-technology/surveillance-technologies/amazons-face-recognition-falsely-matched-28.

165. Drew Harwell, *Federal Study Confirms Racial Bias of Many Facial-Recognition Systems, Casts Doubt on Their Expanding Use*, WASH. POST (Dec. 20, 2019), https://www.washingtonpost.com/technology/2019/12/19/federal-study-confirms-racial-bias-many-facial-recognition-systems-casts-doubt-their-expanding-use.

important role in mediating the relationship between IP law and equitable distribution of technological benefits.[166]

A. *Limiting the IP Clause*

The IP Clause of the U.S. Constitution empowers Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[167] It defines the objective of the legislative power of Congress and prescribes means to achieve the objective. First, the wording of the Clause shows that it is intended to promote technological progress and knowledge growth.[168] It is commonly understood that "Science" is not confined to scientific inquiry but encompasses all knowledge, and "useful Arts" does not refer to artistic endeavors, but rather to fields related to technology or technological arts.[169]

Second, the IP Clause capitalizes on legal protection of copyrights and patents as the means to promote technological progress and knowledge growth. Under the Clause, Congress's enactment of copyright and patent laws functions to financially incentivize authors and inventors to create new works and inventions and further make them available to the public in the marketplace. While authors and inventors receive monetary rewards for doing so, the public benefits from new knowledge embodied in works and technological solutions presented by inventions.[170]

Utilitarianism-based policy analysis undergirds the IP Clause. IP rights protection serves as an aspect of the government's economic policy through optimizing technological progress and knowledge growth. The

166. *See infra* Part IV.

167. U.S. CONST. art. I, § 8, cl. 8.

168. *See* Barton Beebe, Bleistein, *The Problem of Aesthetic Progress, and the Making of American Copyright Law*, 117 COLUM. L. REV. 319, 341 (2017) (arguing that "the late eighteenth century, the realms of 'Science and useful Arts' had developed well-accepted, positive, and seemingly objective standards of judgment, standards that Congress and courts could rely on to limit the reach of monopoly rights to those 'Writings' and 'Discoveries' the creation of which did indeed promote scientific and technological progress").

169. *See* Bilski v. Kappos, 561 U.S. 593, 634 (2010) (ruling that "the term 'useful arts' was widely understood to encompass the fields that we would now describe as relating to technology or 'technological arts'").

170. *See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984) ("The monopoly privileges that Congress may authorize are neither unlimited nor primarily designed to provide a special private benefit. Rather, the limited grant is a means by which an important public purpose may be achieved. It is intended to motivate the creative activity of authors and inventors by the provision of a special reward, and to allow the public access to the products of their genius after the limited period of exclusive control has expired.").

more new inventions and works, the better the promotion of technological progress and knowledge growth. Central to the realization of this policy goal is to incentivize increased creation of inventions and works. As the Supreme Court has elaborated:

> The patent laws promote [technological] progress by offering a right of exclusion for a limited period as an incentive to inventors to risk the often enormous costs in terms of time, research, and development. The productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens. In return for the right of exclusion—this 'reward for inventions,'—the patent laws impose upon the inventor a requirement of disclosure.[171]

The Court has also used the same utilitarian logic to justify copyright protection.[172] These opinions show that the "incentive" thesis and cost-and-benefit analysis are two major components of the utilitarian theory. First, IP protection promotes technological progress for society because it provides the requisite incentives to create new inventions and works. While the initial process of creation can be arduous and costly, copying is easy and cheap. This stark contrast makes it likely that copiers can easily free-ride on creators' efforts. Gradually or even overnight, creators may lose their competitiveness in the marketplace if copyists can distribute cheaper copies. This vulnerability to free-riding activities may deter risk-averse creators from investing in innovation and creativity. IP protection, by contrast, gives creators a set of exclusive rights to use their creations, and copiers would be penalized if they use copyrighted materials without IP rights owners' consent.[173] Hence, IP protection provides the incentive in the form of assurance to creators that their efforts will be protected against unauthorized uses and that they can recoup their investments through commercial exploitation of their creations.[174]

171. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480 (1974).

172. Sony Corp. of America v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984).

173. However, copiers would not be penalized if unauthorized uses of IP fall within the scope of limitations on IP rights. For example, fair use as a limitation on copyright allows the public to make limited uses of copyrighted works without their owners' consent.

174. *See e.g.*, WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 40 (2003) ("In the absence of copyright protection the market price of a book or other expressive work will eventually be bid down to the marginal cost of copying, with the result that the work may not be produced in the first place because the author and publisher may not be able to recover their costs of creating it."); Stanley M. Besen & Leo J. Raskind, *An Introduction to the Law and Economics of Intellectual Property*, J. ECON. PERSPECTIVES, Winter 1991, at 5 (stating that producers will innovate only if they receive an appropriate return).

Second, utilitarianism applies the cost-and-benefit analysis to make sure that the benefits of technological progress accrued from IP protection far exceed the costs in maintaining such a legal system. By focusing on the "access versus incentive" tradeoff,[175] the cost-and-benefit analysis requires a close scrutiny of the costs that IP protection may incur and then caps them way below the benefits it may generate.[176] This analysis normally leads to the assertion that "the more extensive copyright protection is, the greater the incentive to create intellectual property."[177]

However, a major problem with utilitarianism lies in its mishandling of distributive justice. While it dictates the maximization of utilities of a policy for its social outcome as a whole, it fails to take into account the fair distribution of utilities among members of a society. It normally abstracts and considers wealth as a utility, and then it does not make a difference if one individual enjoys many more utilities than most others. This is because the general sum of all the utilities is still maximized. With regard to a social policy, it results in a larger number of utilities, say a one-billion-dollar growth in wealth, for the rich, but a smaller number of loss of utilities, say one-million-dollar wealth, for the poor. This policy, albeit damaging to the poor, could still pass utilitarianism's scrutiny because all that matters is maximizing the sum of utilities, regardless of the existence of profound injustice. John Rawls criticized utilitarianism for causing injustice as follows:

> [T]here is no reason in principle why the greater gains of some should not compensate for the lesser losses of others; or more importantly, why the violation of the liberty of a few might not be made right by the greater good shared by many. . . . No doubt the strictness of common sense precepts of justice has a certain usefulness in limiting men's propensities to injustice and to socially injurious actions, but the utilitarian believes that to affirm this strictness as a first principle of morals is a mistake.[178]

This criticism also applies to the IP Clause, which fails to tackle the relationship between social justice and technological progress properly. Based upon utilitarianism, the Clause is silent on how the benefits of technological progress should be equitably distributed among the members of the public. A proper IP protection system undoubtedly facilitates the constitutional objective of promoting technological

175. LANDES & POSNER, *supra* note 174, at 20.

176. Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 VAND. L. REV. 483, 499-554 (1996) (exploring the premises of the "incentive/access paradigm").

177. William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 474 (2003).

178. JOHN RAWLS, A THEORY OF JUSTICE 23 (rev. ed. 1999).

progress.[179] But there are indeed a host of policy concerns about how the benefits accrued from technological progress as promoted by new inventions and works should be distributed among the public who are non-IP owners. Should IP rights owners primarily control the distribution of technological benefits through voluntary transactions and would this arrangement bring about injustices in access to such benefits? If so, what is the role of the government in channeling the equitable distribution of technological benefits in the marketplace? Moreover, would unfair distribution of technological benefits ultimately deter technological progress?

The principles of justice proposed by John Rawls reveal the roots of the IP Clause's neglect of distributive justice. Rawls argued that injustices can be only tolerated to the extent that the difference principle and equal opportunity principle are met. The equal opportunity principle dictates that "offices and positions [are] open to all under conditions of fair equality of opportunity."[180] By applying legal standards equally to everyone who may become authors and inventors with legal protections for their works or inventions, copyright and patent laws that emanate from the IP Clause satisfy the equal opportunity principle.[181]

However, the IP Clause runs counter to the difference principle, which requires that certain injustices caused by an institution be excused on the condition that the institution distributes resources to "the greatest benefit of the least advantaged."[182] This principle is intended to achieve distributive justice in "property-own democracy."[183] As noted above, built upon utilitarianism, the IP Clause is only meant to maximize technological progress through increased production of works and inventions. But it does not deal with how the benefits accrued from technological progress should be distributed among members of the public. Hence it does not require distribution of such benefits to the least advantaged according to the difference principle. The public, including the least advantaged, ought to obtain IP rights owners' authorization mostly through voluntary market transactions in order to enjoy the technological benefits of inventions and works.[184] Such a market-based

179. *See* Beebe, *supra* note 172, at 333, 337, 345.

180. RAWLS, *supra* note 178, at 266.

181. *See* Justin Hughes & Robert P. Merges, *Copyright and Distributive Justice*, 92 NOTRE DAME L. REV. 513, 552 (2017) (arguing that the U.S. copyright system is in line with the equal opportunity principle).

182. RAWLS, *supra* note 178, at 266. Rawls further explains that "[t]he intuitive idea is that the social order is not to establish and secure the more attractive prospects of those better off unless doing so is to the advantage of those less fortunate." *Id.* at 65.

183. *Id.* at 67.

184. *See* ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY 5 (2011) (contending that

rights protection system may encourage increased production of inventions and works as the IP Clause intends, and further privilege those who are financially able to afford those products to benefit from the relevant technological progress.[185] The IP Clause does not mandate any distributive justice measures to make those who are the least disadvantaged financially, politically and culturally to gain necessary benefits from inventions and works before their IP protection expires.

In *Golan v. Holder*,[186] the constitutionality of the Uruguay Round Agreements Act ("URAA") was challenged because this statute automatically restored copyright protection to all works of foreign origin that were not yet in the public domain in their source countries, but that were in the public domain in the United States for specified reasons. That restoration of copyright protection actually "carries distributive consequences that have disadvantaged certain groups of content users."[187] In his dissenting opinion, Justice Breyer criticized the URAA's copyright restoration from the distributive justice perspective, stating that "[i]f a school orchestra or other nonprofit organization cannot afford the new charges [caused by copyright restoration] . . . [t]hey will have to do without."[188] Thus, he accused the URAA's copyright restoration of "aggravat[ing] the already serious problem of cultural education in the United States."[189]

The fundamental right to technology would serve as a check on Congress's legislative power granted by the IP Clause. It would require that Congress scrutinize distributive justice when legislative proposals to expand IP rights are put on agenda. Thereby, legislators would have to vigilantly examine the extent to which a proposed expansion of rights protection would allow the public, particularly the various groups of the least advantaged, to enjoy the technological benefits accrued from the subsequently stronger IP rights protection. Moreover, legislators would

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"the most important core principle" of property rights over intangible assets such as copyright is this: "[I]t assigns to individual people control over individual assets. It creates a one-to-one mapping between owners and assets."); Christopher Kalanje, *Leveraging Intellectual Property: Beyond the 'Right to Exclude'*, WIPO, https://www.wipo.int/sme/en/documents/leveraging_ip_fulltext.html (last visited Jan. 25, 2020) (arguing that the value of IP rights in business stems from the strategic use of the right to exclude).

185. *See, e.g.*, JAMES BOYLE, THE PUBLIC DOMAIN: ENCLOSING THE COMMONS OF THE MIND 18 (2008) ("Copyright law is supposed to give us a self-regulating cultural policy in which the right to exclude others from one's original expression fuels a vibrant public sphere indirectly driven by popular demand."); Molly Shaffer Van Houweling, *Distributive Values in Copyright*, 83 TEX. L. REV. 1535, 1537 (2005) ("Copyright law generally addresses the relationship between creative expression and money in terms of maximizing total creativity.").

186. 565 U.S. 302 (2012).

187. Haochen Sun, *Copyright and Responsibility*, 4 HARV. J. SPORTS & ENT. L. 263, 297 (2013).

188. *Golan*, 565 U.S. at 354 (Breyer, J., dissenting).

189. *Id.*

be required to proactively consider ways in which limitations should be placed on IP rights so as to adequately protect the fundamental right to technology.

B. Shifting the Legislative Progress in the Public Interest

In order to serve as a check on IP legislative power with distributive justice mandates, the fundamental right to technology would further require fixing the "tyranny of the majority"[190] problem embedded in the legislative process to be dealt with proactively in allocating the benefits of technological progress.[191] This legislative process often suffers from rent-seeking behavior that leads many legislators to vote in majority in the interests of a particular commercial entity. This problem is endemic in legislative progress pertaining to IP laws. Legislative expansions of copyright protection, for example, are designed to serve the interests of copyright-based industries.[192] In response to the challenges posed by reproduction and communication technologies, lobbyists from those industries have urged legislatures to strengthen copyright-protection.[193]

In this one-sided process, many legislators are preoccupied with a rhetoric purporting that stronger copyright protection would give right holders a stronger economic incentive to produce and disseminate works, thereby resulting in a greater number of works being available to the public.[194] Yet, only industry representatives engage in this rhetoric.

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190. *See* LANI GUINIER, THE TYRANNY OF THE MAJORITY: FUNDAMENTAL FAIRNESS IN REPRESENTATIVE DEMOCRACY 3 (1994).

191. *See* Bruce Ackerman, *The New Separation of Powers*, 113 HARV. L. REV. 633, 727 (2000) (arguing that we must prevent majoritarian tyranny and make a democratically-elected legislature "checked and balanced by a host of special-purpose branches, each motivated by one or more of the three basic concerns of separationist theory"); David S. Law & Mila Versteeg, *Sham Constitutions*, 101 CAL. L. REV. 863, 892 (2013) ("[T]he mere recitation of rights in a constitution does not translate into actual respect for those rights in practice."); Daryl J. Levinson, *Parchment and Politics: The Positive Puzzle of Constitutional Commitment*, 124 HARV. L. REV. 657, 731 (2011) ("[W]e expect the kinds of institutional arrangements that qualify as constitutional structure to display greater political stability than the particularistic policy prohibitions represented by rights.").

192. *See* Jessica Litman, *Real Copyright Reform*, 96 IOWA L. REV. 1, 6 (2010) (providing an example of a copyright-based industry halting copyright reform).

193. *Id.* at 26-27, 39; *see also* Anupam Chander & Madhavi Sunder, *Copyright's Cultural Turn*, 91 TEX. L. REV. 1397, 1412 (2013) (reviewing JULIE E. COHEN, CONFIGURING THE NETWORKED SELF: LAW, CODE, AND THE PLAY OF EVERYDAY PRACTICE (2012)) ("The economic rationale counsels nearly boundless expansion as long as it can be justified by some (even implausible) claim that more property rights induce more creativity.").

194. *See* Litman, *supra* note 192, at 26-27, 39. Jessica Litman has bluntly pointed out the central problem with this trend. Jessica Litman, *War Stories*, 20 CARDOZO ARTS & ENT. L.J. 337, 343-44 (2002). She noted that "[a]s technology has enabled individuals to enjoy works in new ways, however, copyright owners have asked for greatly enhanced control over their works. Copyright owners have insisted to [U.S.] Congress and the courts that, because copyrights are their property, nobody should be allowed to make a valuable use of a copyrighted work without paying the copyright owner."

Members of the U.S. legislature routinely shy away from any interrogation of whether stronger protection would actually result in such an economic incentive or substantial benefits for the public.[195] Therefore, it is not surprising that legislative expansions of copyright "often consist of outright congressional rubber-stamping of industry-drafted legislation and committee reports."[196] Among the numerous amendments to copyright law, the U.S. Copyright Term Extension Act ("CTEA") epitomizes the one-sided domination of the law-making process by the copyright-based industries, with congressional hearings persistently dominated by pro-copyright testimonies.[197] The CTEA was adopted on the basis of those testimonies.[198]

A fundamental right to technology would alleviate this majoritarian tyranny problem by subjecting the legislative process to the strict scrutiny of judicial review. To protect this right, the courts would have the power to review whether a law that affects the distribution and enjoyment of the benefits of technological progress passes the three yardsticks of strict scrutiny.[199] First, the legislature must demonstrate a compelling interest in regulation that is necessary or crucial for achieving its legislative goals.[200] Second, the law must be narrowly tailored to achieve that interest.[201] Third, the law must be the least restrictive means of achieving that interest.[202] Therefore, the fundamental right to technology would serve as a powerful check on the legislature's power to enact laws that favor the commercial interests of corporations. By requiring the legislature to scrutinize the purposes of law-making and adopt proper legal standards and rules, the right to technology would promote the enactment of laws aimed at achieving a fair distribution of the benefits of technological progress.

Litman, *supra* note 192, at 14.

195. Jessica D. Litman, *Copyright, Compromise and Legislative History*, 72 CORNELL L. REV. 857, 860-61 (1987) ("Indeed, the statute's legislative history is troubling because it reveals that most of the statutory language was not drafted by members of Congress or their staffs at all. Instead, the language evolved through a process of negotiation among authors, publishers, and other parties with economic interests in the property rights the statute defines."); Jessica Litman, *Copyright Legislation and Technological Change*, 68 OR. L. REV. 275, 314-15 (1989) ("Much legislation advances the agendas of private interest groups. . . . Congress in effect agreed that if the industry representatives would invest the time and energy to develop a bill that all of them endorsed, Congress would refrain from exercising independent judgment on the substance of the legislation.").

196. NEIL WEINSTOCK NETANIEL, COPYRIGHT'S PARADOX 184 (2008).

197. *See* Dennis S. Karjala, *Judicial Review of Copyright Term Extension Legislation*, 36 LOY. L.A. L. REV. 199, 206-22 (2002).

198. *Id.* at 206.

199. *See* Regents of the Univ. of Cal. v. Bakke, 438 U.S. 265, 290-91, 299 (1978).

200. *See id.* at 299.

201. *See id.*

202. *See id.* at 357 (Brennan, White, Marshall, and Blackmun JJ., concurring).

C. *Enforcing Other Responsibilities*

The judiciary and the administration must act to better protect the fundamental right to technology. Courts should proactively fulfill their responsibility to protect societal interests in technological benefits. To that end, they should apply IP in a manner conducive of equitable distribution and the expansive enjoyment of the benefits of technological progress. The fair use doctrine demonstrates how the government should act.[203] As a limitation on copyright, fair use allows the public to make limited use of copyrighted works without permission from the copyright holders.[204] Fair use is of vital importance in a free and just society.[205] It not only accommodates but actually encourages a wide range of freedom-promoting activities such as news reporting, criticism, teaching, and research.[206] As a result, fair use has been hailed as a "free speech safeguard"[207] in copyright law and as an engine of social creativity.[208]

When the U.S. Congress was codifying the fair use doctrine into the Copyright Act, it deliberately afforded the doctrine sufficient flexibility to vest the courts with adequate latitude to protect the public interest in benefiting from technological progress, stipulating that "during a period of rapid technological change," Congress and "the courts must be free to

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203. *See* 17 U.S.C. § 107 (2012).

204. *Id.*

205. *See* Barton Beebe, *Does Judicial Ideology Affect Copyright Fair Use Outcomes?: Evidence from the Fair Use Case Law*, 31 COLUM. J.L. & ARTS 517, 522 (2008) (pointing out that the fair use doctrine defines "the contours of the private and public domains of human expression and, in doing so, directly impact[s] our capability for human flourishing"); Dan L. Burk & Julie E. Cohen, *Fair Use Infrastructure for Rights Management Systems*, 15 HARV. J.L. & TECH. 41, 43-47 (2001) (discussing the social functions of fair use); William W. Fisher III, *Reconstructing the Fair Use Doctrine*, 101 HARV. L. REV. 1659, 1661 (1988) (arguing that the fair use doctrine "would contribute to the realization of a more just social order"); Pamela Samuelson, *Unbundling Fair Uses*, 77 FORDHAM L. REV. 2537, 2540 (2009) ("A well-recognized strength of the fair use doctrine is the considerable flexibility it provides in balancing the interests of copyright owners in controlling exploitations of their works and the interests of subsequent authors in drawing from earlier works when expressing themselves, as well as the interests of the public in having access to new works and making reasonable uses of them."); Haochen Sun, *Fair Use as a Collective User Right*, 90 N.C. L. REV. 125, 201 (2011) ("Fair use is one of the greatest mechanisms for enriching human society. It sustains and enhances both cultural dynamics and political democracy in a free and just society.").

206. *See* 17 U.S.C. § 107.

207. *See, e.g.*, Eldred v. Ashcroft, 537 U.S. 186, 219, 221 (2003) (describing fair use as a "free speech safeguard[]" and a "First Amendment accommodation[]"); Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 560 (1985) ("[T]he First Amendment protections already embodied in the Copyright Act's distinction between copyrightable expression and uncopyrightable facts and ideas, and the latitude for scholarship and comment traditionally afforded by fair use . . . .").

208. *See, e.g.*, Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 575 (1994) ("From the infancy of copyright protection, some opportunity for fair use of copyrighted materials has been thought necessary to fulfill copyright's very purpose, '[t]o promote the Progress of Science and useful Arts . . . .'" (alteration in original) (quoting U.S. CONST. art. I, § 8, cl. 8)).

adapt the doctrine to particular situations on a case by case basis."[209] This benefit of the U.S. fair use system has been further affirmed by case law. In *Sony Corp. of America v. Universal City Studios, Inc.*,[210] the Supreme Court emphasized that "[t]he bill endorses the purpose and general scope of the judicial doctrine of fair use, but there is no disposition to freeze the doctrine in the statute, especially in a period of rapid technological change."[211] Indeed, legislative inability to foresee and deal with all potential circumstances justifies the open-ended and flexible structure of the fair use doctrine. This inherent indeterminacy has become an advantage, relative to the closed system model,[212] because it permits potentially novel ways of exploiting copyrighted works, rendering the framework of copyright law largely coterminous with legislative changes necessitated by continuous technological developments.[213]

On the other hand, the relevant administrative agencies should proactively fulfill its political responsibility to protect group-based interests in technologies. There are a number of legal and practical obstacles that prevent certain groups of people from fully enjoying the benefits of technological progress. Worse still, the relevant administrative agencies have oftentimes turned a blind eye to the interests of underprivileged groups. For example, the World Health Organization estimates "there are more than 314 million blind and visually-impaired persons in the world, 90 percent of whom live in developing countries."[214] However, according to a survey conducted by the World Intellectual Property Organization ("WIPO"), fewer than sixty countries have adopted limitation and exception provisions in their domestic copyright laws to allow or encourage the transformation of works into Braille.[215] In the absence of such provisions, the cost of negotiating with publishers is often prohibitively high.[216]

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209. Universal City Studios, Inc. v. Sony Corp. of Am. 480 F. Supp. 429, 456 (C.D. Cal. 1979).

210. 464 U.S. 417 (1984).

211. *Id.* at 448 n.30.

212. *See* PAUL GOLDSTEIN, GOLDSTEIN ON COPYRIGHT 12:3 (3d ed. 2005) (lamenting that "[n]o doctrine in copyright is less determinate than fair use"); Haochen Sun, *Copyright Law as an Engine of Public Interest Protection*, 16 NW. J. TECH. & INTELL. PROP. 123, 124-245 (2019) (arguing that "use has become something of a legal monster, causing no end of troubles owing to its vague and shifting contours").

213. Universal City Studios, 480 F. Supp., at 456 ("Congress expressly left the fair use doctrine flexible because it recognized the possibility of such a situation. The doctrine is particularly useful in evaluating new technology and its effect on copyright law.").

214. Press Release, World Intellectual Prop. Org., Negotiators Set to Finalize New Treaty Improving Access to Books for Visually Impaired Persons (June 10, 2013), http://www.wipo.int/pressroom/en/articles/2013/article_0012.html.

215. *Id.*

216. *Id.* The WIPO report also explains that:

The end result is that copyright law has effected a widespread "book famine"[217] among the visually-impaired worldwide. "According to the World Blind Union, of the million or so books published each year in the world, less than 5 per cent are made available in formats accessible to visually-impaired persons."[218] This problem is particularly prevalent in less-developed countries. It has been reported that the world's 314 million visually-impaired people live mostly in poor countries where books in friendly formats (Braille, audio, and large print) are scarce.[219] A recent estimate suggests that the entire continent of Africa has only 500 works available for blind English-speakers.[220] However, the book famine is not confined to developing countries. Given the negative effects of copyright law, "book hunger"[221] remains a social problem in the United States, for example, where only about five percent of the 40,000 books published annually are made available to the blind.[222]

Digital libraries offer a potential solution. For example, thirteen U.S. universities jointly created the HathiTrust Digital Library ("HDL"), a repository for the digital versions of 10 million books.[223] The HDL provides visually-impaired users with access to books by using adaptive technologies such as software that magnifies or converts text into spoken words. However, copyright owners have challenged the legality of the HDL.[224] The Second Circuit Court of Appeals ruled that the HDL's digital reproductions of works constitute fair use under the U.S. Copyright Act.[225]

> [B]ecause copyright law is 'territorial', these exemptions usually do not cover the import or export of works converted into accessible formats, even between countries with similar rules. Organizations in each country must negotiate licenses with the rightholders to exchange special formats across borders, or produce their own materials, a costly undertaking that severely limits access by the beneficiaries to printed works of all kinds.

Id.

217. *See* Karyn A. Temple, *The Marrakesh Treaty Implementation Act*, LIBR. CONGRESS (Oct. 10, 2018), https://blogs.loc.gov/copyright/2018/10/the-marrakesh-treaty-implementation-act; *see also* Kwesi Kwaa Prah, *The Difficulties of Publishing in Africa: Random Thoughts on the Casas Publishing Experience*, *in* LANGUAGE AND POWER: THE IMPLICATIONS OF LANGUAGE FOR PEACE AND DEVELOPMENT 301, 301 (Birgit Bock-Utne & Gunnar Garbo eds., 2009) ("In Africa today, there is what is [commonly] described . . . as a 'book famine,' that is a shortage of books, the pricing of books out of the financial reach of most people or the sheer unavailability of books.").

218. Press Release, *supra* note 214.

219. *Id.*

220. *Between the Lines*, ECONOMIST, July 20, 2013, at 54, https://www.economist.com/international/2013/07/20/between-the-lines.

221. Lea Shaver, *Copyright and Inequality*, 92 WASH. U. L. REV. 117, 120 (2014) ("Although much less extreme, book hunger is also a problem in the United States.").

222. *New Copyright Law Big Breakthrough for the Blind*, NAT'L FED'N BLIND, https://www.nfb.org/images/nfb/publications/fr/fr16/issue1/f160106.html (last visited Jan. 25, 2020).

223. *See* Shaver, *supra* note 221, at 145-46.

224. Authors Guild, Inc. v. HathiTrust, 755 F.3d 87, 92 (2d Cir. 2014).

225. *Id.* at 101, 103.

A core reason for the ruling is that the HDL's provision of access to works for the visually-impaired "assure[s] equality of opportunity, full participation, independent living, and economic self-sufficiency for such individuals."[226] Despite this fair use-based ruling, the HDL has not yet provided universal access to all books for all visually-impaired people. At present, only visually-impaired patrons of the University of Michigan library enjoy access to the full text of 10 million copyrighted books.[227]

Against this backdrop, the administration needs to seriously consider how the HDL can be expanded in scale to benefit more visually-impaired persons. The United States ratified the 2013 Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled in February 2019.[228] Therefore, the administration should proactively create initiatives to promote the group-based collective interests of the visually impaired in using technologies to gain access to books.

V. CONCLUSION

The fundamental right to technology, as I have demonstrated, advocates for the dynamic involvement of the U.S. Constitution and the U.S. courts in promoting the equal distribution and enjoyment of the benefits of technological progress. It urges the U.S. legislature and judiciary to reshape IP laws to render them more conducive to protection of this fundamental right, recognizing that IP rights protection has to date played the most prominent role in regulating technology and social justice. If other countries were to follow the constitutional right-based approach proposed herein, they would revolutionize the international human rights system to ensure that it redistributes the benefits of technological progress in the interests of all global citizens.

The fundamental right to technology is by no means an absolute right. It is not intended to substantially harm the interests of IP rights owners by disrupting their business plans to merchandize their IP assets in the market.[229] Nor is it intended to erode the legal confinements of the Fifth Amendment by "[taking] private property . . . for public use, without just compensation."[230] This is because the right does not defy distribution of benefits through market exchange. Instead, this new fundamental right

226. *Id.* at 102 (citing Congress' statement made in the Americans with Disabilities Act).

227. *See id.* at 91.

228. *See WIPO-Administered Treaties*, WIPO, https://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=843 (last visited Jan. 25, 2020).

229. *See supra* Part IV.A.

230. U.S. CONST. amend. V.

is a relational right. It is designed to recharge the Due Process to confront the injustices being ushered in by new technologies. It is intended to redress the potential injustices of the IP Clause in distributing the benefits of those technologies. With this new fundamental right in our hands, we will be in a much better position to harness technology in the service of humanity.

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