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Technology Justice: Taxation of our Collective and Cumulative Cognitive Inheritance

Hilary G. Escajeda

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TECHNOLOGY JUSTICE: TAXATION OF OUR COLLECTIVE AND CUMULATIVE COGNITIVE INHERITANCE

*Hilary G. Escajeda**

As artificial intelligence and robotic technologies accelerate economic transformation, outdated property and tax laws will increasingly fail American workers with ordinary skills that perform routine job functions. Because technology may render millions of workers redundant, U.S. policymakers must make significant social, economic, and legal structural changes to (1) improve the lives of average workers, (2) support the economy, and (3) maintain political stability.

Inspired by Thomas Paine's Agrarian Justice, this twenty-first century Article argues that "Technology Justice" requires that humans benefit from the cognitive endowment created by our ancestors' minds. Specifically, it asserts that our collective and cumulative cognitive inheritance constitutes valuable property—an asset class—that should be taxed for the benefit of all. It then advocates that Technology Justice requires future-focused democracies to invent and implement an integrated property and tax paradigm. This modern paradigm will pre-distribute the economic bounty of our shared cognitive inheritance throughout the community—inspired by Paine's guaranteed minimum income proposal—so that everyone may reap and enjoy the blessings of human progress.

* Assistant Professor, Mississippi College School of Law. I am grateful for the support of my home institution—the Mississippi College School of Law. This Article benefited greatly from workshops both there and at the Association of American Law Schools, Law and Society Association, University of Oregon, Boston College, and University of California Northridge. While I received valuable comments from too many wonderful colleagues to name individually, for particularly constructive thoughts and feedback I thank Alice G. Abreu, Neil H. Buchanan, Roberta Mann (and her tax policy students), Beverly Moran, Shu-Yi Oei, James R. Repetti, Diane M. Ring, Stephen Shay, and Theodore P. Seto.

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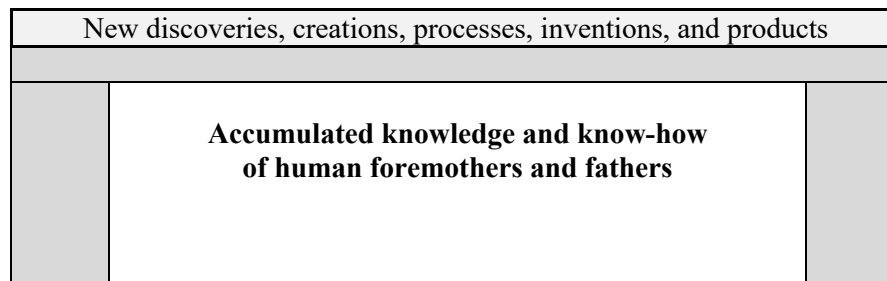
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ARGUMENT IN BRIEF

This Article argues that accumulated knowledge and know-how contained in the “biological wetware that powers the human brain”¹ represents a currently undervalued, idle, and renewable asset class that could fund a universal basic income (UBI) for human workers displaced by artificial intelligence (AI) and robotic technologies.² The simple illustration below shows how contemporary entrepreneurs initially built their modern enterprises on the freely obtainable knowledge generated by our ancestors.

As technology titans continue to make discoveries, create novel products, invent or reimagine whole industries, reshape the economy, and reconfigure the workplace, human-centered laws and policies should be designed to respect and fairly tax emerging and established knowledge assets.³ Ahead in Part III, this Article builds on this simple illustration to offer a prototype for a tax and property paradigm that promotes technology and economic justice—whereby humans can live lives of dignity, community, and opportunity.⁴



1. MARTIN FORD, *RULE OF THE ROBOTS: HOW ARTIFICIAL INTELLIGENCE WILL TRANSFORM EVERYTHING* 154 (2021).

2. *Id.* at 164 (writing that AI “is virtually certain to eliminate or deskill millions of jobs while driving economic inequality to even higher levels”). Ford then observes that if these workers do not have jobs or income, local and national economic growth will stagnate since these consumers do not have the resources to build and support vibrant market economies. *Id.*

3. KATE RAWORTH, *DOUGHNUT ECONOMICS: SEVEN WAYS TO THINK LIKE A 21ST CENTURY ECONOMIST* 189–90 (Joni Praded ed., 2017). Raworth explains:

Economic value lies not in the throughflow of products and services but in the wealth that is their recurring source. That includes the wealth embodied in human-made assets (from tractors to houses) but also the wealth embodied in people (from their individual skills to community trust), in a thriving biosphere (from the forest floor to the ocean floor) and in knowledge (from Wikipedia to the human genome).

Id.

4. *Id.* at 140.

INTRODUCTION

The Fourth Industrial Revolution describes an emerging era where smart machines—powered by AI, robotic, and quantum technologies—increasingly transform how we work and live.⁵ AI appears likely to join the exclusive list of socially and economically transformative general-purpose technologies (GPTs) such as electricity, steam and internal combustion engines, and computers.⁶ In the years ahead, IBM CEO Ginni Rometty predicts that “cognitive AI will impact every decision made.”⁷ Similarly, *Wired* magazine’s founding executive editor Kevin Kelly argues that AI “will enliven inert objects, much as electricity did more than a century ago. Everything that we formerly electrified we will now cognitize.”⁸

For big business, AI and robotics make technology titans economic and political winners,⁹ but for workers, these intelligent machines may render average humans with ordinary skills as having “zero economic value.”¹⁰ To address and ameliorate the adverse

5. See Klaus Schwab, *The Fourth Industrial Revolution: What It Means, How to Respond*, WORLD ECON. F. (Jan. 14, 2016), <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond> [<https://perma.cc/8ZLT-3N23>]. See generally KLAUS SCHWAB, *THE FOURTH INDUSTRIAL REVOLUTION* (2016) (providing an overview of the Fourth Industrial Revolution along with its effects and possible responses).

6. Erik Brynjolfsson et al., *Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics* 19–20 (Nat’l Bureau of Econ. Rsch., Working Paper No. 24001, 2017), <https://www.nber.org/papers/w24001> [<https://perma.cc/WVD4-MV8K>] (observing that the few advances that achieved GPT status are pervasive, improvable, and fostered complementary innovations); ERIK BRYNJOLFSSON & ANDREW MCAFEE, *THE SECOND MACHINE AGE: WORK, PROGRESS, AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES* 76 (2014) (the term GPT describes “deep new ideas or techniques that have the potential for important impacts on many sectors of the economy” (quoting economic historian Gavin Wright)). GPTs boost productivity and are economically significant because “they interrupt and accelerate the normal march of economic progress.” *Id.*; see also FORD, *supra* note 1, at 165 (“[AI] is a systemic, general-purpose technology not unlike electricity, and it will therefore ultimately scale across and invade every aspect of our economy and society.”); PAUL SCHARRE, *ARMY OF NONE: AUTONOMOUS WEAPONS AND THE FUTURE OF WAR* 5 (2018) (quoting Kevin Kelly’s comparison of AI to electricity and how AI will supercharge intelligent machines).

7. BYRON REESE, *THE FOURTH AGE: SMART ROBOTS, CONSCIOUS COMPUTERS, AND THE FUTURE OF HUMANITY* 61 (2018).

8. *Id.* at 182; see also Kevin Roose, *We Need to Talk About How Good A.I. Is Getting: We’re in a Golden Age of Progress in Artificial Intelligence. It’s Time to Start Taking Its Potential and Risks Seriously*, N.Y. TIMES (Aug. 24, 2022), <https://www.nytimes.com/2022/08/24/technology/ai-technology-progress.html> [<https://perma.cc/STS6-NJ8X>] (discussing artificial intelligence’s surprising leaps and the ongoing debate about its ability to achieve human-level sentience).

9. See Martin J. McMahon, Jr. & Alice G. Abreu, *Winner-Take-All Markets: Easing the Case for Progressive Taxation*, 4 FLA. TAX REV. 1, 68 (1998).

10. REESE, *supra* note 7, at 129; see William H. Davidow & Michael S. Malone, *What Happens to Society When Robots Replace Workers?*, HARV. BUS. REV. (Dec. 10, 2014), <https://hbr.org/2014/12/what-happens-to-society-when-robots-replace-workers> [<https://perma.cc/B7M2>]

effects of “technological unemployment,”¹¹ policymakers and the public should discuss and design plans that fund a universal basic income (UBI) for displaced workers.¹² That way, community members would have a minimally decent quality of life that promotes self-respect, independence, stability, and belonging.¹³ Human-centered tax and property law reforms should further “be guided by considered judgments about the appropriate aims of government in a just society.”¹⁴ For instance, the welfare of its citizens, the preservation of

-TJLQ]; YUVAL NOAH HARARI, *HOMO DEUS: A BRIEF HISTORY OF TOMORROW* 318 (2017) (in the section titled “The Useless Class,” Harari writes, “[t]he most important question in twenty-first-century economics may well be what to do with all the superfluous people”); *see also* Hilary G. Escajeda, *Zero Economic Value Humans?*, 10 WAKE FOREST J.L. & POL’Y 129, 142–145 (2020). *See generally* RAWORTH, *supra* note 3, at 162–63 (discussing technological advancement’s effect on employment and referencing Erik Brynjolfsson’s research on the “great decoupling” of production from jobs).

11. John Maynard Keynes, *Economic Possibilities for Our Grandchildren*, in *ESSAYS IN PERSUASION* 321, 325 (1963) (describing “technological unemployment,” which means “unemployment due to our discovery of means of economizing the use of labour outrunning the pace at which we can find new uses for labour”). *See generally* HARARI, *supra* note 10, at 370 (warning that the “governmental tortoise cannot keep up with the technological hare”). Harari observes that when human knowledge slowly increased, politics and the economy similarly changed at a leisurely pace. *Id.* at 62–63. By contrast, in the modern era, “new-found knowledge leads to faster economic, social and political changes; in an attempt to understand what is happening, we accelerate the accumulation of knowledge, which leads to faster and greater upheavals.” *Id.*

12. *See, e.g.*, Miranda Perry Fleischer & Daniel Hemel, *The Architecture of a Basic Income*, 87 U. CHI. L. REV. 625 (2020) (proposing policymaking recommendations to implement a UBI founded upon six core components); Guy Standing, *Basic Income as Common Dividends: Piloting a Transformative Policy*, 40 COMPAR. LAB. L. & POL’Y J. 239 (2019) (discussing how to design a basic income pilot scheme in the United Kingdom and arguing that basic income would be key in confronting our greatest modern challenges, from economic insecurity and inequality to high levels of private debt and the threat of climate breakdown). *See generally* GUY STANDING, *PLUNDER OF THE COMMONS: A MANIFESTO FOR SHARING PUBLIC WEALTH* (2019) (providing a historical look at shared wealth and how it has diminished over time); GUY STANDING, *BASIC INCOME: AND HOW WE CAN MAKE IT HAPPEN* (2017) (diving into arguments for and against a basic income); GUY STANDING, *BASIC INCOME: A GUIDE FOR THE OPEN-MINDED* (2017) (discussing the effect and necessity of basic income through a survey of pilot programs across the globe); PHILIPPE VAN PARIJS AND YANNICK VANDERBORGHT, *BASIC INCOME: A RADICAL PROPOSAL FOR A FREE SOCIETY AND A SANE ECONOMY* (2017) (suggesting how basic income might be financially viable and politically achievable in a globalized economy); CHRIS HUGHES, *FAIR SHOT: RETHINKING INEQUALITY AND HOW WE EARN* (2018) (arguing that the top one percent should pay their fortune forward to create a basic income); RUTGER BREGMAN, *UTOPIA FOR REALISTS: HOW WE CAN BUILD THE IDEAL WORLD* (2017) (advocating for societal utopia through a universal basic income, open borders, and a fifteen-hour work week).

13. LIAM MURPHY & THOMAS NAGEL, *THE MYTH OF OWNERSHIP: TAXES AND JUSTICE* 181–83 (2002) (advocating for “direct cash transfers” that provide some financial stability without disincentivizing work). They also argue, “Any conception of justice that is concerned with the welfare and equal opportunities of the member of society—whether or not it gives special weight to the worst off—will have to be particularly concerned with the standard of living for those who are the poorest.” *Id.* at 135.

14. *Id.* at 139.

freedom and liberty, and the “freedom from concentrated power” should be primary goals of a vibrant and thriving democracy.¹⁵

When considering how to finance a UBI, policymakers may find themselves at a crossroads where two divergent paths appear. The first—a familiar and paved course—reinforces usual property definitions and tax structures for labor, capital, corporate, and estate income.¹⁶ Recently, proposals to tax wealth, robots, data, digital services, and financial transactions, along with expanded value-added taxes, have entered the public debate.¹⁷ Since many of these tax policy

15. McMahon, Jr. & Abreu, *supra* note 9, at 35, 68 (stating that when policymakers formulate policy, the citizens’ welfare should be the “primary goal” along with reducing concentrations of political power and wealth); *see also* Jeremy Bearer-Friend & Vanessa Williamson, *The Common Sense of a Wealth Tax: Thomas Paine & Taxation as Freedom from Aristocracy*, 26 FLA. TAX REV. (forthcoming 2023) (manuscript at 31) (explaining that “Paine’s plan for a wealth tax sprang from the same source as his impassioned case for an American republic: a lifelong advocacy for freedom from concentrated power”).

16. PETER BARNES, WITH LIBERTY AND DIVIDENDS FOR ALL: HOW TO SAVE OUR MIDDLE CLASS WHEN JOBS DON’T PAY ENOUGH 84–85 (Elissa Rabellino ed., 2014) (broadly referencing taxes on individuals, employers, other entities, and co-owned wealth). *See generally* James K. Boyce & Peter Barnes, *How to Pay for Universal Basic Income*, EVONOMICS (Nov. 28, 2016), <https://evonomics.com/how-to-pay-for-universal-basic-income/> [<https://perma.cc/X247-24GH>] (discussing funding UBI with common assets).

17. For contemporary treatment of Thomas Paine’s “Common Sense” ideas about Wealth Taxes, *see* Bearer-Friend & Williamson, *supra* note 15. Some recommended readings include: Orly Mazur, *Taxing the Robots*, 46 PEPP. L. REV. 277 (2019); Roberta F. Mann, *I Robot: U Tax? Considering the Tax Policy Implications of Automation*, 64 MCGILL L.J. 763 (2019); XAVIER OBERSON, TAXING ROBOTS: HELPING THE ECONOMY TO ADAPT TO THE USE OF ARTIFICIAL INTELLIGENCE (2019); Ryan Abbott & Bret Bogenschneider, *Should Robots Pay Taxes? Tax Policy in the Age of Automation*, 12 HARV. L. & POL’Y REV. 145 (2018); Jay A. Soled & Kathleen DeLaney Thomas, *Automation and the Income Tax*, 10 COLUM. J. TAX L. (2018). *See generally* Kevin J. Delaney, *The Robot That Takes Your Job Should Pay Taxes, Says Bill Gates*, QUARTZ (Feb. 17, 2017), <https://qz.com/911968/bill-gates-the-robot-that-takes-your-job-should-pay-taxes> [<https://perma.cc/DHC4-VUSZ>] (“Gates said that a robot tax could finance jobs taking care of elderly people or working with kids in schools, for which needs are unmet and to which humans are particularly well suited.”); Emily Price, *Bill Gates’ Plan to Tax Robots Could Become a Reality in San Francisco*, FORTUNE (Sept. 5, 2017, 1:57 PM), <https://fortune.com/2017/09/05/san-francisco-robot-tax> [<https://perma.cc/2MDB-AHZL>]; RAWORTH, *supra* note 3, at 164 (describing the “robot dividend” concept inspired by the Alaskan permanent fund); Omri Marian, *Taxing Data*, 47 BYU L. REV. 511, 560–576 (2021) (positing a conceptual framework for a data tax); VIKTOR MAYER-SCHÖNBERGER & THOMAS RAMAGE, REINVENTING CAPITALISM IN THE AGE OF BIG DATA 199–200 (2018) (proposing data taxes). *See also* Chris Hughes, *The Wealth of Our Collective Data Should Belong to All of Us*, THE GUARDIAN (Apr. 27, 2018, 6:00 AM), <https://www.theguardian.com/commentis-free/2018/apr/27/chris-hughes-facebook-googledata-tax-regulation> [<https://perma.cc/8MAE-ZK4K>]; Young Ran (Christine) Kim, *Digital Services Tax: A Cross-Border Variation on the Consumption Tax Debate*, 72 ALA. L. REV. 131, 158–160 (2020) (explaining the anatomy of digital service taxes and explaining that they are designed as consumption taxes); ANDREW YANG, THE WAR ON NORMAL PEOPLE: THE TRUTH ABOUT AMERICA’S DISAPPEARING JOBS AND WHY UNIVERSAL BASIC INCOME IS OUR FUTURE 170–73 (2018); William G. Gale, *How a VAT Could Tax the Rich and Pay for Universal Basic Income*, BROOKINGS (Jan. 30, 2020), <https://www.brookings.edu/blog/up-front/2020/01/30/how-a-vat-could-tax-the-rich-and-pay-for-universal-basic-income/> [<https://perma.cc/X4KP-KLQU>]. *Cf.* Kyle Pomerleau, *Does Andrew Yang’s “Freedom*

proposals have already received substantial analyses,¹⁸ this Article does not delve into such details.

Instead, it explores the second, obscured route that ventures into fortuitous cognitive terrain. Here, one finds some starry-eyed and once impractical ideas from bold thinkers across the centuries that now illuminate the sky, revealing a forward path to a UBI.¹⁹ These visionaries' electrifying theories animate the imagination, design, and construction of a modern property and tax paradigm that pre-distributes, rather than re-distributes, co-owned wealth.²⁰ Successful navigation of this conceptual trail involves seeking intellectual sparks that energize critical thinking and creative solutions.

Inspired by Thomas Paine's *Agrarian Justice*,²¹ this Article extends Paine's theories by advocating for "Technology Justice."²² It

Dividend" Proposal Add Up?, TAX FOUND. (Jul. 24, 2019), <https://taxfoundation.org/andrew-yang-value-added-tax-universal-basic-income/> [<https://perma.cc/D4CX-4WQE>] (calculating that Andrew Yang's proposal of a 10 percent VAT would be insufficient to pay for UBI, but an increased percentage could be feasible). Andrew Yang also proposes a 0.1 percent transaction tax on financial trades to fund basic income. See *Financial Transaction Tax Policy*, YANG 2020, <https://www.yang2020.com/policies/financial-transaction-tax/> [<https://perma.cc/ZB47-B484>].

18. See, e.g., Ari Glogower, *A Constitutional Wealth Tax*, 118 MICH. L. REV. 727 (2020); Jay A. Soled, *Reimagining the Estate Tax in the Automation Era*, 9 U.C. IRVINE L. REV. 787 (2019); Bearer-Friend & Williamson, *supra* note 17; Lily Batchelder, *Tax the Rich and Their Heirs: How to Tax Inheritances More Fairly*, N.Y. TIMES (June 24, 2020), <https://www.nytimes.com/2020/06/24/opinion/inheritance-tax-inequality.html> [<https://perma.cc/DSU2-CK24>].

19. A short list of relevant thinkers on guaranteed income include Thomas More, Thomas Paine, Milton and Rose D. Friedman, Dr. Martin Luther King, Jr., Peter Barnes, Charles Murray, Andy Stern, Philippe Van Parijs, Yannick Vanderborght, Andrew Yang, Rutger Bregman, Scott Santens, Kai-Fu Lee, and Annie Lowrey. See Escajeda, *supra* note 10, at 172, 176, 182, 184–85, 191; THOMAS PAINE, *AGRARIAN JUSTICE* (Wildside Press 2010) (1797); BARNES, *supra* note 16; see also FORD, *supra* note 1, at 193–99.

20. REESE, *supra* note 7, at 142–43 (citing Thomas Paine's *Agrarian Justice* and advocating a rethinking of property rights which recognizes the existence of "a body of scientific knowledge, social institutions, and shared conventions such as language, money, and law, which should be legally seen as owned by everyone"). He explains that "[t]hose who create a new widget and make a million dollars made that million using these commonly owned assets . . . and therefore that everyone has an equal claim to almost all that money." *Id.* at 142; see also BARNES, *supra* note 16, at 139 ("Co-owned wealth is wealth we coinherit or cocreate, wealth of the whole system and/or its subsystems, wealth not created by individuals or businesses."). Barnes then distinguishes between the "[o]ld idea" of redistribution that "begins with a taking of income previously received" and Yale University professor Jacob S. Hacker's "[b]reakthrough" idea of pre-distribution that "involves no takings." *Id.* at 125–26. See Jacob S. Hacker, Essay, *The Institutional Foundations of Middle-Class Democracy*, PROGRESSIVE GOVERNANCE: OSLO 33, 35 (2011), https://www.jacobhacker.com/assets/hacker_pn.pdf [<https://perma.cc/8UBM-VWB2>] (explaining the power of "pre-distribution"—the way in which the market distributes its rewards in the first place"). Hacker emphasizes the importance of "market reforms that encourage a more equal distribution of economic power and rewards even before government collects taxes or pays out benefits." *Id.*

21. PAINE, *supra* note 19.

22. This Article combines, reimagines, and expands on a chain of ideas generally articulated by others. Caprice L. Roberts, *Unpopular Opinions on Legal Scholarship*, 50 LOY. U. CHI. L.J.

commences by arguing that logic demands a fundamental rethink of what constitutes our natural inheritance. Next, it asserts that Technology Justice requires that humans benefit from the natural inheritance created by our ancestors' "superminds"²³ over the past forty to seventy millennia (40,000–70,000 years).²⁴ This Article then expressly acknowledges that our nation's "technological abundance" springs from previous generations' collective and cumulative cognitive inheritance.²⁵ To achieve Technology Justice, this Article recommends that

365, 376 (2018) ("In truth, we are building on the work of others consciously and subconsciously."). Roberts explains that, "[w]ithin a given expertise, we might even be writing a scholarly 'chain novel' if we are listening and responding to each other's works on point." *Id.* Specifically, this Article advocates for the taxation and pre-distribution of an asset class: humanity's collective and cumulative cognitive intelligence. It builds and expands upon ideas articulated by: REESE, *supra* note 7, at 142–43 (musing about the need for a modern update to Paine's *Agrarian Justice*); BARNES, *supra* note 16, at 126 (calling for "a new set of pipes and property rights" to achieve pre-distribution); and YUVAL NOAH HARARI, 21 LESSONS FOR THE 21ST CENTURY 6–7 (2018) ("Governments might therefore need to invent entirely new taxes—perhaps a tax on information (which will be both the most important asset in the economy and the only thing exchanged in numerous transactions)."). *See also* SHOSHANA ZUBOFF, *THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER* 211, 414 (2019) (describing a new class of "information assets" and explaining how AI will learn and improve from others' knowledge and experience). *See generally* WORLD ECON. F., *PERSONAL DATA: THE EMERGENCE OF A NEW ASSET CLASS* 5 (2011), http://www3.weforum.org/docs/WEF_ITTC_PersonalDataNewAsset_Report_2011.pdf [<https://perma.cc/2B8Q-92S6>] (describing personal data as an asset).

23. *See* THOMAS W. MALONE, *SUPERMINDS: THE SURPRISING POWER OF PEOPLE AND COMPUTERS THINKING TOGETHER* 3 (2018) ("*Supermind* is an English word that means 'a powerful combination of many individual minds.'"). Malone explains that the "history of humanity is largely the history of human superminds, of how humans in groups—like hierarchies, communities, markets, and democracies—accomplished things that individual humans could have never done alone." *Id.*

24. Daniel Dennett, *The Software/Wetware Distinction, Comment on "Toward a Computational Framework for Cognitive Biology: Unifying Approaches from Cognitive Neuroscience and Comparative Recognition" by W. Tecumseh Fitch*, 11 *PHYSICS LIFE REVS.* 367, 371 (2014) ("Human comprehension has been steadily growing since prehistoric times.") [hereinafter Dennett, *The Software/Wetware Distinction*]. In *From Bacteria to Bach and Back: The Evolution of Minds*, Dennett writes:

For forty millennia and more, we have been living in the age of intelligent design—crafting pots, tools, weapons, clothes, dwellings and vehicles; composing music and poetry; creating art; inventing and refining agricultural practices; and organizing armies, with a mixture of dutiful obedience to tradition, heedless and opportunistic improvisation, and knowing, intentional, systematic R&D, irregularly punctuated with moments of "inspired" genius.

DANIEL C. DENNETT, *FROM BACTERIA TO BACH AND BACK: THE EVOLUTION OF MINDS* 371 (2017) [hereinafter DENNETT, *FROM BACTERIA TO BACH*]; *see also* YUVAL NOAH HARARI, *SAPIENS: A BRIEF HISTORY OF HUMANKIND* 3 (2015) (describing three revolutions that shaped human history). Harari explains: (1) the "Cognitive Revolution" started about 70,000 years ago; (2) the "Agricultural Revolution" began 12,000 years ago; and (3) the "Scientific Revolution" began 500 years ago. *Id.*

25. *See* MARTIN LUTHER KING, JR., *WHERE DO WE GO FROM HERE: CHAOS OR COMMUNITY* 171, 181 (1967) (noting how technology abundance creates opportunities for social, moral, and

such inheritance (comprised of tangible and intangible assets)²⁶ be taxed and pre-distributed for the benefit of all in the form of a UBI. The time is right to engage in a holistic debate about the ownership and taxation of tangible and intangible human-created property that supports all of humanity instead of a few stakeholders.²⁷

Having opened the merits of this proposal for a twenty-first century tax paradigm, this Article proceeds in three parts to reimagine the definition, taxation, and distribution of the property forming humans' collective and cumulative cognitive inheritance.

Part I explores Thomas Paine's *Agrarian Justice*, where he advanced the idea that naturally created assets belong to all humans and proposed that the co-owned wealth derived from these earthly assets fund a guaranteed minimum income.²⁸ It then argues that Paine's eighteenth-century framework lights the way to twenty-first century Technology Justice.

economic justice); BARNES, *supra* note 16, at 95 (anticipating that our technology and economic system will produce an immense amount of wealth).

26. See JONATHAN HASKEL & STIAN WESTLAKE, *CAPITALISM WITHOUT CAPITAL: THE RISE OF THE INTANGIBLE ECONOMY* 20 (2018) (defining an asset as "an economic resource that is expected to provide a benefit over a period of time"). Merriam-Webster defines "tangible asset" as "an asset that has physical form and is capable of being appraised at an actual or approximate value." *Asset*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/asset#legalDictionary> [<https://perma.cc/7SB4-XSTV>]. By contrast, an "intangible asset" is "an asset (as goodwill or a patent) that does not have physical form." *Id.* Professor George Mundstock defines a "tangible asset" as an asset that "has value only to the extent it is expected to generate future cash flow, either by being sold or by increasing future net cash flow." George Mundstock, *Taxation of Business Intangible Capital*, 135 U. PA. L. REV. 1179, 1185 (1987) (referencing R. MILLER, *INTERMEDIATE MACROECONOMICS* 155 (1978)). After describing the evolving definitions and classifications of intangible property, also called intellectual capital, Professor Lily Kahng argues that intellectual capital includes "knowledge-based capital" that may be self-created or acquired from third parties and "can be observed and measured by reference to either inputs or outputs." Lily Kahng, *The Taxation of Intellectual Capital*, 66 FLA. L. REV. 2229, 2235–36 (2014). She then observes that "[i]ntellectual capital [in business context] and human capital [in the individual context] are closely related but not coterminous." *Id.* at 2237. See generally JAMES BOYLE, *THE PUBLIC DOMAIN: ENCLOSING THE COMMONS OF THE MIND* 37 (2008) (explaining Thomas Jefferson's insights into the differences between tangible property and ideas).

27. HASKEL & WESTLAKE, *supra* note 26, at 23 (observing that "[f]ast-growing tech companies are some of the most intangible-intensive of firms"). See generally BOYLE, *supra* note 26, at 240–242, 247 (advocating for an evidence-based, harmonious, integrated—international and environmental—approach to intellectual property policy and laws); see also Bearer-Friend & Williamson, *supra* note 15, at 32 (encouraging "us to consider tax policy as primarily a political endeavor").

28. PAINE, *supra* note 19, at 15–25 ("[m]eans by which the fund is created").

Part II ventures to the “adjacent possible,”²⁹ where policymakers can imagine and invent an integrated property and tax paradigm.³⁰ It does so through summarizing and building on Loyola Law School, Los Angeles tax professor Theodore Seto’s 2017 article, “A Forced Labor Theory of Property and Taxation.”³¹ Part II then argues that property and tax laws should align to support social capital creation and Technology Justice.

Part III draws on Paine’s *Agrarian Justice* to propose a framework for Technology Justice that modernizes laws to recognize and value humans’ shared patrimony—an ignored income source within capitalism.³² Next, it asserts that the co-owned wealth derived from humans’ collective and cumulative cognitive assets (patrimony) should be taxed.³³ And, like Paine’s guaranteed income, Part III posits the UBI as the vehicle for pre-distributing humans’ shared inheritance. It then summarizes Elon Musk’s recent earthly and space adventures and demonstrates the treatment of Musk’s enterprises under the proposed paradigm. Lastly, Part III closes by inviting others to debate

29. STEVEN JOHNSON, WHERE GOOD IDEAS COME FROM: THE NATURAL HISTORY OF INNOVATION 31 (2010) (noting that the phrase “adjacent possible” “captures both the limits and the creative potential of change and innovation”). Johnson explains: “The adjacent possible is a kind of shadow future, hovering on the edges of the present state of things, a map of all the ways in which the present can reinvent itself.” *Id.* He adds: “What the adjacent possible tells us is that at any moment the world is capable of extraordinary change, but only *certain* changes can happen.” *Id.*

30. Murphy and Nagel assert:

Private property is a legal convention, defined in part by the tax system; therefore, the tax system cannot be evaluated by looking at its impact on private property, conceived as something that has independent existence and validity. Taxes must be evaluated as part of the overall system of property rights that they help to create. Justice or injustice in taxation can only mean justice or injustice in the system of property rights and entitlements that result from a particular tax regime.

MURPHY & NAGEL, *supra* note 13, at 8.

31. Theodore P. Seto, *A Forced Labor Theory of Property and Taxation*, in PHILOSOPHICAL FOUNDATIONS OF TAX LAW 193–216 (Monica Bhandari ed., 2017); see ROBERT NOZICK, ANARCHY, STATE, AND UTOPIA 169–71 (2013); see also MURPHY & NAGEL, *supra* note 13, at 122 (“Robert Nozick famously argued that taxation of earnings was for this reason ‘on a par with forced labor’; to achieve their preferred level of explicit consumption, people are forced to work more than they would need to in a tax-free world.”).

32. See BARNES, *supra* note 16, at 27. Referring to this shared patrimony, Barnes writes, “[t]he sum of wealth created by nature, our ancestors, and our economy as a whole is what I here call *co-owned wealth*.” *Id.* at 61.

33. See generally JOSEPH HENRICH, THE SECRET OF OUR SUCCESS: HOW CULTURE IS DRIVING HUMAN EVOLUTION, DOMESTICATING OUR SPECIES, AND MAKING US SMARTER 12, 211, 277, 283 (2016) (Harvard University professor of human evolutionary biology, Joseph Henrich explains how human intelligence and technologies result from the “accumulated repertoire of mental tools” and cumulative cultural learning and evolution inherited from our ancestors).

payment structures and formulas, augment this analysis, and develop practical policy designs.

I. PROPERTY: NATURAL, HUMAN-CREATED, AND CO-OWNED

Thomas Paine, an uneducated and unknown Englishman, emigrated to America in 1774 after a fortuitous meeting with Benjamin Franklin in London.³⁴ Deftly wielding his pen, Paine's bold political prose—especially *Common Sense*—fueled the American Revolution.³⁵ Determined to spread his visionary ideas across continents, in 1787, Paine returned to England where he wrote *Rights of Man*—a publication for which he was subject to trial, found guilty, and outlawed.³⁶ Paine fled to France where he wrote *The Age of Reason (Part I)* during the Reign of Terror.³⁷ He drafted *Part 2* in prison.³⁸

After his release, Paine penned *Agrarian Justice*—a document described as “radical” since it radiated revolutionary ideas about property rights.³⁹ In this slim pamphlet, Paine advanced several arguments for restricting private property and sought to “revive natural law teaching about the original community of property ordained by God.”⁴⁰ Paine identified two forms of property: natural and human-created.⁴¹ Paine described natural property as the blessings bestowed upon us by the “Creator of the universe—such as the earth, air, water.”⁴² Paine then defined human-created property as encompassing “artificial or acquired property—the invention of men.”⁴³ Paine argued that

34. Jill Lepore, *The Sharpened Quill*, *NEW YORKER* (Oct. 16, 2006), <https://www.newyorker.com/magazine/2006/10/16/the-sharpened-quill> [<https://perma.cc/W3W5-V4F9>]; see also Bearer-Friend & Williamson, *supra* note 17, 4–5.

35. Lepore, *supra* note 34.

36. *See id.*

37. *Id.*

38. *Id.*; see also R.B. Bernstein, *Rediscovering Thomas Paine*, 39 *N.Y.L. SCH. L. REV.* 873, 878 (1994) (arguing that Paine should be considered as a “constructive constitutional and political thinker”).

39. PAINE, *supra* note 19; J. E. King & John Marangos, *Two Arguments for Basic Income: Thomas Paine (1737–1809) and Thomas Spence (1750–1814)*, *XIV HIST. OF ECON. IDEAS* 55, 59–61 (2006).

40. GREGORY CLAEYS, *THOMAS PAINE: SOCIAL AND POLITICAL THOUGHT* 196 (1989); see Bernstein, *supra* note 38, at 890 (describing *Agrarian Justice* as Paine's “great statement on property, poverty, and the need for radical reform of the English political, social, and economic system”).

41. PAINE, *supra* note 19, at 5 (“Author's Note from the French Edition: To the Legislature and the Executive Directory of the French Republic”).

42. *Id.*

43. *Id.*

because humans have a “natural birthright” to God-created property, those dispossessed from such property should be compensated.⁴⁴

This section explores these two types of property and then ponders property co-ownership. It next considers how to reimagine and reshape Paine’s natural property ideas for the twenty-first century—thereby illuminating a path for achieving Technology Justice.

A. Natural Property

In *Agrarian Justice*, Paine asserted that “all individuals have legitimate birthrights in a certain species of property or its equivalent.”⁴⁵ Specifically, he argued that all humans were entitled to share their “natural inheritance” derived from the Earth.⁴⁶ Paine then distinguished between natural and cultivated property.⁴⁷ Natural property represented “*the common property of the human race*,”⁴⁸ whereas improvements to natural property could create individual property rights.⁴⁹

1. Achieving Agrarian Justice: A Four-Step Process For Natural Property

Paine posited a four-step procedure for achieving “Agrarian Justice.”⁵⁰ The process of identifying “distinct species of rights” begins by “tracing things to their origin” so one can “gain rightful ideas of them.”⁵¹ After tracing the property to its then-known origins, step two involves “discover[ing] the boundary that divides right from wrong.”⁵² Step three distinguishes between individual and common property.⁵³ Upon completion of these three steps, Paine then devised a solution to achieve Agrarian Justice. Specifically, step four monetizes the earthly

44. CLAEYS, *supra* note 40, at 196–97.

45. PAINE, *supra* note 19, at 6.

46. *Id.* at 14–15.

47. *Id.* at 12–14 (providing examples of cultivated property include human-made dams, waterwheels, etc.).

48. *Id.* at 15.

49. *Id.* at 12 (“[T]he value of the improvement, only, and not the earth itself, that is individual property.”). Paine explains how the process of land cultivation created value as compared with land in its “natural state.” *Id.* at 14. He writes, “Cultivation is at least one of the greatest natural improvements ever made by human invention. It has given to created earth a tenfold value.” *Id.*

50. *See id.* at 13–14.

51. *Id.*; *see* BOYLE, *supra* note 26, at 175 (discussing unwritten “prior art”).

52. PAINE, *supra* note 19, at 13.

53. *See id.* at 14 (“teach[ing] every man to know his own”).

assets comprising humans' natural inheritance.⁵⁴ From there, Paine advocated for asset distribution through a guaranteed minimum income.⁵⁵ Paine next proposed the creation of a national fund, which would pay "every person, when arrived at the age of twenty-one years, the sum of fifteen pounds sterling, as compensation in part, for the loss of his or her natural inheritance, by the introduction of the system of landed property."⁵⁶

When Paine wrote his Pamphlet in 1796, his definitions of property and innovative proposal to achieve Agrarian Justice made sense based on the era's common knowledge. While Paine's 227-year-old analytical framework remains sound, subsequent scientific discoveries now make it possible to analyze natural and human-created property components and subcomponents—thereby enabling more precise property valuations. Water and lightning serve as two examples of how science can and should reshape our understanding of all natural property and its economic value.

2. Applying Chemical and Electrical Sciences to Refine Paine's Model of Asset Tracing and Valuation

The constant growth and evolution of knowledge since Paine penned *Agrarian Justice* suggests that the year 1796 functions as a conceptual baseline, not an endpoint, for any analysis of what constitutes natural and common property.⁵⁷ This Article's analysis of Paine's 1796 framework begins with a cursory study of water to foster an appreciation of the atoms forming this naturally occurring resource.⁵⁸ It next describes humans' continuously evolving

54. See *id.* at 12 (collection of "ground-rent[s]"); *id.* at 14–15 (proposing a guaranteed basic income); *id.* at 27–28 (stating "[m]eans for carrying the proposed Plan into Execution"). Paine's last step consists of two tasks: (1) monetizing the assets comprising humans' natural inheritance; and (2) pre-distributing the collected revenues from the co-owned wealth via guaranteed payments to all. *Id.* This Article uses the terms guaranteed minimum income and UBI interchangeably. Part III builds on Paine's step four.

55. *Id.* at 14–15 (proposing a guaranteed basic income). Paine explained, "It is wrong to say God make *rich* and *poor*; He made only *male* and *female*, and He gave them the earth for their inheritance." *Id.* at 9.

56. *Id.* at 14–15. To support older members of the community, Paine also proposed "the sum of ten pounds per annum, during life, to every person now living, of the age of fifty years, and to all others as they shall arrive at that age." *Id.* at 15. Converting Paine's proposal in pounds sterling to current dollars reveals that every person who attains age 21 would receive a lump sum payment of \$2,070.68 at age 21 and those who live to age 50 would receive an annual stipend of \$1,380.45. Eric W. Nye, *Pounds Sterling to Dollars: Historical Conversion of Currency*, UNIV. WYO., <https://www.uwyo.edu/numimage/currency.htm> [<https://perma.cc/S6LN-V75F>].

57. See PAINE, *supra* note 19, at 12.

58. See *infra* Section I.A.2.a.

understanding of electricity as a model for identifying, tracing, valuing, and distributing the economic bounty of natural property to its rightful common owner—humanity.⁵⁹ Ahead, Section I.B. extends these sparking ideas to human-created property by providing insight on the consistent treatment of both natural and human-created property.

a. Water

While Paine “extolled the cosmopolitan virtues of science”⁶⁰ and recognized water’s importance and overall economic value,⁶¹ the chemistry of this free-flowing liquid was not mainstream knowledge until decades later.⁶² Today, water is understood as “a substance composed of the chemical elements hydrogen and oxygen and existing in gaseous, liquid, and solid states.”⁶³

Water is more than a liquid—it consists of individual elements (hydrogen and oxygen)—each with separate and distinct economic value. For example, oil refineries and ammonia producers routinely use hydrogen.⁶⁴ Hydrogen increasingly powers vehicles equipped with

59. See *infra* Section I.A.2.b.

60. STEVEN PINKER, ENLIGHTENMENT NOW: THE CASE FOR REASON, SCIENCE, HUMANISM, AND PROGRESS 409 (Penguin Books 2019) (2018). In 1782, Paine wrote in “A Letter Addressed to the Abbe Raynal” the following:

Science, the partisan of no country, but the beneficent patroness of all, has liberally opened a temple where we all may meet. Her influence on the mind, like the sun on the chilled earth, has long been preparing it for higher cultivation and further improvement. The philosopher of one country sees not an enemy in the philosophy of another: he takes his seat in the temple of science, and asks not who sits beside him.

Id.

61. See PAINE, *supra* note 19, at 5 (recognizing water as natural property from the Creator).

62. See, e.g., Trevor H. Levere, *Henry Cavendish*, BRITANNICA (Feb. 20, 2023), <https://www.britannica.com/biography/Henry-Cavendish> [<https://perma.cc/UJ7M-XLRT>] (identifying water as a compound of two gases); Arthur L. Donovan, *Antoine Lavoisier*, BRITANNICA (Feb. 25, 2023), <https://www.britannica.com/biography/Antoine-Lavoisier> [<https://perma.cc/NM62-QH4U>] (identifying water as a compound of two gases, oxygen, and hydrogen (H₂O)); Keith Sheppard & Dennis M. Robbins, *Chemistry, The Central Science? The History of the High School Science Sequence*, 82 J. CHEM. EDUC. 561, 561 (2005) (“Chemistry as a subject was introduced into American secondary schools in the first quarter of the 19th century and it soon became firmly established in the curricula of many schools.” (citation omitted)).

63. *Water*, BRITANNICA, (Feb. 23, 2023), <https://www.britannica.com/science/water> [<https://perma.cc/X6C3-CJFT>]. See generally REESE, *supra* note 7, at 244 (describing how the combination of oxygen and hydrogen “can be explained as the predictable outcome of the four fundamental forces acting on quarks and leptons, the basic building blocks of matter”).

64. Dennis Reid, *Hydrogen in Oil Refineries: Understanding the Importance of Hydrogen Monitoring and Best Practices*, FORBES (Sept. 8, 2022), <https://www.forbes.com/sites/forbesbusinesscouncil/2022/09/08/hydrogen-in-oil-refineries-understanding-the-importance-of-hydrogen-monitoring-and-best-practices/?sh=100c542243d7> [<https://perma.cc/25D6-ZKWW>]. In December

fuel cell technologies.⁶⁵ In addition, NASA recently designated liquid hydrogen as the fuel of choice for space exploration.⁶⁶ Aside from oxygen's life-sustaining capacities, manufacturers use oxygen to produce steel, chemicals, glass, ceramics, and many other products.

Further, water's economic significance is not limited to industrial production. For example, the February 2023 Denver water consumption charge ranged between \$2.63 and \$6.31 per thousands of gallons used at the residential level.⁶⁷ No matter its form—liquid, solid, or gas—water can now be valued, sold, and distributed.

b. Electricity

Much like water, electricity plays a vital social and economic role. Electricity powers everything from streetlights to smartphones. In Paine's era and present times, lightning strikes can illuminate otherwise dark nights. In Paine's lifetime, ordinary persons viewed the "devastating scourge of lightning" as an "expression of God's will."⁶⁸ Others considered such sparks a "supernatural phenomenon" that provided excellent entertainment at posh eighteenth-century social

2019, S&P Global Platts published a "first-to-market suite of hydrogen price assessments." *See S&P Global Platts Launches World's First Hydrogen Price Assessments*, S&P GLOBAL (Dec. 18, 2019), <https://www.spglobal.com/platts/en/about-platts/media-center/press-releases/2019/18-12-2019-hydrogen-launch> [<https://perma.cc/T3TX-9SPG>].

65. S&P GLOBAL, *supra* note 64 (predicting networks of hydrogen-fueling stations will proliferate across the nation and citing California plans to deploy one thousand hydrogen fueling stations by 2030); Casey Crownhart, *Hydrogen-powered Planes Take Off with Startup's Test Flight*, MIT TECH. REV. (Jan. 19, 2023), <https://www.technologyreview.com/2023/01/19/1067113/hydrogen-planes-test-flight/> [<https://perma.cc/EW9N-3P5B>]. *But see* Hiroko Tabuchi, *For Many, Hydrogen Is the Fuel of the Future. New Research Raises Doubts.*, N.Y. TIMES (Aug. 12, 2021), <https://www.nytimes.com/2021/08/12/climate/hydrogen-fuel-natural-gas-pollution.html> [<https://perma.cc/S537-KKQJ>] (explaining how most hydrogen production requires substantial energy and results in carbon dioxide emissions).

66. *Liquid Hydrogen—the Fuel of Choice for Space Exploration*, NASA, https://www.nasa.gov/topics/technology/hydrogen/hydrogen_fuel_of_choice.html [<https://perma.cc/F5RW-TBMG>]; *see also* Rachel Koning Beals, *As Bezos Completes Blue Origin Mission, Many Ask What's the Climate Change Impact*, MARKETWATCH (July 20, 2021), <https://www.marketwatch.com/story/as-bezos-completes-blue-origin-mission-many-ask-whats-the-climate-change-impact-11626795950> [<https://perma.cc/3S75-TP2P>] ("The New Shepard booster rocket burned a mix of liquid hydrogen and liquid oxygen. Its exhaust was a trail of water vapor with no carbon emissions, which are among the biggest contributing factors in global warming."); Alan Boyle, *NASA Awards \$10M to Jeff Bezos' Blue Origin for Hydrogen-Oxygen Storage Tech*, GEEKWIRE (Sept. 27, 2019, 4:27 PM), <https://www.geekwire.com/2019/nasa-awards-10m-jeff-bezos-blue-origin-hydrogen-oxygen-storage-tech/> [<https://perma.cc/SGJ6-CBGS>]; *Blue Engines: Rockets Designed for Reuse*, BLUE ORIGIN, <https://www.blueorigin.com/engines> [<https://perma.cc/R387-GGGL>].

67. *2023 Residential Water Rates*, DENVER WATER (2023), <https://www.denverwater.org/residential/billing-and-rates/2023-rates> [<https://perma.cc/ZJM6-RMGP>].

68. WALTER ISAACSON, BENJAMIN FRANKLIN: AN AMERICAN LIFE 137 (2003).

gatherings where static-charged parlor (magic) tricks mesmerized and awed attendees.⁶⁹

A few fearless and curious thinkers saw past the novelty and instead sought to understand thunderbolts and the electricity produced therefrom. For instance, Sir Isaac Newton “noted the apparent connection between lightning and electricity.”⁷⁰ Another, Benjamin Franklin, Paine’s friend and mentor, gained international fame for his electricity experiments.⁷¹ From these experiments, Franklin articulated the “‘first satisfactory theory’ of electricity,” leading to his status as its “primary creator.”⁷² Over subsequent centuries, many supercharged visionaries expanded, updated, and refined Franklin’s theories to discover the immense power and potential of electricity’s atomic and subatomic particles.⁷³

As this brief overview reveals, humans’ evolving knowledge and understanding of chemical and electrical sciences now make it possible to trace the origins of both water and electricity and determine the economic value of such natural property.⁷⁴ As explored next, human-created property merits consistent treatment.⁷⁵

69. *Id.* at 133–45; *see also* TIMOTHY J. JORGENSEN, SPARK: THE LIFE OF ELECTRICITY AND THE ELECTRICITY OF LIFE 9–12 (2021) (describing Dr. Spencer’s “static electricity demonstrations,” including “the Flying Boy demonstration”).

70. ISAACSON, *supra* note 68, at 138.

71. *Id.* at 138–45, 307–08, 467–68 (summarizing Franklin’s experiments with lightning and electricity and noting how Franklin encouraged and suggested revisions to Thomas Paine’s writing).

72. CRAIG R. ROACH, SIMPLY ELECTRIFYING: THE TECHNOLOGY THAT TRANSFORMED THE WORLD, FROM BENJAMIN FRANKLIN TO ELON MUSK 7 (2017) (quoting Harvard historian and professor I. Bernard Cohen). Roach explains that Franklin’s “core theory of electricity” remains consistent with current science because (1) modern “scientists believe all matter is made up of atoms,” and (2) Franklin’s “opposites attract” observation has been validated. *Id.* at 19–20. Further, Roach notes how current language and concepts of positive and negative charge trace back to letters Franklin wrote in 1747. *Id.* at 9; *see also* ISAACSON, *supra* note 68, at 134–44.

73. A partial list of the supercharged visionaries who unlocked the mysteries of electricity include James Watt, Michael Faraday, James Clerk Maxwell, Thomas Edison, Nikola Tesla, Albert Einstein, and Elon Musk. ROACH, *supra* note 72, at 3–32, 71–104, 203–21, 344–54. *See generally* *Electricity Explained: The Science of Electricity*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/electricity/the-science-of-electricity.php> [<https://perma.cc/PFF7-3593>].

74. Like water, electricity has economic value. For example, in 2021, the average price per kilowatt-hour (kWh) averaged \$13.72 for residential consumers and ranged between \$7.26 to \$11.27 for industrial and commercial customers in the United States. *Electricity Explained: Factors Affecting Electricity Prices*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/electricity/prices-and-factors-affecting-prices.php> [<https://perma.cc/6AHH-VMJ7>].

75. DOUGLAS HOFSTADTER & EMMANUEL SANDER, SURFACES AND ESSENCES: ANALOGY AS THE FUEL AND FIRE OF THINKING 19 (2013) (asserting that “analogy-making” constitutes “the lifeblood of cognition”). Particularly pertinent to this Article, Hofstadter and Sander observe:

B. Human-Created Property

Paine defined human-created property as “artificial or acquired property—the invention of men.”⁷⁶ While Paine’s dividing line between natural and artificial property initially and superficially seems reasonable, further reflection reveals logical cracks. Specifically, his natural-artificial distinction raises the following question: how can human-created property be artificial when nature (or the “Creator of the universe”) made the Earth and human minds?⁷⁷ Setting aside these logical inconsistencies until Part III.A.1, this section concentrates on human-generated ideas, innovations, and inventions.

Based on his 1796 understanding of human knowledge, Paine wrote that “equality is impossible” for human-created property.⁷⁸ He explained that “to distribute it equally, it would be necessary that all should have contributed in the same proportion, which can never be the case.”⁷⁹ Some techno-historical context explains why Paine concluded that these analyses, calculations, and allocations were “impossible.”⁸⁰ Back then, the printing press served as the primary information and communications technology of his day—that is, it functioned as the eighteenth-century “Google.”⁸¹ Contemporary hindsight further shows that these printed books and newspapers also seeded the “intellectual genome”⁸² that underpins modern “Global Civilization.”⁸³

Moreover, Paine lived in an analog era of handwritten ideas, cumbersome manual calculations, and slow-moving paper. As a result, any

We who are alive today are the beneficiaries of countless thousands of conceptual pitons that have been driven into the metaphorical cliffs of highly abstruse situations. We can easily climb up steep slopes of abstraction that would have seemed impossible a few generations ago, for we have inherited a vast set of concepts that were create by ingenious forebearers and that are easy to use.

Id. at 131.

76. PAINE, *supra* note 19, at 5.

77. *Id.* (explaining that “natural property, or that which comes to us from the Creator of the universe” includes earth, water, and air).

78. *Id.* at 5–6.

79. *Id.*

80. *Id.* at 5.

81. ROACH, *supra* note 72, at 5.

82. JOHN MAN, *THE GUTENBERG REVOLUTION: HOW PRINTING CHANGED THE COURSE OF HISTORY* 281 (2002) (comparing books to the “intellectual genome” that created “a basis of knowledge which could be based on from generation to generation”).

83. Brian Eno, *Just a New Fractal Detail in the Big Picture*, in *WHAT TO THINK ABOUT MACHINES THAT THINK* 277, 278 (John Brockman ed., 2015) (describing how our “global civilization” was built “with intelligence of thousands of generations of human minds”).

ability to identify, trace, track, and calculate the economic value of human-created knowledge would only become theoretically possible—but mostly impracticable—in the twenty-first century through digital technologies.⁸⁴

Paine’s sturdy framework for achieving Agrarian Justice for natural property nonetheless endures and illuminates a path toward attaining Technology Justice for human-created property.⁸⁵ A scan of human-generated ideas, innovations, and inventions offers a reference for applying Paine’s 1796 framework to the present day.

1. Understanding Human-Generated Ideas, Innovations, and Inventions

Let us begin with Thomas Jefferson’s views on the transmission, generation, and ownership of ideas. In his August 13, 1813, letter to Isaac McPherson,⁸⁶ Jefferson explained how ideas—a “fugitive fermentation of an individual brain”—can spread like fire and do not diminish when others use or build upon them.⁸⁷ He also observed that property ownership constitutes a “gift of social law,”⁸⁸ a concept that will be considered further in Part II.

Ideas ignite innovation. Innovation brings together unique approaches and techniques to solve problems.⁸⁹ Innovation, like the

84. Jessica Litman, *The Public Domain*, 39 EMORY L.J. 965, 1004, 1012 (1990) (dissecting and tracing the “tangible boundaries among parcels of intellectual property . . . is inherently unascertainable”); PINKER, *supra* note 60, at 261 (“We have, at our fingertips, virtually all the works of genius prior to our time, together with those of our own time, whereas the people who lived before our time had neither. Better still, the world’s cultural patrimony is now available not just to the rich and well-located but to anyone who is connected to the vast web of knowledge, which means most of humanity and soon all of it.”). See generally ROBERT COOTER & THOMAS ULEN, *LAW AND ECONOMICS* 130–31 (6th ed. 2012) (discussing copyright tracing challenges).

85. PAINE, *supra* note 19, at 13–14 (tracing property origins, discovering boundaries that divide right from wrong, and distinguishing individual and common property); *id.* at 12 (collection of “ground-rents”); *id.* at 14–15 (proposing a guaranteed basic income); *id.* at 27–28 (“Means for Carrying the Proposed Plan into Execution”). Paine’s last step consists of two tasks: (1) monetizing the assets comprising humans’ natural inheritance; and (2) pre-distributing the collected revenues from the co-owned wealth via guaranteed payments to all. *Id.* at 12, 14–15.

86. Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), in 6 THE PAPERS OF THOMAS JEFFERSON, RETIREMENT SERIES 379, 379–86 (J. Jefferson Looney ed., 2009).

87. *Id.* at 383.

88. *Id.*; see BOYLE, *supra* 26, at 19–20, 37, 202 (noting that Benjamin Franklin deserved patent rights, but did not pursue them). Boyle also explains that neither facts nor ideas can be owned under *Feist Publications, Inc. v. Rural Telephone Service Company*, 499 U.S. 340 (1991). *Id.* at 208.

89. Paul Michelman, *Opening Up Your Innovation*, HBR IDEACAST (Aug. 31, 2006) (interviewing Henry Chesbrough), <https://hbr.org/ideacast/2006/08/harvard-business-ideacast-10-0> [<https://perma.cc/6RX3-Y4YL>] (asserting that invention involves creation or discovery of something novel which was previously unknown).

related concept of invention, begins with ideation.⁹⁰ Or more cheekily, as science writer Matt Ridley describes, innovation is what happens when “ideas have sex.”⁹¹ After umpteen trials, misfires, and reboots, the combination of ideation and innovation may result in the discovery, application, modification, recombination, and development of novel concepts, technologies, and processes.⁹² Ideation thus sparks invention and innovation—thereby generating progress.

Next, we continue our examination of human-created property under Paine’s durable *Agrarian Justice* framework.

2. Applying Paine’s Framework (Step One): Inventory, Trace, and Value Human-Created Property

Inventorying, tracing, and valuing all human-created property would have been an unachievable task in 1796. Today, even with much of the “world’s cultural patrimony” digitized, developing such a digest is daunting.⁹³ But to advance this analysis of and proposed update to Paine’s *Agrarian Justice*, this subsection offers a rudimentary inventory, tracing, and valuation of human-created property to stimulate debate.

a. Inventory

A cursory constellation of thinkers who tirelessly toiled to form humans’ collective and cumulative cognitive inheritance includes Plato, Aristotle, Copernicus, Galileo Galilei, Leonardo Da Vinci, Isaac Newton, J.S. Bach,⁹⁴ Thomas Jefferson,⁹⁵ Benjamin Franklin,

90. Ideation means “the capacity for or the act of forming or entertaining ideas.” *Ideation*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/ideation?utm_campaign=sd&utm_medium=serp&utm_source=jsonld [https://perma.cc/GXY7-NTTS]. Jefferson noted that once an idea is “divulged, it forces itself into the possession of everyone and the receiver cannot dispossess himself of it.” BOYLE, *supra* note 26, at 20.

91. HASKEL & WESTLAKE, *supra* note 26, at 81.

92. WILLIAM ROSEN, *THE MOST POWERFUL IDEA IN THE WORLD: A STORY OF STEAM, INDUSTRY, AND INVENTION* 23–24 (2010) (describing how innovators view failure as the means to learn from past mistakes and guide future inquires and experiments); ROACH, *supra* note 72, at 367 (“The history told here shows how the electricity business arrived at the present through both successes and failures.”).

93. PINKER, *supra* note 60, at 261.

94. *See, e.g.*, DENNETT, *FROM BACTERIA TO BACH*, *supra* note 24, at 324 (listing some iconic minds); WALTER ISAACSON, *LEONARDO DA VINCI* (2017) (discussing Leonardo Da Vinci).

95. BOYLE, *supra* note 26, at 62–63, 177–78, 202–03 (highlighting how Jefferson’s ideas apply to modern issues regarding the internet, computers, and biology).

Alessandro Volta,⁹⁶ Émilie du Châtelet,⁹⁷ Charles Babbage,⁹⁸ Ada Lovelace,⁹⁹ Nikola Tesla,¹⁰⁰ Marie Curie,¹⁰¹ Lise Meitner,¹⁰² Albert Einstein,¹⁰³ Cecilia Payne-Gaposchkin,¹⁰⁴ Grace Hopper,¹⁰⁵ Alan

96. Alessandro Volta, Italian physicist who invented an electric battery that provided the “first source of continuous current.” *Alessandro Volta*, BRITANNICA (Mar. 1, 2023), <https://www.britannica.com/biography/Alessandro-Volta> [<https://perma.cc/85LL-S9M3>].

97. Gabrielle-Émilie Le Tonnelier de Breteuil, marquise du Châtelet, French mathematician, physicist, and philosopher (1706–1749). *Gabrielle-Émilie Le Tonnelier de Breteuil, marquise du Châtelet*, BRITANNICA (Jan. 20, 2023), <https://www.britannica.com/biography/Gabrielle-Emilie-Le-Tonnelier-de-Breteuil-Marquise-du-Chatelet> [<https://perma.cc/95KV5-5RBS>].

98. Charles Babbage, English mathematician and inventor who conceived of the computer (1791–1871). *Charles Babbage*, BRITANNICA, <https://www.britannica.com/biography/Charles-Babbage> [<https://perma.cc/5B83-ZBPK>].

99. Ada Lovelace, mathematician and computer programmer (1815–1852); Betsy Morais, *Ada Lovelace, The First Tech Visionary*, NEW YORKER (Oct. 15, 2013), <https://www.newyorker.com/tech/elements/ada-lovelace-the-first-tech-visionary> [<https://perma.cc/A37S-VY8P>] (noting the U.S. Department of Defense developed a software language called Ada).

100. MARC J. SEIFER, WIZARD: THE LIFE AND TIMES OF NIKOLA TESLA: BIOGRAPHY OF A GENIUS xi (1996) (listing Tesla’s inventions: “induction motor, the electrical-power distribution system, fluorescent and neon lights, wireless communications, remote control, and robotics”). *See generally* NIKOLA TESLA, MY INVENTIONS: THE AUTOBIOGRAPHY OF NIKOLA TESLA (1919).

101. Marie Curie (1867–1934) was a Polish-born French Physicist and Nobel Prize winner in two fields: physics and chemistry. She is famous for her work on radioactivity. *Marie Curie*, BRITANNICA (May 15, 2023), <https://www.britannica.com/biography/Marie-Curie>.

102. Lise Meitner (1878–1968) was an Austrian Physicist and Enrico Fermi Award–winner (1966). In addition to proposing the term “fission,” she was known for her path-breaking work on nuclear fission, radioactivity, uranium, and protactinium-231. *Lise Meitner*, BRITANNICA (Nov. 3, 2022), <https://www.britannica.com/biography/Lise-Meitner> [<https://perma.cc/QKM9-W78G>].

103. Michio Kaku, *Albert Einstein*, BRITANNICA (Mar. 10, 2023), <https://www.britannica.com/biography/Albert-Einstein> [<https://perma.cc/6BCD-GTAC>].

104. Cecilia Payne-Gaposchkin (1900–1979), British-born American astronomer who discovered the composition of stars (hydrogen and helium) and classified stars based on their temperatures. Eric Gregersen, *Cecilia Payne-Gaposchkin*, BRITANNICA (Feb. 21, 2011), <https://www.britannica.com/biography/Cecilia-Payne-Gaposchkin> [<https://perma.cc/4K5L-VBDV>].

105. Grace Hopper (1906–1992) was a U.S. Navy Rear Admiral and mathematician who developed pioneering computer technologies. *Grace Hopper*, BRITANNICA (Feb. 10, 2023), <https://www.britannica.com/biography/Grace-Hopper> [<https://perma.cc/KSB9-9SP6>].

Turing,¹⁰⁶ Hedy Lamarr,¹⁰⁷ and Katherine Johnson,¹⁰⁸ among innumerable others. These bold and visionary thinkers saw past the limited conceptions of their time to kindle innovative ideas, solve problems, and imagine, discover, and create the future. Rephrased in Google-speak, these brilliant, innovative minds made the once “impossible possible.”¹⁰⁹

b. Trace

Practicality prevents precisely tracing the origins of each idea, discovery, or product that comprises the “corpus of [human] knowledge” made by countless unnamed contributors over history.¹¹⁰ To this point, Stigler’s Law of Eponymy provides that “[n]o scientific

106. Alan Turing (1912–1954) was a British mathematician and logician who not only made significant contributions to the fields of mathematics, logic, philosophy, and cryptanalysis, but whose ideas profoundly influenced the future fields of computer science, cognitive science, and artificial intelligence. B.J. Copeland, *Alan Turing*, BRITANNICA (Mar. 6, 2023), <https://www.britannica.com/biography/Alan-Turing> [<https://perma.cc/ZBM5-28CH>].

107. Hedy Lamarr (1914–2000) co-invented and received a patent for a “Secret Communications System” used to combat the Nazis in World War II. The frequency-hopping technology she co-invented with George Antheil is integral to modern information and communications technologies (cellular, Wi-Fi, GPS, etc.). Lamarr was also a Hollywood silver screen star. *See Hedy Lamarr: Invention of Spread Spectrum Technology*, FAMOUS WOMEN INVENTORS, <http://www.women-inventors.com/Hedy-Lamarr.asp> [<https://perma.cc/UK4U-VVNY>]; *Hedy Lamarr: Movie Star, Inventor of WiFi*, CBS NEWS (Apr. 20, 2012, 1:52 PM), <https://www.cbsnews.com/news/hedy-lamarr-movie-star-inventor-of-wifi/> [<https://perma.cc/6TA6-7DWU>]; *Bombshell: The Hedy Lamarr Story*, IMDB, <https://www.imdb.com/title/tt6752848/> [<https://perma.cc/9GXH-XAJN>].

108. *See* Margalit Fox, *Katherine Johnson Dies at 101; Mathematician Broke Barriers at NASA*, N.Y. TIMES (Feb. 24, 2020), <https://www.nytimes.com/2020/02/24/science/katherine-johnson-dead.html> [<https://perma.cc/A4QT-DWWY>] (“Wielding little more than a pencil, a slide rule and one of the finest mathematical minds in the country, Mrs. Johnson . . . calculated the precise trajectories that would let Apollo 11 land on the moon in 1969 and, after Neil Armstrong’s history-making moonwalk, let it return to Earth.”). *See generally* KATHERINE JOHNSON, *REACHING FOR THE MOON: THE AUTOBIOGRAPHY OF NASA MATHEMATICIAN KATHERINE JOHNSON* (2020); RACHEL IGNOTOFSKY, *WOMEN IN SCIENCE: 50 FEARLESS PIONEERS WHO CHANGED THE WORLD* (2016) (highlighting the work of brilliant women scientists who shaped humans’ understanding of science and the world).

109. ERIC SCHMIDT & JONATHAN ROSENBERG, *HOW GOOGLE WORKS* 11 (2014).

110. Maximilian Shich, *Thought-Stealing Machines*, in *WHAT TO THINK ABOUT MACHINES THAT THINK: TODAY’S LEADING THINKERS ON THE AGE OF MACHINE INTELLIGENCE* 449, 449 (John Brockman ed., 2015) (“Stealing thoughts is a common activity in the thought processes of both humans and machines. Indeed, when we humans think, much of the content of our thoughts come from past experience or the documented experience of others. Very rarely do we come up with something completely new.”); *see* Matt Ridley, *Among the Machines, Not Within the Machines*, in *WHAT TO THINK ABOUT MACHINES THAT THINK* 226, 226 (John Brockman ed., 2015) (“What transformed human intelligence was the connecting-up of human brains into networks by the magic division of labor, a feat first achieved on a small scale in Africa around 300,000 years ago and then with gathering speed in the last few thousand years.”). *But see* BOYLE, *supra* note 26, at 34–35 (describing how Jefferson “traced the origins of the mechanical arts used in the elevators and hopper-boys all the way back to ancient Persia”).

discovery is named after its original discoverer,”¹¹¹ but instead, that “[e]very scientific discovery is named after the last individual too ungenerous to give due credit to his predecessors.”¹¹² For example, the discovery of DNA’s double helix should be properly attributed to Rosalind Franklin, James Watson, and Francis Crick—instead of just Watson and Crick.¹¹³

Notwithstanding these tracing impediments, it is possible to think about how progress—broadly defined as problem-solving—and technology innovations have and will continue to transform our world.¹¹⁴ As author and technology entrepreneur Byron Reese explains in *The Fourth Age: Smart Robots, Conscious Computers, and the Future of Humanity*:

Progress happens because of the symbiotic relationship between two things: civilization and technology. Civilization is the infrastructure that enables progress. Technology is the knowledge we use to amplify human ability. Grow one, and the other will grow as well. Our rocket ship of technological advance over the last few centuries has fed, and in turn, has been fed by extraordinary advances in civilization.¹¹⁵

111. Stephen M. Stigler, *Stigler’s Law of Eponymy*, 39 *TRANSACTIONS N.Y. ACAD. SCI.* 147, 147–57 (1980). Stigler explains how scientific discoveries were often made by others earlier before becoming linked with a namesake. *Id.* at 147.

112. *Id.* at 148 (“That I do not identify the source of this quotation is due to a lack of information, not a lack of generosity.”). Author’s observation: Although it would be difficult to identify and trace with exactitude, it is reasonable to question why numerous brilliant ideas and inventions by women and people of color have been discounted—or stolen—only to be later appropriated by those in power (often men).

113. HOWARD MARKEL, *THE SECRET OF LIFE: ROSALIND FRANKLIN, JAMES WATSON, AND FRANCIS CRICK, AND THE DISCOVERY OF DNA’S DOUBLE HELIX* 390 (2021) (“If life were fair—and it is not—we would be calling it the Watson–Crick–Franklin model of DNA, instead of ‘Watson and Crick.’”).

114. PINKER, *supra* note 60, at 55 (“[P]rogress is an outcome not of magic but of problem solving.”); REESE, *supra* note 7, at 276–77 (describing “progress” as “a way to make things better”).

115. REESE, *supra* note 7, at 277 (citing WILL DURANT, *THE STORY OF CIVILIZATION 1: OUR ORIENTAL HERITAGE 1* (1954) as providing the best definition of “civilization”); *see also* HENRICH, *supra* note 33, at 278 (“Cumulative cultural evolution also produces packages of technologies, practices, and social norms that provide us with the mental and physical tools, as well as the reputational incentives, to change our brains in ways that create whole new cognitive abilities or hone existing capacities.”).

Recognition of the inextricable link between civilization¹¹⁶ and technology should inform potential economic valuations of this accumulated knowledge, know-how, and resulting innovations.¹¹⁷

Thus, progress and innovation describe the collective and cumulative process of problem-solving.¹¹⁸ It is important to remember that progress stands on the shoulders of an incalculable number of named and unnamed humans who imagined, theorized, created, harvested, designed, tested, and built solutions for problems.¹¹⁹ The next challenge involves valuing such progress.

c. Value

As Paine correctly observed, it is impossible to accurately value the individual contributions to human knowledge created over “3.5 billion years of natural-selection-evolution” and “conscious analytical thinking.”¹²⁰ Achieving a fair valuation of the knowledge, know-how, and resulting objects and technologies that comprise our collective and cumulative cognitive inheritance, however, remains within reach.

116. REESE, *supra* note 7, at 277. Reese cites Will and Ariel Durant’s *The Story of Civilization* as providing the best definition of “civilization”:

Civilization is the social order promoting cultural creation. Four elements constitute it: economic provision, political organization, moral traditions, and the pursuit of knowledge and the arts. It begins where chaos and insecurity end. For when fear is overcome, curiosity and constructiveness are free, and man passes by natural impulse towards the understanding and embellishment of life.

Id. (citing DURANT, *supra* note 115, at 1).

117. See Cesar Hidalgo, *Machines Don’t Think, but Neither Do People*, in WHAT TO THINK ABOUT MACHINES THAT THINK 102, 102–03 (John Brockman ed., 2015); PINKER, *supra* note 60, at 326 (observing the cumulative nature of human progress); REESE, *supra* note 7, at 277 (describing how civilization supports progress by creating social and political stability through laws, information flows, civil resolution of conflicts, and social safety nets); RAWORTH, *supra* note 3, at 70 (“Institutional economists have highlighted that markets (and hence their prices) are strongly shaped by a society’s context of laws, institutions, regulations, policies and culture.”).

118. PINKER, *supra* note 60, at 55, 326. Pinker explains that “Progress consists not in accepting every change as part of an indivisible package . . . [Rather, it] consists of unbundling the features of a social process as much as we can to maximize the human benefits while minimizing the harms.” *Id.* at 94.

119. DANIEL SUSSKIND, A WORLD WITHOUT WORK: TECHNOLOGY, AUTOMATION, AND HOW WE SHOULD RESPOND 89 (2020) (quoting Isaac Newton: “If I have seen further, it is by standing on the shoulders of Giants.”); HASKEL & WESTLAKE, *supra* note 26, at 84 (noting that “most ideas are other people’s ideas”).

120. Bruce Parker, *Artificial Selection and Our Grandchildren*, in WHAT TO THINK ABOUT MACHINES THAT THINK 260, 260 (John Brockman ed., 2015) (“In the natural world, after 3.5 billion years of natural-selection-driven evolution, only one species developed the ability to carry out abstract self-aware conscious analytical thinking.”).

Technology Justice and fairness can be achieved by modifying Paine's goal from equal distribution¹²¹ to equitable allocation.

In making a fair valuation and equitable allocation, one should first ask how much private wealth originates from our political, legal, and social systems.¹²² These systems define, protect, and tax property. But as highlighted ahead in Section III.B, technology titans with super-sized egos who make critical statements about government action and leaders can experience vastly different outcomes. In the United States, Elon Musk can battle the government in court, on social media, and in the court of public opinion.¹²³ By contrast, in China, after the ruling Communist Party "waged an unprecedented crackdown on Big Tech," China's Jack Ma (founder of Alibaba, e-commerce giant) recently relinquished control of his company following his criticism of government leaders. Ma's situation thus shows how even a high-flying billionaire cannot escape the Communist Party's political, legal, and social gravity.¹²⁴

Paine answered the question of how much private wealth derives from our political, legal, and social system by writing: "Personal property is *the effect of society*; and it is as impossible for an individual to acquire personal property without the aid of society, as it is for him to make land [natural property] originally."¹²⁵ He explained, "[a]ll accumulation, therefore, of personal property, beyond what a man's own hands produce, is derived to him by living in society; and he owes on every principle of justice, of gratitude, and of civilization, a part of that accumulation back again to society from whence the whole came."¹²⁶

121. PAINE, *supra* note 19, at iii (recognizing under his framework that distributing human-created property "equally" makes it "necessary that all should have contributed in the same proportion, which can never be the case").

122. BARNES, *supra* note 16, at 49–50; ROSEN, *supra* note 92, at 162 (reminding readers "that an invention acquires a good bit of its value from the social system in which it is created").

123. See, e.g., Mark Matousek, *Elon Musk and the SEC Are in a Fierce Battle over One of Musk's Tweets—Here's What You Need to Know About Their Dispute*, BUS. INSIDER (Apr. 3, 2019, 10:39 AM), <https://www.businessinsider.com/elon-musk-and-sec-battle-timeline-2019-3> [<https://perma.cc/3S75-TP2P>].

124. Chan Che & Mike Ives, *Ant Group Says Its Founder, Jack Ma, Will Relinquish Control*, N.Y. TIMES (Jan. 6, 2023), <https://www.nytimes.com/2023/01/06/business/jack-ma-ant-group.html> [<https://perma.cc/ENG6-N2R8>] ("Mr. Ma was once hailed in China as a model of success, but he faced increasing trouble with the Chinese government, especially after he criticized the nation's banking regulators in late 2019. In recent years, he has largely disappeared from public view.").

125. PAINE, *supra* note 19, at 17–18.

126. *Id.* at 18; see Brishen Rogers, *Basic Income and the Resilience of Social Democracy*, 40 COMPAR. LAB. L. & POL'Y J. 199, 202–03 (2019). Rogers describes Paine's concept of patrimony:

Next, one should determine how much private wealth is “genuinely earned” by an individual.¹²⁷ When presented with this question, Nobel laureate and economist Herbert A. Simon wrote, “If we’re very generous with ourselves, I suppose we might claim we ‘earned’ as much as one-fifth of [our income and wealth]. The rest is patrimony associated with being a member of an enormously productive social system.”¹²⁸

Simon explained that this “patrimony” consists of “a vast store of physical capital, and an ever larger store of intellectual capital—including knowledge, skills, and organizational know-how held by all of us.”¹²⁹ He then explained how this patrimony creates a “generous allotment of unearned income” for talented, hard-working people who build on this physical and intellectual capital to develop and deliver successful products and services.¹³⁰ Warren Buffett concurred and stated that “society is responsible for a very significant percentage of what I’ve earned.”¹³¹ He adds, for those individuals like him who have enjoyed “enormous” financial rewards, “I think society has a big claim on that.”¹³²

In sum, inventorying, tracing, and valuing human-created ideas and innovations over the past forty thousand to seventy thousand years does not lend itself to clear provenance¹³³ and precise valuations for

In Paine’s telling, before the establishment of modern property rights, the Earth was our common possession, and the process of industrial and technological development has proceeded through the ingenuity and labor of our ancestors. As a result, the net social wealth and/or income today is our patrimony, to which each has a presumptively equal share.

Id.

127. BARNES, *supra* note 16, at 49–50.

128. Herbert A. Simon, *Public Administration in Today’s World of Organizations and Markets*, 33 POL. SCI. & POL. 749, 756 (2000); *see also* King & Marangos, *supra* note 39, at 56 (citing Simon’s conclusion that “[n]o less than 90% of income in the United States is the product of social capital”). *See generally* McMahon, Jr. & Abreu, *supra* note 9, at 68–69 (describing how successful entrepreneurs—that, is the “winners”—built their fortunes on government-provided common goods such as laws, public education, and national infrastructure).

129. Simon, *supra* note 128, at 756; *see* HASKEL & WESTLAKE, *supra* note 26, at 3–4. *See generally* BOYLE, *supra* note 26, at 38–39 (defining the terms “the public domain” and “the commons”). Boyle then explains that “the public domain is the basis for our art, our science, and our self-understanding. It is the raw material from which we make new inventions and create new cultural works.” *Id.* at 39.

130. Simon, *supra* note 128, at 756.

131. JANET LOWE, WARREN BUFFETT SPEAKS: WIT AND WISDOM FROM THE WORLD’S GREATEST INVESTOR 212 (2007).

132. *Id.*

133. The word “provenance” means “origin” or “source.” *Provenance*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/provenance> [https://perma.cc/42M3-PYP3].

the intangible and tangible property forming humans' shared patrimony.¹³⁴ Given these practical impediments, what should be the economic value of this patrimony?¹³⁵ Herbert A. Simon claims 80 percent;¹³⁶ Warren Buffett suggests it is significant but does not offer an exact percentage.¹³⁷ So, what represents a fair percentage? Though unknown, what is known is that our ancestors' toil makes modern life easier for many—such as potable water from the tap and electricity at the flip of a switch.

Paine's second step offers a framework for determining a fair percentage that equitably compensates humans for their portion of the collective and cumulative cognitive inheritance. Step two involves "discover[ing] the boundary that divides right from wrong."¹³⁸ It therefore requires special consideration of how to indemnify the wrongfully dispossessed for their economic losses.¹³⁹

3. Applying Paine's Framework (Step Two): Discovering Boundaries that Divide Right from Wrong

In *Agrarian Justice*, Paine expressed his shock at the "extremes of wretchedness" in a civilized society.¹⁴⁰ He observed that the "most affluent and the most miserable of the human race are to be found in the countries that are called civilized."¹⁴¹ Paine noted that while real property cultivation produced extraordinary wealth for an elite few, it left most of society poor and wretched.¹⁴² The remedy, he later argued

134. See, e.g., DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 371; HARARI, *supra* note 22, at 3; Litman, *supra* note 84, at 1015 ("Ideas, systems, themes, and plots are not easily traced. It is difficult to ascertain the source of an idea and impossible to prove its provenance in any meaningful sense."); Gregory Brazeal, *How Much Does a Belief Cost?: Revisiting the Marketplace of Ideas*, 21 S. CAL. INTERDISC. L.J. 1, 23 (2011) ("[M]any of the ideas in circulation may be very old and of uncertain provenance.").

135. Patrimony is defined as human collective and cumulative cognitive inheritance. See Simon, *supra* note 128, at 756.

136. *Id.* (positing 80 percent).

137. See LOWE, *supra* note 131, at 212.

138. PAINE, *supra* note 19, at 10.

139. *Id.* at 9–10.

140. *Id.* at 5.

141. *Id.* at 6.

142. *Id.* at 10–11 (describing how real property laws created wretchedness and poverty).

in step four, was to indemnify those dispossessed by real property laws¹⁴³ through the provision of a guaranteed income.¹⁴⁴

While Paine’s call for fairness and discovery of “the boundary that divides right from wrong” focused on natural property,¹⁴⁵ intellectual consistency supports applying the same analysis to human-created property and its resulting wealth.¹⁴⁶ In 2018, Harvard professor Steven Pinker wrote that “wealth is created . . . primarily by knowledge and cooperation: networks of people arrange matter into improbable but useful configurations that combine the fruits of their ingenuity and labor.”¹⁴⁷ As discussed above, because our collective and cumulative cognitive inheritance consists of a broad spectrum of tangible and intangible assets, this knowledge and information have substantial social and economic value.¹⁴⁸ While calculating the exact percentage that compensates humans for their equitable share of the collective and cumulative cognitive inheritance remains open to debate, the rightness and wisdom of indemnification for those dispossessed of their common property remain sound.

4. Applying Paine’s Framework (Step Three): Distinguishing Between Individual and Common Property

Because it is now theoretically possible to trace and value human-created property, step three of Paine’s fairness test supports the extension and application of his *Agrarian Justice* framework to humans’

143. *Id.*; see also Rogers, *supra* note 126, at 202–03 (describing Paine’s view that “the Earth was our common possession, and the process of industrial and technological development has proceeded through the ingenuity and labor of our ancestors”). Accordingly, “the net social wealth and/or income today is our patrimony, to which each has a presumptively equal share.” *Id.*

144. PAINE, *supra* note 19, at 11.

145. *Id.* at iii, 10 (common property and ownership of air, earth, and water).

146. Litman, *supra* note 84, at 971 (describing how real property rights have shaped intellectual property rights). Litman explains that copyright laws “create[] legal rights akin to property rights.” *Id.* at 970. For example, copyright laws “cast the author’s rights in the mold of exclusive rights of control.” *Id.* at 971. These rights can also be mortgaged, bequeathed, inherited, and divided in divorce. *Id.*

147. PINKER, *supra* note 60, at 80 (emphasis omitted).

148. GILLIAN K. HADFIELD, RULES FOR A FLAT WORLD: WHY HUMANS INVENTED LAW AND HOW TO REINVENT IT FOR A COMPLEX GLOBAL ECONOMY 25, 34, 64–65, 138 (2017) (discussing common knowledge and information). Hadfield writes: “Information is not only basically free once it’s been produced, it is cumulative . . . and displays what economists call increasing returns.” *Id.* at 65. Hadfield also notes “the paradox—information is valuable but really hard to contract over.” *Id.* at 138. BOYLE, *supra* note 26, at 184 (quoting Justice Brandeis (“The general rule of law is, that the noblest of human productions—knowledge, trusts, ascertained, conceptions, and ideas—become, after voluntary communication to others, free as the air to common use. Upon these incorporeal productions the attribute of property is continued after such communication only in certain classes of cases where public policy has seemed to demand it.”)).

natural collective and cumulative cognitive inheritance. It is, therefore, the *kairos* time¹⁴⁹ to update Paine’s pioneering ideas about what constitutes the “*common property of the human race*”¹⁵⁰ to cover the tangible and intangible assets created by human minds. Specifically, this Article asserts that only identifiable improvements can constitute separate property—not the underlying cognitive assets. The property traceable to our ancestors’ collective and cumulative knowledge not only represents the “*common property of the human race*,”¹⁵¹ but it also constitutes perpetual co-owned wealth that could fund a UBI congruent with step four of Paine’s *Agrarian Justice* framework.¹⁵²

C. Co-owned Property and Wealth

In her essay on thinking machines, historian and philosopher Noga Arikha wrote, “The history of humanity and the history of technology are conjoined.”¹⁵³ Currently, AI and robotic technologies spark wonder while technologies such as electricity on demand fade “into the wallpaper of modernity.”¹⁵⁴ Technology visionary Andrew Ng recently compared AI to electricity because these technologies are revolutionary when harnessed.¹⁵⁵ As AI technologies become ubiquitous, AI may follow electricity’s path and eventually blend into the background of everyday life.¹⁵⁶

149. Merriam-Webster defines the Greek word “Kairos” as “a time when conditions are right for the accomplishment of a crucial action” and “the opportune and decisive moment.” *Kairos*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/kairos> [<https://perma.cc/TK3X-SC5C>].

150. See PAINE, *supra* note 19, at 12 (asserting that the Earth is the “*common property of the human race*”). Paine believed “a revolution in the system of government” was needed to reinstate the rights of “persons thus dispossessed.” *Id.* at 14.

151. *Id.* at 12.

152. See *infra* Parts II and III.

153. Noga Arikha, *Metarepresentation*, in WHAT TO THINK ABOUT MACHINES THAT THINK 536, 536–37 (2015); see also NOGA ARIKHA, <https://nogaarikha.com/> [<https://perma.cc/KJY3-EHJ9>].

154. Chris Anderson, *Drones Go to Work*, in HBR’S 10 MUST READS ON AI, ANALYTICS, AND THE NEW MACHINE AGE 77, 86 (Harv. Bus. Publ’g Corp. 2019) (“The sign of a successful technology is not that it thrills but that it becomes essential and accepted, fading into the wallpaper of modernity. Electricity was once a magic trick, but now it is assumed.”).

155. KAI-FU LEE, AI SUPERPOWERS: CHINA, SILICON VALLEY, AND THE NEW WORLD ORDER 13 (2018); Salvador Rodriguez, *An Artificial Intelligence Expert Explains Why ‘AI Is the New Electricity,’* INC. (Oct. 26, 2016), <https://www.inc.com/andrew-ng/why-artificial-intelligence-is-the-new-electricity.html> [<https://perma.cc/W7SX-MV83>]; see also THOMAS H. DAVENPORT, THE AI ADVANTAGE: HOW TO PUT THE ARTIFICIAL INTELLIGENCE REVOLUTION TO WORK 7 (2018) (“In the short run, AI will provide evolutionary benefits; in the long run, it is likely to be revolutionary.”).

156. Niraj Dawar, *Marketing in the Age of Alexa*, in HBR’S 10 MUST READS ON AI, ANALYTICS, AND THE NEW MACHINE AGE 39, 41 (Harv. Bus. Publ’g Corp. 2019) (“AI assistants

Mindful of these interconnections between humanity and technology, this Article continues the study of natural and human-created property by exploring some origins of “co-owned” property and wealth.¹⁵⁷ In *Sapiens: A Brief History of Humankind*, Hebrew University professor Yuval Noah Harari observed that “[d]uring the past 500 years modern science has achieved wonders thanks largely to the willingness of governments, businesses, foundations, and private donors to channel billions of dollars into scientific research.”¹⁵⁸ Harari emphasized the essential relationship between financial resources and scientific discoveries by noting that “if proper funding were unavailable, no intellectual brilliance could have compensated for that” lack of economic support.¹⁵⁹ Such public and private support fueled human knowledge and generated opportunities for innovators.¹⁶⁰ For example, in 2018, Elon Musk’s SpaceX capitalized on the lessons learned and technologies created in past government-funded space explorations to launch the first reusable space rocket.¹⁶¹ Expanding on this accumulated knowledge, in May 2020, SpaceX launched NASA astronauts Bob Behnken and Doug Hurley to the International Space

will become trusted advisers to consumers, anticipating and satisfying their needs, ensuring that routine purchases flow uninterrupted to their households like electricity, and guiding them through complex buying decisions.”)

157. BARNES, *supra* note 16, at 60–61 (identifying components of co-owned wealth: natural property such as land, air, and water; human knowledge and culture; and economic systems). Barnes explains that the ancestral wealth includes “sciences and technologies, legal and political systems, our financial infrastructure, and much more.” *Id.* at 61. He also recognizes “another trove of co-owned wealth” as “the value added by the scale and synergies of our economy itself” or “wealth of the whole.” *Id.*

158. HARARI, *supra* note 24, at 272; *see also* NAT’L RSCH. COUNCIL OF THE NAT’L ACADS., INTANGIBLE ASSETS: MEASURING AND ENHANCING THEIR CONTRIBUTION TO CORPORATE VALUE AND ECONOMIC GROWTH 1 (2009) (noting that U.S. investment in intangibles exceeds investment in tangible assets).

159. HARARI, *supra* note 24, at 272 (noting, for example, how European-financed research led to geographic, botanical, and zoological discoveries by Christopher Columbus and Charles Darwin). Harari also notes how the U.S. government’s funding of nuclear physics and other scientific research not only advanced knowledge, but also generated industry profits and tax revenues. *Id.* at 249.

160. *Id.* at 249, 272.

161. Amy Thompson, *This Year SpaceX Made Us All Believe in Reusable Rockets*, WIRED (Dec. 30, 2018, 7:00 AM), <https://www.wired.com/story/this-year-spacex-made-us-all-believe-in-reusable-rockets/> [<https://perma.cc/HKS9-QVAP>]; *see also* Eric Berger, *Last Year Reusable Rockets Entered the Mainstream, and There’s No Going Back*, ARS TECHNICA (Jan. 6, 2021, 7:11 AM), <https://arstechnica.com/science/2021/01/last-year-reusable-rockets-entered-the-mainstream-and-theres-no-going-back/> [<https://perma.cc/TBU3-A8U4>].

Station—representing the “first launch by a private company of people into orbit.”¹⁶²

Beyond economic prospects, scientific research gives humans the power to innovate and venture into the unknown. In his 1620 scientific manifesto, *The New Instrument*, Francis Bacon argued that “knowledge is power.”¹⁶³ He also posited the then-radical idea to unite science and technology—a prescient pairing that has since energized countless advancements.¹⁶⁴ Contemporary thinkers¹⁶⁵ echo Bacon’s maxim that “knowledge is power” by explicitly recognizing how humans’ collective and cumulative cognitive inheritance makes the technological abundance¹⁶⁶ of modern life possible. Learned people worldwide now share the same understanding of time, energy, and space, along with Einstein’s $E=mc^2$.¹⁶⁷ Global knowledge of Einstein’s “famous equation” not only explains “the fires of the sun” but also propels spacecraft that sever Earth’s “surlly bonds”—making it possible for human trespass into the “sanctity of space.”¹⁶⁸ But for our

162. Christian Davenport, *SpaceX Faces Its Toughest Test*, WASH. POST (May 16, 2020), <https://www.washingtonpost.com/technology/2020/05/16/spacex-biggest-challenge/>; Mike Wall, *SpaceX’s 1st Astronaut Launch Was NASA’s Most-Watched Online Event Ever*, SPACE.COM (June 2, 2020), <https://www.space.com/nasa-spacex-astronaut-launch-viewer-record.html> [<https://perma.cc/5NLJ-QR9R>]; see also *infra* Section III.B for additional analysis of Musk’s enterprises.

163. HARARI, *supra* note 24, at 259.

164. *Id.* at 259–60 (“Generally speaking, most premodern rulers and businesspeople did not finance research about the nature of the universe in order to develop new technologies, and most thinkers did not try to translate their findings into technological gadgets.”).

165. Similarly, Philippe Van Parijs and Yannick Vanderborght recognize the immense value of this patrimony, writing that modern humans “benefit very unequally from what was freely given us by nature, technological progress, capital accumulation, social organization, civility rules, and so on.” PHILIPPE VAN PARIJS & YANNICK VANDERBORGH, *BASIC INCOME: A RADICAL PROPOSAL FOR A FREE SOCIETY AND A SANE ECONOMY* 105 (2017); see also LOWE, *supra* note 131, at 212.

166. KING, *supra* note 25, at 181 (“We must work passionately and indefatigably to bridge the gulf between our scientific progress and our moral progress. One of the great problems of mankind is that we suffer from a poverty of the spirit which stands in glaring contrast to our scientific and technological abundance. The richer we have become materially, the poorer we have become morally and spiritually.”); see also *AI Principles*, FUTURE OF LIFE INST., <https://futureoflife.org/ai-principles/?cn-reloaded=1> [<https://perma.cc/3FZE-LVSV>] (promoting the exchange of ideas between researchers and policymakers for advancing artificial intelligence); Brynjolfsson et al., *supra* note 6, at 1–2 (quoting Eric Schmidt, Executive Chair of Alphabet, Inc., who believes that we are entering an “age of abundance [and] during the age of abundance, we’re going to see a new age . . . the age of intelligence”); RAWORTH, *supra* note 3, at 164 (citing economist Mariana Mazzucato’s proposal to collect royalties on co-owned private-public patents).

167. HARARI, *supra* note 22, at 108; see also BOYLE, *supra* note 26, at 39, 168 (explaining this shared understanding comes from the public domain, which provides the “raw materials” humans use to create new cultural works and inventions). Boyle also gives examples of this “same store of information, innovation, and free culture,” such as: the Pythagorean theorem, periodic table, tables of logarithms, musical scales, etc. *Id.* at 39–40, 168.

168. DAVID BODANIS, *E=MC²: A BIOGRAPHY OF THE WORLD’S MOST FAMOUS EQUATION* 175, 182 (2000) (describing Cecilia Payne-Gaposchkin’s pioneering astronomy research).

ancestors' collective and cumulative discoveries, humankind would likely be sitting, cracking tree nuts with stones instead of exploring the atmosphere and magnetosphere of Jupiter and planning for life on Mars.¹⁶⁹

Building on this fundamental yet foundational hypothesis about the importance and economic value of shared human knowledge (patrimony), this Article advocates for a reimagining of Paine's vision of economic justice for the twenty-first century. Specifically, Paine's framework should be updated to include the immense co-owned wealth¹⁷⁰ steadily generated from humans' collective and cumulative cognitive inheritance.¹⁷¹ Taxation of this presently untapped asset

Professor Payne-Gaposchkin's research showed "that the right fuel was floating up in space; that the sun and all the stars we see actually are great $E=mc^2$ pumping stations." *Id.* at 182. John Gillespie Magee, Jr., *High Flight*, ARLINGTON NAT'L CEMETERY (Feb. 28, 2023), <http://www.arlingtoncemetery.net/highflig.htm> [<https://perma.cc/6HE3-76GE>] ("Oh, I have slipped the surly bond of earth . . . while with silent, lifting mind I've trod the high untrespassed sanctity of space, put out my hand and touched the face of God.").

169. As evolutionary biologist Mark Pagel colorfully observes about humans' accumulated knowledge, "Having culture is why we watch 3D TV and build cathedrals while our close genetic relatives, chimps, sit in the forest as they have for millions of years cracking the same nuts and stones." IAN LESLIE, *CURIOUS: THE DESIRE TO KNOW AND WHY YOUR FUTURE DEPENDS ON IT* 15 (2014); *Juno Overview: Unlocking Jupiter's Secrets*, NASA, https://www.nasa.gov/mission_pages/juno/overview/index.html [<https://perma.cc/2MTG-FQCS>] (describing how the Juno Spacecraft and instruments "has investigated the existence of a solid planetary core, mapped Jupiter's intense magnetic field, measured the amount of water and ammonia in the deep atmosphere, and observed the planet's auroras"); Darrell Etherington, *Elon Musk Says Building the First Sustainable City on Mars Will Take 1,000 Starships and 20 Years*, TECHCRUNCH (Nov. 7, 2019, 4:13 PM), <https://techcrunch.com/2019/11/07/elon-musk-says-building-the-first-sustainable-city-on-mars-will-take-1000-starships-and-20-years/> [<https://perma.cc/F5GN-SWKB>] (describing efforts to colonize Mars).

170. In *With Liberty and Dividends for All*, Peter Barnes builds on Paine's "simple idea" that "all persons have a right to income from wealth we inherit or create together." BARNES, *supra* note 16, at 2–3. Barnes argues that by sharing our "co-owned wealth," our economy moves from a "winner-take-all" to an "everyone-gets-a share" form of capitalism. *Id.* at 3. Barnes defines "co-owned wealth" as "the underappreciated complement to privately owned wealth. It consists of assets created not by individuals or corporations but by nature or society as a whole." *Id.* at 11. He argues that co-owned assets and wealth should be commonly owned rather than individually owned. *Id.* at 42.

171. Echoing and then expanding on Paine's ideas, Barnes argues that co-owned wealth encompasses both natural gifts (land, air, and water), and ancestral gifts. *Id.* at 60–61. These inherited gifts include art, science, and technology, along with political, social, legal, and financial systems and infrastructure. *Id.* Reiterating Herbert A. Simon and Warren Buffett's assessment that a significant percentage of private wealth stems from our shared patrimony, Barnes likens the "sum of wealth created by nature, our ancestors, and our economy" to the "goose that lays almost all of the eggs of private wealth." *Id.* at 61; Simon, *supra* note 128, at 756; LOWE, *supra* note 131, at 212; see also HERBERT A. SIMON, *UBI and the Flat Tax*, in *WHAT'S WRONG WITH A FREE LUNCH?* 34, 36 (highlighting the relationship between social capital and economic prosperity and proposing a UBI payment of "\$8,000 per annum per inhabitant, or \$25,000 for a family of three"). The term "social capital" describes a country's "stored knowledge"; examples of social capital include technologies, organizational and economic systems, and legal and government infrastructure. *Id.*

class could fund guaranteed incomes that support community members as they craft lives of meaning, purpose, and dignity.¹⁷²

Since the successful distribution of co-owned wealth requires taxation, Part II examines how to imagine and invent an integrated property and tax paradigm that aligns with Paine's step four and achieves Technology Justice.¹⁷³

II. EQUITABLE COMPENSATION FOR COLLECTIVE AND CUMULATIVE COGNITIVE INHERITANCE

The next requisite task involves envisioning and designing a unified property and tax paradigm that accounts for separate and commonly owned property and the wealth derived from both. Before doing so, it is worth revisiting Thomas Jefferson's observations that property ownership represents a "gift of social law."¹⁷⁴ Almost two centuries later, Liam Murphy and Thomas Nagel's writings in *The Myth of Ownership: Taxes and Injustice* offer modern perspectives into the relationship between property and taxation:

The state does not own its citizens, nor do they own each other collectively. But individual citizens don't own anything except through laws that are enacted and enforced by the state. Therefore, the issues of taxation are not about how the state should appropriate and distribute what its citizens already own, but how it should allow ownership to be determined.¹⁷⁵

Determining what can (or should) be owned thus becomes essential for conceiving and constructing an integrated property and tax paradigm. Exploring the adjacent possible offers some insights.

172. Shoshana Zuboff, *Surveillance Capitalism and the Challenge of Collective Action*, 28 NEW LAB. F., Jan. 2019, at 10, 13 (2019); see also ZUBOFF, *supra* note 22, at 91 (discussing digital surveillance as a new asset class that is converted to revenue).

173. See generally MURPHY & NAGEL, *supra* note 13, at 8 (explaining that "[j]ustice or injustice in taxation can only mean justice or injustice in the system of property rights and entitlements that result from a particular tax regime").

174. See *supra* notes 86–88 and accompanying text.

175. MURPHY & NAGEL, *supra* note 13, at 176.

The “adjacent possible”¹⁷⁶ represents “a set of potential futures in which modified versions of the existing systems lurk.”¹⁷⁷ The adjacent possible dwells in shadows and along the edges of feasibility—just beyond one’s reach.¹⁷⁸ For thinkers and doers who are intrepid, creative, and curious, venturing into the adjacent possible occurs voluntarily, but for many others, exploring the unknown of the adjacent possible requires a hard shove.¹⁷⁹

For policymakers, crises wrought by emergencies and catastrophes can bend and buckle once seemingly solid ideas and structures—thereby blasting through the boundary that separates the present from the adjacent possible.¹⁸⁰ The 1982 preface to Milton and Rose D. Friedman’s *Capitalism and Freedom* highlighted the critical relationship between crisis and change.¹⁸¹ The Friedmans explained: “Only a crisis—actual or perceived—produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around.”¹⁸² Anticipating eventual economic emergencies, the Friedmans viewed the “basic function” of their theories as two-fold: (1) to develop “alternatives to existing policies”; and (2) to keep these ideas “alive and available until the politically impossible becomes politically inevitable.”¹⁸³

176. JOHNSON, *supra* note 29, at 31. See generally STUART KAUFFMAN, AT HOME IN THE UNIVERSE: THE SEARCH FOR THE LAWS OF SELF-ORGANIZATION AND COMPLEXITY (1995) (discussing this adjacent possible concept).

177. BARNES, *supra* note 16, at 120–121 (explaining and building on Kauffman’s adjacent possible concept).

178. FLYNN COLEMAN, THE HUMAN ALGORITHM: HOW ARTIFICIAL INTELLIGENCE IS REDEFINING WHO WE ARE 202 (2019) (“The adjacent possible is the horizon at the edge of possibility—we can just manage to see it, but we can’t quite get there.”); BARNES, *supra* note 16, at 121 (“In my mind, a market economy with liberty and dividends for all is a plausible adjacent possibility.”).

179. THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 85, 93 (50th Anniversary ed. 2012) (describing the relationship between crisis, malfunction, and paradigm change). Kuhn observes that as “crises deepen,” some leaders “will commit themselves to some concrete proposal for the reconstruction of society in a new institutional framework” and create a new paradigm. *Id.* at 93. Kuhn explains, “a novel theory emerged only after a pronounced failure in the normal problem-solving activity.” *Id.* at 75.

180. HOFSTADTER & SANDER, *supra* note 75, at 250–252, 300–301 (describing Archimedes’s “Eureka” discovery of water displacement as the combination of immense pressure, obsessive focus, and abstract thought to determine whether King Heron’s new crown was made of pure gold). Hofstadter & Sander explain that such obsessions can “bring out curious connections that no one would dream of otherwise.” *Id.* at 301. These curious connections may reveal the adjacent possible. JOHNSON, *supra* note 29, at 31; COLEMAN, *supra* note 178, at 202; BARNES, *supra* note 16, at 121.

181. MILTON FRIEDMAN, CAPITALISM AND FREEDOM xiv (40th Anniversary ed. 2002).

182. *Id.*

183. *Id.*

Following the Friedmans' advice to develop future-ready plans, let us now consider how to design a unified theory of taxation that achieves Technology Justice by building on professor Theodore Seto's 2017 article, "A Forced Labor Theory of Property and Taxation."¹⁸⁴ The pages ahead sustain Seto's call for a "unified account of property and taxation" that makes possible "a simple, coherent model of civilization."¹⁸⁵ Coherence—and hopefully civility—begins with shared understandings of property types, the domino effect of human knowledge, and how taxes help build communities. From there, it is possible to imagine an integrated tax and property law paradigm that supercharges the creation of social capital, which not only supports our community, economic, and personal well-being, but also safeguards our nation's political stability and democratic ideals.¹⁸⁶

*A. Identifying Property Types:
Natural, Human-Created, and Collective*

Like Paine, Seto begins by identifying two "functional classes" of property—natural and human-created—subdivided into tangible and intangible property.¹⁸⁷ He explains that "most created tangible property is rivalrous and most created intangible property is nonrivalrous."¹⁸⁸ Some examples of tangible, human-created property include the physical buildings and generators in an electricity power plant.

184. Seto, *supra* note 31.

185. *Id.* at 195. *See generally* JOHN RAWLS, JUSTICE AS FAIRNESS: A RESTATEMENT 51 (Erin Kelly ed., 2001) (noting how taxation can "keep property and wealth evenly enough shared over time to preserve the fair value of the political liberties and fair equality of opportunity over generations").

186. McMahon, Jr. & Abreu, *supra* note 9, at 68 (discussing how tax policy can promote political stability, reduce concentrated power, and support democratic ideals); BOYLE, *supra* note 26, at 56 ("When you set up the property rules in some new space, you determine much about the history that follows. Property rules have a huge effect on power relationships and bargaining positions.").

187. Seto, *supra* note 31, at 204–07 (natural property includes oceans, land, animals, etc., and human-created property encompasses tangible and intangibles); BOYLE, *supra* note 26, at 47 (explaining that "[u]nlike the earthly commons, the commons of the mind is generally 'nonrival'").

188. Seto, *supra* note 31, at 206–07; *see also* Paul M. Romer, *Endogenous Technological Change*, 98 J. POL. ECON. S71, S73–S74 (1990) ("Rivalry is a purely technological attribute. A purely rival good has the property that its use by one firm or person precludes its use by another; a purely nonrival good has the property that its use by one firm or person in no way limits its use by another."); COOTER & ULEN, *supra* note 84, at 40 (defining "nonrivalrous consumption" as "consumption of a public good by one person that does not leave less for any other consumer"); Benjamin G. Damstedt, *Limiting Locke: A Natural Law Justification for the Fair Use Doctrine*, 112 YALE L.J. 1179, 1181–82 (2003) ("A fundamental difference between tangible goods and intangible goods, however, is that intangible goods are nonrivalrous, which means that they can be used by an infinite number of people in an infinite number of ways without harming the use value of any other person, including the initial producer.").

These tangible assets often have limited useful lives, as physical machines and structures are susceptible to rust, rot, and breakage.¹⁸⁹ Further, such tangible property can be difficult (or impossible) to move and use in other settings.¹⁹⁰

By contrast, intangible property in the form of human ideas, knowledge, or know-how can exist indefinitely, is portable, and is transferrable to others.¹⁹¹ As a result, information and innovation generally constitute nonrival and nonexcludable goods.¹⁹² Continuing with the power station example, the concept of intangible, human-created property describes the information and know-how used to design, build, and operate the physical infrastructure and electricity generation systems.¹⁹³ Because “people are knowledge,”¹⁹⁴ this intangible property also includes humans themselves. Not only can these power plant architects, engineers, and operators apply and expand their

189. Seto, *supra* note 31, at 207 (“Tangible created capital generally resuccumbs to entropy quickly; as a result, items of tangible created capital typically have short useful lives.”).

190. Daniel Liberto, *Rival Good*, INVESTOPEDIA (Nov. 27, 2019), https://www.investopedia.com/terms/r/rival_good.asp [<https://perma.cc/J8GH-RXSM>] (“A rival good is a type of good that may only be possessed or consumed by a single user. These items can be durable, meaning they may only be used one at a time, or nondurable, meaning they are destroyed after consumption, allowing only one user to enjoy it.”).

191. Seto, *supra* note 31, at 207 (explaining that “nonrivalrous” information “does not preclude or limit its use by another”); see HARARI, *supra* note 10, at 212 (“Knowledge . . . is a growing resource – the more you use, the more you have.”); Litman, *supra* note 84, at 972 (“A parcel of intellectual property, however, is neither tangible nor unique.”); BOYLE, *supra* note 26, at 37 (highlighting how Thomas Jefferson distinguished between tangible and intangible property). Boyle explains that Jefferson promoted free trade and “anti-monopoly” ideals when it came to intellectual property rights. *Id.* at 36–37. Specifically, Jefferson emphasized the importance of understanding “the policy implications of the differences between tangible property and ideas, which ‘like fire’ are ‘expandable over all space, without lessening their density in any point.’” *Id.* at 37; see also Michael Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 32 (2004) (“As a public good, information is nonexclusive and nonrivalrous.”). Carrier explains that “Nonexclusivity prevents owners from excluding others from the possession of information (in contrast to tangible property, for which physical restraints often are sufficient).” *Id.* He adds that “one person’s consumption [of information] does not diminish the amount of the good for others to consume—that is, multiple persons can use information without depleting it.” *Id.*

192. BOYLE, *supra* note 26, at 39.

193. Carrier, *supra* note 191, at 32; see Ana M. Aizcorbe et al., *Toward Better Measurement of Innovation and Intangibles*, 89 SURV. CURRENT BUS., Jan. 2009, at 10, 13 (“Summing up, the innovation process leads to the creation of economically useful knowledge that exists separately from either people or tangibles, such as equipment or structures. This economically useful knowledge is an intangible that is an output of a productive process as well as an input into the creation of new output.”).

194. ETHAN ZUCKERMAN: REWIRE: DIGITAL COSMOPOLITANS IN THE AGE OF CONNECTION 196 (2013).

accumulated knowledge to this and other projects, but they may also share their know-how with students, colleagues, and in other forums.¹⁹⁵

Seto also describes how the passage of time can shift the ownership of human-created intangible and tangible property from individual to collective status.¹⁹⁶ For instance, as intellectual property protections lapse, know-how and information become part of “society’s commonwealth, open to all.”¹⁹⁷ Because Seto’s know-how classification broadly aligns with Simon’s concepts of patrimony and this Article’s use of the phrase “collective and cumulative cognitive inheritance,” going forward, these terms should be considered interchangeable.

B. Understanding the Domino Effect of Collective Human Knowledge

Scientific progress reveals a “domino effect of collective knowledge,”¹⁹⁸ where shared information and accumulated

195. LESLIE, *supra* note 169, at 112 (“[A]s a species, we have always depended on the epistemic endowment of our elders and ancestors. Our generation didn’t need to rediscover fire or how to build a skyscraper. Every scientist stands on the shoulders of giants; every artist works within or against a tradition.”). Leslie then describes this intergenerational sharing as an “ancient tutorial system.” *Id.*

196. Seto, *supra* note 31, at 207 (“[P]roperty rights in created intangibles are generally limited in term. Once they expire, the resulting capital falls back into society’s commonwealth, open to all.”); *see, e.g.*, Litman, *supra* note 84, at 1000 (“The realm protected by copyright is privately owned; the unprotected realm is the public domain.”). Litman explains:

The concept of the public domain is another import from the realm of real property. In the intellectual property context, the term describes a true commons comprising elements of intellectual property that are ineligible for private ownership. The contents of the public domain may be mined by any member of the public.

Id. at 975; BOYLE, *supra* note 26, at 39 (“The term ‘commons’ is generally used to denote a resource over which some group has access and use rights—albeit perhaps under certain conditions.”).

197. Seto, *supra* note 31, at 207; Juliet M. Moringiello, *False Categories in Commercial Law: The (Ir)relevance of (In)tangibility*, 35 FLA. ST. U. L. REV. 119, 148 (2007) (“Intellectual property laws also limit the ‘owner’s’ rights in a temporal way. There are statutory time limits on the duration of copyrights and patents, and a trademark is entitled to protection only so long as the mark is used in commerce.”); *see* Litman, *supra* note 84, at 1015 (“It is our inability to trace or verify the lineage of ideas that makes it essential that they be preserved in the public domain.”). *See generally* ROGER E. SCHECHTER & JOHN R. THOMAS, *INTELLECTUAL PROPERTY: THE LAW OF COPYRIGHTS, PATENTS AND TRADEMARKS* § 1.2.4 (2003); U.S. CONST. art. I, § 8, cl. 8 (“limited times”); 17 U.S.C. § 302 (copyright duration); 35 U.S.C. § 154(a)(2) (patent duration).

198. COLEMAN, *supra* note 178, at 4. Coleman references Thomas W. Malone’s *Superminds* (see *supra* note 23) in support of her statement “that our collective intelligence—not the genius of isolated individuals—is responsible for almost all human achievement in business, government, science, and beyond.” *Id.* at 53. Coleman adds that “with intelligent tech, we are all about to get a

knowledge spark cycles of “curiosity-experimentation-innovation.”¹⁹⁹ Historical accounts describe determined thinkers and doers—wired to be innovators—“ratchet[ing] up” or “scaffold[ing]” available knowledge and information to pursue new scientific inquiries, develop novel systems, and push science, engineering, and humanity forward.²⁰⁰

Discussing this expansion of human understanding and know-how over time, Seto writes that “modern created capital is always an admixture of the laborer’s efforts and society’s vast stores of accumulated capital.”²⁰¹ As an illustration, Seto describes a potter throwing a pot:

[T]he potter’s understanding of how to throw pots is the result of millennia of trial and error by others long dead. If we were to allocate the fruits of the potter’s labour based on the relative contributions of the potter, on the one hand, and society’s commonwealth, on the other, we would probably be

lot smarter.” *Id.*; see also ROSEN, *supra* note 92, at 74 (describing how new knowledge and discoveries function like dominoes by “knock[ing] down walls between theory and practice that had stood for centuries”).

199. Romer, *supra* note 188, at S83–S84 (“The engineer working today is more productive because he or she can take advantage of all the additional knowledge accumulated as design problems were solved during the last 100 years.”). Romer also observes how these innovative designs expand “the total stock of knowledge and thereby increases the productivity of human capital in the research sector.” *Id.* at S84; see AGUSTÍN FUENTES, *THE CREATIVE SPARK: HOW IMAGINATION MADE HUMANS EXCEPTIONAL* 255 (2017). Fuentes writes:

Over the last 10,000 years, our knowledge base and technical developments have continued to accelerate. The more we know, the more technologies we have, and the faster and more dramatic our scientific endeavors and outcomes become. Knowledge, curiosity, imagination, creativity, technological improvements, and our intense capacity for cooperation and coordination, combined with the increasing density of humans, the needs of growing populations, language, economies, and so many other factors, set us up for the modern scientific explosion in engineering. Towns, cities, nations, roads, water systems, electrical grids, global transportation systems, and the Internet all emerged from the same underlying [cognitive] processes our ancestors utilized.

Id. at 265. He adds: “Change is happening so fast today that it makes the whole preceding 2 million years of our story look like it was in snail-paced slow motion.” *Id.*

200. *Id.* at 253. As a modern-day example, recall how Benjamin Franklin’s electricity experiments formed the cognitive and scientific foundations for Elon Musk’s current energy generation and storage experiments and burgeoning business endeavors. Alan Ohnsman, *A Decade of Elon Musk—and the Dawn of the Electric Car*, FORBES (Dec. 23, 2019, 10:30 AM), <https://www.forbes.com/sites/alanohnsman/2019/12/23/a-decade-of-elon-musk-and-the-dawn-of-the-electric-car> [<https://perma.cc/XJK6-6NLV>]; Tim Higgins, *Elon Musk Has Changed Investors’ Views on the Electric Car*, WALL ST. J. (Feb. 17, 2020, 5:30 AM), [.wsj.com/articles/elon-musk-has-changed-investors-views-on-the-electric-car-1158193540](https://www.wsj.com/articles/elon-musk-has-changed-investors-views-on-the-electric-car-1158193540) [<https://perma.cc/4KLP-45TX?type=image>].

201. Seto, *supra* note 31, at 207–08.

able to justify tax rates far in excess of any now generally imposed.²⁰²

Seto then argues that “society deserves to be compensated for its contribution” that makes the modern potter’s work possible.²⁰³ Taxation extracts such compensation.²⁰⁴

C. Building Communities via Taxation

Taxes finance and advance civilization “by extending the number of important operations we can perform without thinking about them.”²⁰⁵ Potable water and electricity on demand represent two such examples. Taxation forms the foundation for civilization’s “grand bargain” by creating the “social capital” that builds community infrastructure and improves the lives of “ordinary” residents.²⁰⁶

Seto explains how laws and policies can create “social capital” that promotes “community cohesion” and achieves competitive advantages.²⁰⁷ For instance, tax policies that value human knowledge and innovation can harness and direct surplus economic resources to support the imagination, discovery, recording, growth, and sharing of

202. *Id.* at 208.

203. *Id.*

204. RAWLS, *supra* note 185, at 52 (“Citizens understand that when they take part in social cooperation, their property and wealth, and their share of what they help to produce, are subject to . . . taxes”); *see also* McMahon & Abreu, *supra* note 9, at 68 (discussing how tax systems can be fair and just).

205. DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 379 (quoting English philosopher and mathematician Alfred North Whitehead); *see, e.g.*, HARARI, *supra* note 24, at 103 (“The Roman Empire at its zenith collected taxes from up to 100 million subjects. This revenue financed a standing army of 250,000–500,000 soldiers, a road network still in use 1,500 years later, and theatres and amphitheatres that host spectacles to this day.”).

206. Seto, *supra* note 31, at 196, 213 (emphasizing that explicit and implicit taxation “facilitates the creation of [social] capital” that “ultimately inures to the benefit of a society’s ordinary members”); *id.* at 196, 204 (using the terms capital and social capital interchangeably). Seto explains that “[c]reated capital is capital created by human activity.” *Id.* at 206; *see also* HASKEL & WESTLAKE, *supra* note 26, at 145, 156 (explaining how the words “infrastructure” and “social capital” refer to intangible things such as trust, common knowledge, rules, norms, and institutions); RAWLS, *supra* note 185, at 118 (discussing “society’s political capital”). Rawls explains:

Here the term “capital” is appropriate because these virtues are built up slowly over time and depend not only on the existing political and social institutions (themselves slowly built up), but also on citizens’ experience as a whole and their public knowledge of the past. Again, like capital, these virtues can depreciate, as it were, and must be constantly renewed by being reaffirmed and acted on in the present.

Id.

207. Seto, *supra* note 31, at 194–95, 213. Seto writes that “taxation, explicit or implicit, facilitates the creation of such [social] capital.” *Id.* at 196.

human knowledge and “productivity-enhancing know-how.”²⁰⁸ Much like interest, sustained investments in “social capital”—such as accumulated human knowledge, processes, and technologies—compound over time to form socially stable, economically enterprising, and politically prosperous civilizations.²⁰⁹

As expected, taxpayers may regard tax policies and laws designed to create “social capital” negatively or positively. A standard negative view is that taxation “force[s] ordinary members to work harder than they otherwise might.”²¹⁰ Although taxation “involves a significant element of forced labour,” these collected tax revenues support community health and economic stability, thereby making “life more pleasant and productive.”²¹¹ For instance, taxes finance valuable human-created capital and “social” technologies such as the law and associated “legal infrastructure” for dispute resolution.²¹² Taxes also support

208. *Id.* at 194–96, 207–08. *See generally* BOYLE, *supra* note 26, at 199–200 (advocating for a comprehensive rethink and update of intellectual property laws).

209. Seto, *supra* note 31, at 195. Seto explains, “if property, tax, and other rules are structured so as to maximize the production of social capital while minimizing regressive implicit taxation, societies are more likely to flourish in the long run.” *Id.* at 197; *see* McMahon & Abreu, *supra* note 9, at 67 (illustrating a range of market participants from the poor to the rich and labeling the rich as market “winners”). Professors McMahon and Abreu further observe that:

Society at large owns the market, because it has created the market, including the legal infrastructure that facilitates [the participation of economic winners] in that market. In levying taxes, society is, in effect, charging rent for the privilege of participating in the market—rent which will be plowed back into maintaining that market in the form of public goods.

Id. at 69; *see also* VAN PARIJS & VANDERBORGHT, *supra* note 165, at 106 (quoting Herbert A. Simon in describing how the term “social capital” encompasses “stored knowledge” such as technology, organizational, and government systems and skills). *See generally* KIRK HAMILTON ET AL., WORLD BANK, WHERE IS THE WEALTH OF NATIONS?: MEASURING CAPITAL FOR THE 21ST CENTURY 85–99 (2005), <https://documents1.worldbank.org/curated/en/287171468323724180/pdf/348550REVISED0101Official0use0ONLY1.pdf> [<https://perma.cc/P434-X2CF>] (“Explaining the Intangible Capital Residual: The Role of Human Capital and Institutions”). The World Bank Report states that “intangible capital is the largest share of total wealth.” *Id.* at 87. It explains that intangible capital includes: “human capital, the skills and know-how embodied in the labor force. It encompasses social capital, that is, the degree of trust among people in a society and their ability to work together for common purposes. It also includes those governance elements that boost the productivity of the economy.” *Id.*

210. Seto, *supra* note 31, at 195; *see, e.g.*, HARARI, *supra* note 10, at 175 (“Pharaonic Egypt was the most powerful kingdom of its day, but for the simple peasant all that power meant taxes and forced [labor] rather than clinics and social services.”).

211. Seto, *supra* note 31, at 196, 199, 213.

212. *Id.* at 194 (classifying “mechanisms for the peaceful resolution of disputes” as social capital); HADFIELD, *supra* note 148, at 26 (defining law as “the enterprise of subjecting human conduct to the governance of rules”). Hadfield explains: “The enterprise of creating rules to organize our interactions to produce a collective good, often attended by competition and strategy, is as old as human society.” *Id.* at 17. Hadfield also uses the phrase “legal infrastructure.” *Id.* at 129, 285.

public education, information communication technologies, military and police protection, and social and economic safety nets for neighbors in need.²¹³

By contrast, taxpayers with positive perspectives support social programs and policies. Namely, they understand that taxes: (1) make “work more productive”; (2) “ultimately inure[] to the benefit of a society’s ordinary members”; and (3) make life more “pleasant” and productive for all because it allows “ordinary members to move beyond mere subsistence.”²¹⁴ The challenge for policymakers thus involves financing public goods²¹⁵ while navigating their constituents’ disparate political views about social and tax justice.²¹⁶

D. Creating Social Capital

By recognizing “private ownership of property,” Seto argues that such property laws deny and dispossess “humans of their natural liberty.”²¹⁷ Rejecting the trite “taxation is theft” meme, Seto argues that “uneven distribution of property rights without the creation of social capital is theft.”²¹⁸ He also explains how tax and property laws can and should work together to achieve “civilization’s grand bargain”—whereby taxes finance the construction of “social capital.”²¹⁹ He argues that if tax revenues support “social capital” investments, taxes on wages and income constitute acceptable economic deprivation and “justify the resulting forced labor.”²²⁰

213. Seto explains that concentrated economic surplus supports the creation of other capital improvements and investments. Seto, *supra* note 31, at 194. Some examples of tangible assets include “irrigation systems, mills, and boats.” *Id.* He then describes these other important capital investments in public infrastructure: “systems for the orderly distribution of the products and labor, mechanisms for the peaceful resolution of disputes, defen[s]e against outsiders, grain stored against droughts and other forms of social insurance, roads, communication networks, productivity-enhancing know-how, and community cohesion.” *Id.*

214. *Id.* at 195–96, 213.

215. MURPHY & NAGEL, *supra* note 13, at 46 (defining “public goods” as “those [goods and services] that cannot be provided to anybody unless they are provided to everybody”). They explain, for example, that “[s]ome public expenditure is needed to sustain a legal and economic order of any kind.” *Id.* at 79. Other examples include security (external and domestic), courts and other administrative services, cultural and social resources, and environmental protection. *Id.* at 80.

216. *Id.* at 38, 184 (“Tax justice must be part of an overall theory of social justice and of the legitimate aims of government.”); see also RAWORTH, *supra* note 3, at 235 (recommending that advocates frame policy discussions as seeking “tax justice” and focusing on the value and importance of “public investment”).

217. Seto, *supra* note 31, at 196, 199.

218. *Id.* at 196.

219. *Id.*

220. *Id.*

Seto then advocates for an integrated property and tax paradigm where “property law rules” and tax policies serve as instruments to achieve social goals.²²¹ He argues for property and tax laws to be explicitly “structured so as to maximize the production of social capital.”²²² Using maximization of “the production of social capital” as a property and tax policy North Star,²²³ Part III outlines some Technology Justice components—hopefully, in a manner that is clear, intuitive, and just.²²⁴

III. COMPONENTS OF TECHNOLOGY JUSTICE

Technology Justice begins by socially and legally recognizing humans’ collective and cumulative cognitive inheritance and the associated tangible and intangible assets.²²⁵ As AI, robotic, and eventually quantum technologies reshape how humans live and work, legal operating systems—also known as the law—will need substantial upgrades.²²⁶

This section proposes some necessary upgrades by positing a tax and property paradigm prototype. It then offers an example of this tax and property paradigm in action by applying it to Elon Musk and his business ventures. Readers should note that these pages sketch a preliminary framework—with the goal of stimulating ideas and generating debate. Accordingly, this Author invites other thinkers to add detail and texture to potential designs for an integrated property and tax paradigm nimble enough to respond to the social and economic

221. *Id.* at 197 (asserting that property laws should be “primarily instrumental”); *see also Instrumental*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/instrumental> [<https://perma.cc/J987-RGKW>] (defining instrumental as “serving as a crucial means, agent or tool”).

222. Seto, *supra* note 31, at 197.

223. *Id.*

224. MURPHY & NAGEL, *supra* note 13, at 188 (explaining that any moral ideas must be “graspable and intuitively appealing, not just correct”).

225. BOYLE, *supra* note 26, at 19 (quoting Thomas Jefferson’s observation that “[s]table ownership is the gift of social law, and is given late in the progress of society”). Boyle then adds that society “creates property rights that go beyond mere occupancy.” *Id.*

226. Caitlin “Cat” Moon, *Delta Model Lawyer: Lawyer Competencies for the Computational Age*, MIT COMPUTATIONAL L. REP. (2019), <https://law.mit.edu/pub/deltamodellawyer/release/2> [<https://perma.cc/UN8L-RGFT>] (noting that the “law is human society’s operating system”); *see REESE, supra* note 7, at 277 (“Civilization is law codes, it is coinage, it is scientific inquiry, and it is the educational system.”). *See generally* RAWLS, *supra* note 185, at 61 (stating “the fundamental idea of society as a fair system of social cooperation”). Rawls observes that “[s]ocial cooperation, we assume, is always productive, and without cooperation there would be nothing produced and so nothing to distribute.” *Id.*; *see also* ROSEN, *supra* note 92, at 185 (“Inventions don’t just solve problems; they create new ones, which demand—and inspire—other inventions.”).

transformations generated by high-voltage Fourth Industrial Revolution technologies.²²⁷

*A. Applying Paine’s Framework (Step Four) to
Fourth Industrial Revolution Technologies*

Anticipating that AI, robotic, and quantum technologies will accelerate the economic transformation of the workplace in the coming decades, this Article advocates for a rethink and reimagination of what constitutes taxable property—a task that spans across current legal and economic systems and political views. It also echoes Peter Barnes’s call to identify and evaluate “all the sources of income within capitalism”²²⁸ as potential UBI funding sources. This Article’s proposal to reimagine and rethink property aligns with step four of Paine’s *Agrarian Justice* framework.

The following section updates Paine’s theories for the Fourth Industrial Revolution by suggesting three elements of an integrated tax and property paradigm. First, tax and property laws should explicitly recognize humans’ collective and cumulative cognitive inheritance.²²⁹ Second, the tangible and intangible assets comprising separate (cultivated) and co-owned (patrimony) property should be valued and

227. COLEMAN, *supra* note 178, at 149 (describing the need for “our systems, economies, governments, and institutions” to prepare for “paradigm-shifting technological advance[s]”). Coleman advocates for a “societal restructuring” that harnesses Fourth Industrial Revolution technologies to create “a brighter future for all.” *Id.* at 204.

228. BARNES, *supra* note 16, at 27. *See generally* RAWORTH, *supra* note 3, at 152 (discussing “[Henry] George’s proposal for a land-value tax—an annual levy on underlying land values as a fair means of generating public revenue—which echoed John Stuart Mill’s earlier call to tax ‘rentier landlords’ who ‘grow richer, as it were in their sleep, without working, risking, or [economizing]’”).

229. Simon, *supra* note 128, at 756; Seto, *supra*, note 31, at 211 (“In the modern world, privately owned capital is an admixture of pre-existing social capital, already in the common pool, and some private contribution by the person to whom we award ownership rights. The former almost always vastly outweighs the latter.”); BOYLE, *supra* note 26, at 19 (building on Jefferson’s observation about the relationship between ownership and society); *see also* ORG. FOR ECON. CO-OPERATION & DEV., NEW SOURCES OF GROWTH: KNOWLEDGE-BASED CAPITAL 51 (2013), <https://www.oecd.org/sti/inno/knowledge-based-capital-synthesis.pdf> [<https://perma.cc/UN7N-L7YH>] (“[D]espite the fact that the value of many of the world’s most successful companies resides almost entirely in their intangibles, corporate reports provide only limited information on these.”). The Organisation for Economic Co-operation and Development report estimates that between 1995 and 2007, 27 percent of U.S. labor productivity growth stemmed from knowledge-based capital. *Id.* at 10, 18. The report also advocates for readjustment of public and tax policies treating human, knowledge-based (intangible) capital. *Id.* at 27. *See generally* ORG. FOR ECON. CO-OPERATION & DEV., ENQUIRIES INTO INTELLECTUAL PROPERTY’S ECONOMIC IMPACT 85–122, 415–19 (2015), <https://www.oecd.org/sti/economy/KBC2-IP.Final.pdf> [<https://perma.cc/PKJ4-MCYL>] (“measuring the technological and economic value of patents” and evaluating “society’s gain from the intellectual property exchange”).

transparently taxed.²³⁰ Third, tax revenues collected from this shared patrimony should be used to create a perpetual, national cognitive trust fund that finances and pre-distributes a UBI to eligible recipients.²³¹ Using these compounding cognitive assets to finance a guaranteed income will ensure that all have the economic resources for basic shelter, food, and healthcare. Further, since “tax policy is fundamentally social policy,” the proposal below seeks to honor, recognize, and balance the priorities, values, and choices of those community members both positively and negatively affected by technology and taxation.²³²

1. Modernizing Laws to Recognize Humans’ Shared Patrimony

As explained above in Part I, Paine argued that the resources made by the Creator represent humans’ natural inheritance, to which all descendants have claims rooted in justice.²³³ Ongoing brain research, cognitive science discoveries, and multidisciplinary findings about human culture and evolution support this Article’s contention that Paine’s framework should apply to another natural, organic asset: knowledge created by the “wetware” in our analog, parallel human brains.²³⁴ More precisely, this Article asserts that “the ‘cognitive

230. Seto, *supra*, note 31, at 211 (discussing private capital components). *See generally* PAINE, *supra* note 19, at 12–13 (proposing the collection of ground rents to monetize the assets comprising humans’ natural inheritance); ROSEN, *supra* note 92, at 163–64 (explaining “rent seeking” as “the practice of earning income from an asset without currently working at it” and noting that patent and copyright holders are “rent seekers”).

231. *See* PAINE, *supra* note 19, at 12–13 (explaining Paine’s step four: proposing a guaranteed income to pre-distribute the collected revenues from the co-owned wealth); RAWLS, *supra* note 185, at 129–30 (discussing a “social minimum that “covers the basic needs essential to a decent life”). Rawls then posits the pre-distribution of “productive assets” as a means for “put[ting] all citizens in a position to manage their own affairs on a footing of a suitable degree of social and economic equality.” *Id.* at 139.

232. McMahon & Abreu, *supra* note 9, at 71 (“Societal values reflect a complex balancing of principles and interests.”); Clinton G. Wallace, *Democracy Avoidance in Tax Lawmaking*, 25 FLA. TAX REV. 272, 338 (2021); *see also* MURPHY & NAGEL, *supra* note 13, at 190 (“[M]ost people are coming to believe that even under capitalism the organization of the economy, and the allocation of its product between public and private control, is a legitimate object of continual collective choice, and that this choice must be made on grounds that justify it not only economically but morally, and by a democratic procedure that legitimizes it.”).

233. PAINE, *supra* note 19, at 21 (“But it is justice, and not charity, that is the principle of the plan.”).

234. Dennett, *The Software/Wetware Distinction*, *supra* note 24, at 367–68 (“At least large parts of the human mind *are* (like) programs running on the wetware of teams of neurons.” (footnote omitted)); DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 154 (“Brains are analog; computers are digital.”). Dennett then observes that human brains are parallel, and computers are serial processors. *Id.* at 155.

niche’ our ancestors have constructed over the millennia”²³⁵ merits equal treatment to Paine’s natural—earthly—inheritance.

If, as according to Paine, all humans are entitled to a share of their earthly inheritance created by the Almighty,²³⁶ what halts a similar application of such natural inheritance to the collective and cumulative cognitive assets created by our ancestors?²³⁷ Since the Creator endowed and equipped human minds with the capacity for creativity, curiosity, and innovation, logic suggests that the resulting cognitive bounty—modernly described as assets—should be similarly included in humans’ natural inheritance.²³⁸ As noted above in the discussion about “social capital,”²³⁹ these human-created tangible and intangible

235. DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 335 (referencing Steven Pinker’s “cognitive niche” concept and “stressing that it is a *product* of human comprehension”); see Steven Pinker, *The Cognitive Niche: Coevolution of Intelligence, Sociality, and Language*, 107 PROCS. NAT’L ACAD. SCIS. 8993, 8998 (2020) (“[H]ominids evolved to specialize in the cognitive niche, which is defined by: reasoning about the causal structure of the world, cooperating with other individuals, and sharing that knowledge and negotiating those agreements via language.”). Pinker explains that the cognitive niche theory offers “several advantages as an explanation of the evolution of the human mind” and “invokes the intrinsic advantages of know-how, cooperation, and communication that we recognize uncontroversially in the contemporary world.” *Id.* at 8996. Pinker also points out how the concept of cognitive niche links language to the sharing of know-how. *Id.* at 8995. Pinker writes: “The ability to share information via language leverages the value of acquiring new knowledge and skills. One does not have to recapitulate the trial-and-error, lucky accidents, or strokes of genius of other individuals but can build on their discoveries, avoiding the proverbial waste of reinventing the wheel.” *Id.* According to Dennett, “‘*Homo sapiens*’ are the only species (so far) with richly cumulative culture, and the key ingredient of culture that makes this possible is language.” DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 177. He then lists some important “human cultural innovations, such as cooking, agriculture, transportation, religion, and science.” *Id.* at 177–78.

236. PAINE, *supra* note 19, at iv (noting that the Creator gave humans “the earth for their inheritance”).

237. Merriam-Webster defines the word “cognitive” as “of, or relating to, being, or involving conscious intellectual activity (such as thinking, reasoning, or remembering).” *Cognitive*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/cognitive?utm_campaign=sd&utm_medium=serp&utm_source=jsonld [<https://perma.cc/K3XA-HRTZ>]; see, e.g., BARNES, *supra* note 16, at 60–61 (identifying the following three categories of co-owned wealth: (1) earthly gifts such as air, water, forests, and fertile land; (2) ancestral gifts such as the sciences, technologies, legal, financial, and political systems, etc.; and (3) the gifts generated by the “scale and synergies of our economy”). Note: This Article takes the liberty to label Barnes’s ancestral gifts as our collective and cumulative cognitive inheritance.

238. For a modern perspective, Harvard psychology professor Steven Pinker describes the human brain as a “designer” powered by “10 trillion synapses” that incorporate “half a billion years of evolutionary R&D.” Daniel Dennett & Steven Pinker, *How Brains Become Minds: The Role of Cultural Software at Harvard University*, YOUTUBE (Apr. 23, 2009), <https://www.youtube.com/watch?v=3H8i5x-jcew> [<https://perma.cc/4AZ4-A2EU>]. Pinker states, “there is really a designer—the human brain—and there’s nothing mystical or mysterious about saying that.” *Id.*; see also DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 316 (referencing and quoting Pinker’s 2009 lecture comments). Dennett also writes, “Steven Pinker is right that the ‘human brain is really a designer.’” *Id.* at 323.

239. See *supra* notes 208–209 and accompanying text (discussing “social capital”).

assets include, but are not limited to, ideas, arts, sciences, technologies, processes, and political, economic, and legal systems.²⁴⁰ Capitalizing on these human-created assets, agile and adaptable human minds discovered and cultivated new ideas, designed and developed techniques, and collaborated with others to build communities and nations.²⁴¹ Pairing Paine’s natural property analysis with Seto’s concept of “social capital”²⁴² demonstrates that Technology Justice is achievable by taxing these valuable cognitive assets and equitably distributing the collected revenues in the form of a guaranteed income or UBI (Paine’s step four).

In sum, because our collective and cumulative cognitive inheritance seeds and supports private wealth creation,²⁴³ it is time to modernize tax and property laws and expand the definition of taxable

240. According to Pinker:

Science and technology, organizations (such as corporations, universities, armies, and governments), and communication media (such as the press, mail, telephones, television, radio, and the internet) are, respectively, just the exercise of cognition, sociality, and language writ large, and they singly and jointly enable the achievement of outcomes that would be impossible without them. The theory of the cognitive niche simply extrapolates these advantages backward in time and scale.

Pinker, *supra* note 235, at 8996; *see also* DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 330–331 (describing how humans grew over time in their knowledge and sophistication by “small innovations, adjustments, and refinements, building excellently designed cultural habits and institutions”); BOYLE, *supra* note 26, at 19 (describing how society “creates property rights that go beyond mere occupancy”).

241. PAINE, *supra* note 19, at 14 (“Cultivation is, at least, one of the greatest natural improvements ever made by human invention. It has given to created earth a tenfold value.”). In her 2015 foreword, “Social Security, Thomas Paine, and The Spirit of America,” current Social Security Advisory Board Member and former Harvard Law professor Nancy J. Altman observed:

Thomas Paine and our other Founders understood that no one becomes rich completely on his or her own; no one is totally self-made. The accumulation of large estates is dependent, in part, on the nation’s infrastructure. Governments build the public roads which assist getting goods to market, establish laws and the courts that make contracts enforceable, fund police and fire services which protect property, and provide countless other goods and services benefiting rich and poor alike.

Nancy J. Altman, *Foreword to THOMAS PAINE, AGRARIAN JUSTICE* 11 (CreateSpace Indep. Publ’g Platform 2015). *See generally* HARARI, *supra* note 24.

242. *See supra* notes 207–208 and accompanying text.

243. BARNES, *supra* note 16, at 61 (“The sum of wealth created by nature, our ancestors, and our economy as a whole is what I call here *co-owned wealth*. Some, including myself, have called it *shared wealth*, *the commons*, or *common wealth*. Whatever we call it, it’s the goose that lays almost all of the eggs of private wealth.”).

property to include the tangible and intangible assets of our shared patrimony.²⁴⁴

2. Valuing and Taxing Co-owned Wealth/Patrimony to Fund UBI

As we consider how to value and tax our collective and cumulative cognitive inheritance, let us pause briefly to revisit Paine’s enduring observations about the relationship between property, wealth, and society: “All accumulation, therefore, of personal property, beyond what a man’s own hands produce, is derived to him by living in society; and he owes on every principle of justice, of gratitude, and of civilization, a part of that accumulation back again to society from whence the whole came.”²⁴⁵ Determining an appropriate part of such accumulation is our next task.

A simple estimate of the tangible and intangible assets—forming humans’ collective and cumulative cognitive inheritance—supports the discussion and development of a dynamic Technology Justice prototype. Recall Herbert A. Simon’s appraisal that only 20 percent of an individual’s earnings and wealth is actually “earned,” while the other 80 percent represents the “patrimony associated with being a member of an enormously productive system.”²⁴⁶ Simon’s 80-20 model clarifies how co-owned wealth could be taxed, collected, and stewarded to create a national cognitive trust fund that economically benefits all. For example, imagine that 80 percent of the tangible and intangible assets underlying IBM, Microsoft, Amazon, Alphabet Inc. (Google), or Meta’s (Facebook) enterprises were considered co-owned wealth and held in “escrow for the public good.”²⁴⁷ Even a downward

244. See generally BOYLE, *supra* note 26, at 56 (“When you set up property rules in some new space, you determine much about the history that follows. Property rules have a huge effect on power relationships and bargaining positions.”).

245. PAINE, *supra* note 19, at 24 (explaining that wealth depends on society).

246. Simon, *supra* note 128, at 756.

247. BARNES, *supra* note 16, at 49 (“[A] sizable portion of Microsoft’s stock value—arguably the lion’s share—comes from system properties such as the network effect, market power, and copyright protection, a gift for which our government charges nothing.”). Barnes adds:

On top of this, Microsoft benefits from decades of public investment in schools, semi-conductors, and the Internet; centuries of scientific progress; and unstinting generosity from nature (think of the fuels and atmosphere required to power the Internet). When you add it all up, you can’t help but conclude that a large portion of Gates’s fortune wasn’t earned by him but rather was taken by him from wealth that rightfully belongs to everyone.

Id.; Daniel C. Dennett, *What Can We Do?*, in POSSIBLE MINDS: 25 WAYS OF LOOKING AT AI 51 (John Brockman ed., 2019) (arguing that “we should enact legislation that puts [large technology companies’] deep pockets in escrow for the public good”).

adjustment of Simon’s percentage estimate to Buffett’s “very significant percentage”²⁴⁸ shows how taxing humans’ shared patrimony could finance a UBI.²⁴⁹ In ensuring that giant technology companies pay their fair share of taxes,²⁵⁰ this proposal aligns with Murphy and Nagel’s call for standards of social justice and fairness to guide tax policy.²⁵¹ This proposal also echoes McMahon, Abreu, and Altman’s arguments that because economic winners benefit most from our “common wealth” they should support—via taxation—the common goods and services that support and protect their wealth.²⁵²

Updating and extending Paine’s framework to include human-created property will ensure that humans receive their rightful share of the co-owned wealth stemming from their collective and cumulative cognitive inheritance. Such expansion fortifies the long-term economic viability of Paine’s proposals because the immense value of these human-created tangible and intangible cognitive assets (if identified, traced, assessed, taxed, collected, and stewarded) could fund a UBI for all—especially those workers displaced by intelligent machines.²⁵³ This proposal further recognizes that under Paine’s framework and the American capitalist system, forward-thinking innovators and savvy business entrepreneurs are entitled to own property separately, benefit financially, and enjoy the economic and professional

248. BARNES, *supra* note 16, at 49; Simon, *supra* note 128, at 756; LOWE, *supra* note, 131 at 284.

249. VAN PARIJS & VANDERBORGHT, *supra* note 165, at 124 (“In order to fund this [UBI] without forced labor, however, producers must have sufficiently strong material incentives to work and train. This means that tax rates on market rewards must remain well under 100 percent.”).

250. Marian, *supra* note 17, at 563 (noting how data-rich companies such as Google/Alphabet, Amazon, and Facebook “pay extremely low effective tax rates”); *see also* RAWORTH, *supra* note 3, at 165 (highlighting Mariana Mazzucato’s proposal to collect “royalties from co-owned public-private patents” or on “publicly funded research”); McMahon & Abreu, *supra* note 9, at 56–57 (“Optimal tax theory suggests that imposing higher rates of taxation on winners will produce the greatest overall good by increasing revenue while not decreasing productivity.”).

251. MURPHY & NAGEL, *supra* note 13, at 173.

252. McMahon & Abreu, *supra* note 9, at 69 (“In levying taxes, society is, in effect, charging rent for the privilege of participating in the market—rent which will be plowed back into maintaining that market in the form of public goods.”); *see* Altman, *supra* note 243, at 11 (observing that “the wealthy often benefit the most from what government provides”). Altman explains:

When government protects private property, for example, the rich have the most property to be protected. Thus, requiring the wealthiest estates to contribute a portion of their great fortunes to the funding of common goods and services, while still retaining for heirs the large bulk of the assets accumulated, is the least that should be required of those who have benefitted so greatly from the Commonwealth (i.e., common wealth).

Id.

253. *See generally* Escajeda, *supra* note 10, at 150–55, 171–73, 182–94.

prestige derived from the effort and risk they took to “cultivate” their identifiable creations.²⁵⁴

This proposal for Technology Justice provides a balanced and sensible approach to identifying, tracing, valuing, and taxing human-created property. It not only adheres to Paine’s demand that “justice and not charity” guide national plans and policies,²⁵⁵ but it also meets Paine’s criteria that any property and taxation proposal “benefit all, without injuring any.”²⁵⁶ Further, any claims of prospective injury resulting from this proposal fall flat; the example of electricity-energy explorer Elon Musk illustrates Paine’s common versus cultivated property distinction.²⁵⁷ While Musk neither created electrical science nor generated any significant scientific advances before 2003,²⁵⁸ he may claim any tangible and intangible property explicitly created by Tesla, SpaceX, and his other ventures.²⁵⁹ Technology Justice does not prevent Musk’s enterprises from advancing science and making substantial profits. Instead, it simply requires payment for using humans’ collective and cumulative cognitive assets that buttress Tesla and

254. PAINE, *supra* note 19, at 10 (discussing how “cultivation” is a human invention that can create “a tenfold value”). Paine also writes that “the value of the improvement only, and not the earth itself, . . . is individual property.” *Id.* at 8. *See generally* McMahon, Jr. & Abreu, *supra* note 9, at 65 (asserting that taxpayers who “receive winners’ compensation” may be driven to excel in their work for nonpecuniary reasons (prestige and personal gratification) rather than by changes in tax policy).

255. PAINE, *supra* note 19, at 21.

256. *Id.* at 23.

257. *Id.* at 10, 12 (explaining that “additional value made by cultivation” constitutes the individual property of the person who did the work).

258. ROACH, *supra* note 73, at 351 (describing historical electrical discoveries). Roach writes:

As Einstein showed, electricity was not just one stop along the path of scientific discovery in the nineteenth and twentieth centuries; the study of electricity was the path itself. This gives even greater hope for scientific discovery with electricity. The first burst of scientific discovery for electricity was in the Age of Franklin and encompassed Franklin, Faraday, and Maxwell. After a long hiatus, in the Age of Edison and the Age of Big, Tesla and Einstein led two further surges in scientific breakthroughs. . . . In 2016 Elon Musk is perhaps the most fitting torchbearer for our latest revolution in both the science and business of electricity.

Id.; *see* *Elon Musk*, TESLA, <https://www.tesla.com/elon-musk> [<https://perma.cc/Q9MF-HM24>] (noting Tesla’s founding in 2003).

259. *See supra* Section II.B.4 (“Distinguishing Between Individual and Common Property”). *See generally* Lora Kolodny, *Elon Musk’s SpaceX Is Now Worth More Than Tesla*, CNBC (May 31, 2019, 5:55 PM), <https://www.cnbc.com/2019/05/31/elon-musk-spacex-is-now-worth-more-than-tesla.html> [<https://perma.cc/L6NG-92FG>].

SpaceX's innovations since Musk and other economic winners' wealth originates and depends on society.²⁶⁰

As discussed in the following section, this proposal also shifts tax policy away from the much-maligned redistribution model to a pre-distribution model²⁶¹ by: (1) delineating between common and separately owned property; (2) taxing and pre-distributing co-owned property; and (3) respecting separate ownership (with associated taxation) for new creations and innovations. Most importantly, a shift to pre-distribution would ensure “a more equal distribution” of economic power²⁶² and co-owned wealth.²⁶³

3. Pre-distributing Patrimony via UBI

Technology Justice requires that humans benefit from the natural inheritance—that is, co-owned wealth—created by human minds.²⁶⁴ Specifically, this Article asserts that our collective and cumulative cognitive inheritance constitutes property that should be identified, traced, taxed, and pre-distributed for the benefit of all. Specifically, recipients (both rich and poor) should receive their inheritance in the form of a *universal* basic income (UBI).²⁶⁵ A UBI would then provide

260. See PAINE, *supra* note 19, at 25 (asserting that the rich have a financial duty to society). “Separate an individual from society, and give him an island or continent to possess, and he cannot acquire personal property. He cannot become rich. So inseparably are the means connected with the end, in all cases, that where the former do not exist, the latter cannot be obtained.” *Id.* at 24; see also McMahan, Jr. & Abreu, *supra* note 9, at 68 (observing that “the market that produces and nurtures the winners is created by society collectively. While capital may be crucial for modern economic productivity and growth, the most important factors in significant increases in the rate of growth of the GDP historically have been increases in educational level and advances in technology”).

261. See BARNES, *supra* note 16, at 125 (redistribution “breeds resentment among those whose money is taken”). Barnes explains that “[p]re-distribution, by contrast, involves no takings.” *Id.*; see also VAN PARIJS & VANDERBORGHT, *supra* note 165, at 106–07 (noting that “the correct term is fair distribution and not fair redistribution”). Van Parijs and Vanderborcht argue that fair distribution involves charging fees for the use of collective property. *Id.* See generally MURPHY & NAGEL, *supra* note 13, at 175 (advocating for a counterintuitive “conception of property” and its taxation).

262. Hacker, *supra* note 20, at 35 (describing pre-distribution as “the way in which the market distributes its rewards in the first place”). Hacker emphasizes the importance of “market reforms that encourage a more equal distribution of economic power and rewards even before government collects taxes or pays out benefits.” *Id.*

263. See BARNES, *supra* note 16, at 2–3, 11, 61, 139 (defining an expansive concept of co-owned wealth).

264. See *id.* at 85 (identifying co-owned wealth and user fees on such co-owned wealth as potential basic income funding sources); DENNETT, FROM BACTERIA TO BACH, *supra* note 24, at 371; HARARI, *supra* note 22, at 3.

265. PAINE, *supra* note 19, at 12–13. Arguing for a guaranteed income to all citizens, Paine wrote:

recipients with the choice, for example, to invest in business enterprises or pursue lifelong learning—thereby growing economic capital and fueling cognitive advancements.²⁶⁶

The writings of Oxford University economist George D. H. Cole further support this Article’s proposed extension of Paine’s ideas to human-created property (patrimony).²⁶⁷ In 1944, Cole wrote that our ancestors’ “inventiveness and skill” made modern productivity and prosperity possible.²⁶⁸ To “share in the yield of this common heritage,” Cole advocated for structured payments that (1) timely compensated citizens for their share of these economic benefits, and (2) provided financial rewards to individuals who leverage this shared heritage to create state-of-the-art products and services.²⁶⁹

Further, this proposal for Technology Justice adheres to Paine’s calls in 1796 to discover the boundaries that divide “right from wrong” and indemnify the dispossessed from the loss of their natural inheritance.²⁷⁰ By recognizing common ownership and taxing the tangible and intangible assets collectively created by human minds over the millennia, it now becomes possible to realize one of Rev. Dr. Martin Luther King, Jr.’s dreams: solving poverty through a guaranteed income.²⁷¹ In his 1967 book, *Where Do We Go From Here: Chaos or Community*, Dr. King wrote, “I am now convinced that the simplest approach will prove to be the most effective—the solution to poverty is to abolish it directly by a now widely discussed measure: the

It is proposed that the payments, as already stated, be made to every person, rich or poor. It is best to make it so, to prevent invidious distinctions. It is also right it should be so, because it is in lieu of the natural inheritance, which, as a right, belongs to every man, over and above the property he may have created, or inherited from those who did. Such persons as do not choose to receive it can throw it into the common fund.

Id. at 15–16; see VAN PARIJS & VANDERBORGHT, *supra* note 162, at 113 (“[A] basic income can be viewed not only as a return on commonly owned capital but also as a capital endowment transferred in small installments to each member of society.”).

266. See VAN PARIJS & VANDERBORGHT, *supra* note 162, at 113 (discussing human capital creation). According to “libertarian Mat Zwolinski: ‘A basic income gives people an option—to the exit the labor market, to relocate to a more competitive market, to invest in training, to take an entrepreneurial risk, and so on.’” *Id.* at 121; see Altman, *supra* note 243, at 3 (quoting Paine’s observation that with a minimum guaranteed payment, recipients would buy property or tools to become “useful and profitable citizens”). Also, because UBI is universal and unrestricted, recipients have the freedom to use their UBI for family care, education, entrepreneurial endeavors—and even squander it should they should so choose. See Escajeda, *supra* note 10, at 192.

267. G. D. H. COLE, *MONEY: ITS PRESENT AND FUTURE* 144 (G. D. H. Cole ed., 1945).

268. *Id.*

269. *Id.*

270. PAINE, *supra* note 19, at 10–11.

271. KING, *supra* note 25, at 171.

guaranteed income.”²⁷² Dr. King noted how a guaranteed income would provide economic security and positive psychological benefits to all Americans.²⁷³ He explained: “The dignity of the individual will flourish when the decisions concerning his life are in his own hands, when he has the assurance that his income is stable and certain, and when he knows that he has the means to seek self-improvement.”²⁷⁴

Dr. King’s wise observation resounds today—that is, technological progress creates economic abundance.²⁷⁵ As was present in Dr. King’s life, the question remains whether sufficient political will—and social might—exist to demand law and policy changes for capturing and pre-distributing the co-owned wealth underpinning our nation’s techno-economic abundance. As of this writing, the answer is no. But as noted above, emergencies, catastrophes, pandemics, and mass unemployment often force policymakers to venture into the adjacent possible—thereby shifting paradigms and joining Technology Justice with economic justice.²⁷⁶

In brief, financing Technology Justice through co-owned wealth makes sense in modern times, where AI-powered robots can immediately “add[] to the compendium of robot knowledge” that took the human-creators decades or centuries to master.²⁷⁷ Pre-distributing the co-owned wealth generated by shared patrimony ensures that everyone—

272. *Id.*

273. *Id.* at 173.

274. *Id.*

275. *See id.* at 181. Dr. King wrote:

We must work passionately and indefatigably to bridge the gulf between our scientific progress and our moral progress. One of the great problems of mankind is that we suffer from a poverty of the spirit which stands in glaring contrast to our scientific and technological abundance. The richer we have become materially, the poorer we have become morally and spiritually.

Id.; *see* HARARI, *supra* note 24, at 310 (“The idea of progress is built on the notion that if we admit our ignorance and invest resources in research, things can improve.”). Harari then explains, “Whoever believes in progress believes that geographical discoveries, technological inventions, and organizational developments can increase the sum total of human production, trade and wealth.” *Id.*; *see also* COLEMAN, *supra* note 178, at 139 (arguing that because AI technologies will generate “vast new wealth,” policymakers can “finally engineer fairness into the fabric of our societies”).

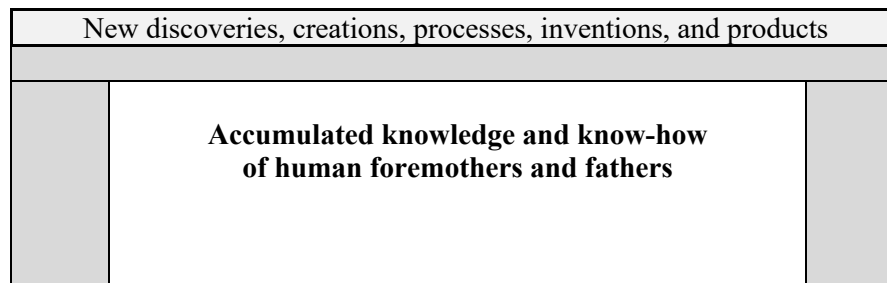
276. *See* Joseph Zeballos-Roig, *House Speaker Nancy Pelosi Opens Door to Guaranteed Income for Americans, Saying It’s ‘Worthy of Attention,’* BUS. INSIDER (Apr. 27, 2020, 9:03 AM), <https://www.businessinsider.com/nancy-pelosi-guaranteed-income-americans-coronavirus-stimulus-economy-minimum-plan-2020-4> [<https://perma.cc/WW84-AL4B>]; *see also* FORD, *supra* note 1, at 179–80 (observing that the COVID-19 pandemic and ongoing need for social distancing may accelerate the transition from human workers to AI-robotic smart machines in many industries). *See generally supra* Section III.A.

277. ANDREW MCAFEE & ERIK BRYNJOLFSSON, MACHINE PLATFORM CROWD: HARNESSING OUR DIGITAL FUTURE 97 (2017).

not just technology titans—enjoys the intellectual and economic bounty created by our foremothers and fathers. Thus, in an era of boundless technological possibilities, it is time for society to see Paine’s theories to fruition.

B. Prototype for a Tax and Property Paradigm

Let us return to this simple sketch below showing how accumulated human knowledge nourishes, sustains, and strengthens nascent discoveries. The top level of this illustration depicts how technology titans financially benefit from our shared patrimony when they make new discoveries, creations, processes, inventions, and products.



The question of whether technology titans are “free riders” is open to debate—but it certainly appears that an argument can be made that they are.²⁷⁸ Setting aside the free-rider debate briefly, payment for the use of these collective human knowledge assets seems fair, measured, and reasonable. Such payment serves as a legitimate means to compensate society for the tangible and intangible assets created by our foremothers and fathers which have been passed down to later generations through public education, laws, and infrastructure.²⁷⁹ Plainly stated, without access to these raw materials, modern technology titans could not build from and profit off the cognitive, social, and

278. Free riders seek to benefit from the efforts of others at no cost to themselves. COOTER & ULEN, *supra* note 84, at 41. *But see* BOYLE, *supra* note 26, at 113, 164 (discussing some benefits and detriments of free riding and describing how Bill Gates both benefitted from free riding and publicly opposed free riding on Microsoft’s work products).

279. BOYLE, *supra* note 26, at 39 (explaining that “the public domain is the basis for our art, our science, and our self-understanding. It is the raw material from which we make new inventions and create new cultural works”); *see also* McMahon, Jr. & Abreu, *supra* note 9, at 68–69 (describing how successful entrepreneurs—that, is the “winners”—built their fortunes on government-provided common goods such as laws, public education, and national infrastructure).

legal infrastructure that now makes them economic winners.²⁸⁰ With this shared understanding, it is possible to devise a dynamic and durable property paradigm. This development process involves asking questions, envisioning alternatives, and sketching prototypes for debate and further refinement. But before doing so, let us turn our attention to free-riding billionaires.

1. Free-Riding Billionaires with “Astro Fetishes”

In December 2021, *Time Magazine* named Elon Musk its Person of the Year.²⁸¹ Like other billionaires with “astro fetishes,”²⁸² Musk made his fortune by (1) harnessing the collective and cumulative intelligence of our ancestors, and (2) fusing and expanding that foundational knowledge and know-how into technological leaps forward.²⁸³ Also, Musk’s bold vision, gritty determination, high tolerance for risk, impeccable timing, and likely some serendipity, repeatedly saved his enterprises from the brink of disaster.²⁸⁴

Musk’s net worth of \$251 billion made him the wealthiest person in the world in 2021.²⁸⁵ A recent *ProPublica* investigation, however, reported that Musk paid nothing in federal income taxes in 2018 and paid less than \$70,000 in taxes in 2015 and 2017.²⁸⁶ Despite paying little in taxes in recent years, Musk has repeatedly expressed strong

280. McMahon, Jr. & Abreu, *supra* note 9, at 69 (rejecting “as abstractly unrealistic, the neo-conservative philosophy, epitomized by Robert Nozick, that individuals are morally entitled to keep the fruits of their labor and have a claim superior to the societal claim”).

281. Molly Ball et al., *2021 Person of the Year: Elon Musk*, TIME (Dec. 13, 2021, 2:09 PM), <https://time.com/person-of-the-year-2021-elon-musk/> [<https://perma.cc/N88L-PYLV>].

282. *Id.*; see, e.g., Roxanne Roberts, *Billionaires in Space: The Launch of a Dream for Just Out-of-This-World Ego?*, WASH. POST (July 18, 2021), <https://www.washingtonpost.com/lifestyle/2021/07/18/billionaire-space-race/> [<https://perma.cc/56GN-XC5N>].

283. See Ball et al., *supra* note 281 (noting Tesla’s battery technologies).

284. See *id.* (describing Musk’s ambition, vision, ego, creativity, risk tolerance, and unorthodox communication style); Fareed Zakaria, Opinion, *Elon Musk’s Diatribe Against Subsidies Ignores the History of the Tech Industry*, WASH. POST (Dec. 9, 2021), <https://www.washingtonpost.com/opinions/2021/12/09/elon-musks-diatribe-against-subsidies-ignores-history-tech-industry/> [<https://perma.cc/8WX4-4LEY>].

285. Ball et al., *supra* note 281 (noting that Musk receives no salary but instead has company stock).

286. Jesse Eisinger et al., *The Secret IRS Files: Trove of Never-Before-Seen Records Reveal How the Wealthiest Avoid Income Tax*, PROPUBLICA (June 8, 2021, 5:00 AM), <https://www.propublica.org/article/the-secret-irs-files-trove-of-never-before-seen-records-reveal-how-the-wealthiest-avoid-income-tax> [<https://perma.cc/RTB2-GJQN>]. See generally Abby Maxman, *Billionaires in Space Are Costing Lives on Earth*, WBUR (July 19, 2021), <https://www.wbur.org/cognoscenti/2021/07/19/jeff-bezos-blue-origin-space-race-abby-maxman> [<https://perma.cc/7546-VRWS>] (noting that Jeff Bezos paid little federal income tax and claimed the child tax credit while spending \$7.5 billion on his private aerospace company).

views against taxing billionaires and rejected the idea that he has a moral obligation to pay some share of his immense fortune in taxes.²⁸⁷ It is unknown if Musk believes that he is solely responsible for his technological accomplishments, but as highlighted above, the historical record recounts how named (and unnamed) great thinkers imagined, questioned, discovered, tested, expanded, and refined the scientific knowledge that presently propels Musk's earthly and Martian adventures.²⁸⁸ Further, Musk's enterprises have benefitted from publicly funded space, military, and renewable energy research, as well as federal and state government loans, contracts, and tax incentives.²⁸⁹

287. See James Vincent, *Elon Musk, World's Richest Edgelord, Responds to Billionaire Tax with Another Stupid Tweet*, THE VERGE (Nov. 8, 2021, 3:02 AM), <https://www.theverge.com/2021/11/8/22769731/elon-musk-billionaire-tax-stock-sell-off-ron-wyden-tweet> [<https://perma.cc/6JVV-TFNA>]; Ball et al., *supra* note 281. In response to Senator Elizabeth Warren's December 13, 2021, Tweet stating, "Let's change the rigged tax code so The Person of the Year will actually pay taxes and stop freeloading off everyone else," Musk Tweeted "And if you opened your eyes for 2 seconds, you would realize I will pay more taxes than any American in history this year." Elon Musk (@elonmusk), TWITTER (Dec. 14, 2021, 3:30 PM), <https://twitter.com/elonmusk/status/1470898920146542592?s=20> [<https://perma.cc/C3ED-URMX>]. See generally Andrew Solender, *Billionaire Space Race Tax Proposed by House Democrat*, FORBES (July 20, 2021, 12:17 PM), <https://www.forbes.com/sites/andrewsolender/2021/07/20/billionaire-space-race-tax-proposed-by-house-democrat> [<https://perma.cc/KF44-BS66>] (proposing new taxes on entertainment or tourist space flights). According to Rep. Blumenauer, "[s]pace exploration isn't a tax-free holiday for the wealthy. Just as normal Americans pay taxes when they buy airline tickets, billionaires who fly into space to produce nothing of scientific value should do the same, and then some." *Id.*

288. This Article does not seek to disparage or diminish the accomplishments of visionary thinkers and doers like Musk, but it highlights that the "I built it alone" belief is not rooted in reality or fact. Having been born in 1971 instead of 1771 (Paine's era), Musk's business opportunities have undoubtedly benefitted from the fortuitous confluence of science, the internet, Global Positioning Systems, and the U.S. government's funding of space exploration and solar technologies. Compare *Elon Musk*, BRITANNICA (Mar. 18, 2023), <https://www.britannica.com/biography/Elon-Musk> [<https://perma.cc/SM5R-YWN4>], with *Thomas Paine*, BRITANNICA (Mar. 17, 2023), <https://www.britannica.com/biography/Thomas-Paine> [<https://perma.cc/LPN8-SYS8>]. Simply put, U.S. policies and programs "created the digital infrastructure that made possible companies such as PayPal, the original source of Elon Musk's billions." Zakaria, *supra* note 286; see also Altman, *supra* note 241, at 12 (describing the political uproar over former President Barack Obama's 2012 comment that, "If you've got a business, you didn't build that"). Altman explains that Thomas Paine more artfully explained the relationship between property and society when he wrote:

Land . . . is the free gift of the Creator in common to the human race. Personal property is the *effect of society*; and it is as impossible for an individual to acquire personal property without the aid of society, as it is for him to make land originally.

Separate an individual from society, and give him an island or a continent to possess, and he cannot acquire personal property. He cannot be rich.

Id. See generally *Mars & Beyond: The Road to Making Humanity Multiplanetary*, SPACE X, <https://www.spacex.com/human-spaceflight/mars/> [<https://perma.cc/VJ3U-UE7Z>].

289. See Ball et al., *supra* note 281 (noting the irony of Musk's position against federal subsidies and support for industries—as he has seemingly forgotten (1) the \$465 million federal loan that kept Tesla afloat in 2010 and (2) the market support that federal tax incentives for electric vehicles provided by stimulating Tesla customer purchases). Tesla received ten years of tax

Importantly, Musk's fortunes should be viewed with an appreciation and recognition of the time in which he made these discoveries (twenty-first century), the country in which he made his fortune (United States), and the social, legal, digital, and economic infrastructure (social capital) in the United States that sustains, fuels, and protects his entrepreneurial endeavors.²⁹⁰ As the precarious relationship between China's Jack Ma and the ruling Communist Party illustrates, a tech titan's wealth and personal freedom is not guaranteed if he questions—dares to criticize—the actions of government leaders and regulators.²⁹¹

Let us now move beyond Musk and Ma to consider how to improve the lives of millions of workers displaced by AI-robotic technologies. In the decades ahead, the public may ultimately find it morally untenable and politically unsustainable for free-riding, planet-hopping billionaires to profit from our collective and cumulative

abatements by Travis County, Texas, as an inducement to build a manufacturing facility near Austin. Nathan M. Jensen & Calvin Thrall, *Elon Musk Got Millions in Tax Breaks to Put a Plant in Austin. Here's Why Laws Don't Stop These Secret Deals*, WASH. POST (Aug. 7, 2020), <https://www.washingtonpost.com/politics/2020/08/07/elon-musk-got-millions-tax-breaks-put-plant-austin-heres-why-laws-dont-stop-these-secret-deals> [<https://perma.cc/YC3E-FH52>]; see also RAWORTH, *supra* note 3, at 72–73 (explaining the role of government funding of innovation and proposing the creation of a knowledge commons). Raworth also proposes that “all publicly funded research become[] public knowledge by contractually requiring it to be licensed in the knowledge commons, rather than permitting it to be locked away under patents and copyright for private commercial gain.” *Id.* at 167. See generally PETER WEISS, U.S. DEP'T COM., BORDERS IN CYBERSPACE: CONFLICTING PUBLIC POLICIES AND THEIR ECONOMIC IMPACTS 18 (2020), <https://umaine.edu/computingcoursematerials/wp-content/uploads/sites/511/2020/03/BordersReportWeiss.pdf> [<https://perma.cc/6W9Y-54TE>] (concluding that open access to government information is critical to scientific discoveries and economic growth).

290. SIMON, *supra* note 171, at 35 (explaining the term “social capital” describes a country's “stored knowledge,” and providing examples of social capital, including technologies, organizational and economic systems, and legal and government infrastructure). See generally REESE, *supra* note 7, at 277; BARNES, *supra* note 16, at 60–61; HADFIELD, *supra* note 148, at 129, 213; Seto, *supra* note 31, at 194; Zakaria, *supra* note 284; McMahon, Jr. & Abreu, *supra* note 9, at 69.

291. Selina Wang, *Jack Ma Was Almost Bigger Than China. That's What Got Him into Trouble*, CNN BUS. (Jan. 6, 2021, 11:49 AM), <https://www.cnn.com/2021/01/06/tech/jack-ma-china-tech-intl-hnk/index.html> [<https://perma.cc/CN4P-SVNW>]; Zeyi Yang, *Who Gets to Be a Tech Entrepreneur in China*, MIT TECH. REV. (Feb. 1, 2023), <https://www.technologyreview.com/2023/02/01/1067505/china-tech-entrepreneur-book-zhang/> [<https://perma.cc/3458-7HLY>]; Katsuji Nakazawa, *Analysis: Jack Ma Downfall Spells End of China's Golden Age*, NIKKEI ASIA (Jan. 19, 2023, 4:02 AM), <https://asia.nikkei.com/Editor-s-Picks/China-up-close/Analysis-Jack-Ma-downfall-spells-end-of-China-s-golden-age> [<https://perma.cc/2PHX-LEGK>]; see Che & Ives, *supra* note 124 (noting how Ma's legal ownership and control of the business he founded depends on social and political systems).

cognitive inheritance without adequate compensation for the raw assets they use.²⁹²

Before soaring into the stars, some technology titans may find it prudent—or perhaps, even morally required—to reduce the human suffering below on Earth.²⁹³ If other titans are not similarly inclined, maybe self-interest will motivate. For example, as Musk prepares his trip to Mars, perhaps it would be prudent to make the Earth a vibrant and healthy place for human life should an unexpected return home become necessary.²⁹⁴

Next, we turn our attention to developing a dynamic and durable property paradigm that fosters human well-being by asking questions and envisioning alternatives.

2. Asking Questions and Envisioning a Modern Paradigm

When crafting durable solutions, policymakers will need long-term vision, flexible thinking, and steadfast commitment to human well-being over corporate profits.²⁹⁵ They will also need to ask questions to imagine and design a modern tax and property paradigm. Some initial questions to consider may include:

- What part of the claimed innovation is new?
- What part of the claimed innovation springs from our collective and cumulative cognitive inheritance?
- Does the claimed innovation result from state-funded science and technology research?
- What property rights should creators have to their innovations?
- How long should such property rights last?
- How should follow-on innovations be treated?
- How should the claimed innovation be taxed?

292. See *supra* note 279 and accompanying text.

293. See Ryan Browne, *Bill Gates Says Elon Musk's Ambition to Colonize Mars Is Not a Good Use of Money*, CNBC (Feb. 3, 2023, 7:20 AM), <https://www.cnbc.com/2023/02/03/bill-gates-elon-musks-mars-mission-is-not-a-good-use-of-money.html> [<https://perma.cc/6XZY-7PNF>] (reporting Bill Gates's comment that Musk's cash would be better used to support vaccine development on Earth rather than putting people on Mars).

294. See, e.g., Jackie Wattles, *Elon Musk on Mars: 'You Might Not Come Back Alive,'* CNN BUS. (Apr. 27, 2021, 11:03 AM), <https://www.cnn.com/2021/04/27/tech/elon-musk-spacex-mars-danger-sc/index.html> [<https://perma.cc/2YCE-GBWJ>].

295. COOTER & ULEN, *supra* note 84, at 118 (“Besides inadequate scientific tools, intellectual property law aligns poorly with economic efficiency because the legislators respond to politically powerful special interest groups who care about their own profits more than the nation's wealth.”).

- How should any follow-on innovations be taxed?²⁹⁶

When seeking answers to these questions, policymakers should engage the public, academy, and industry to identify and balance the competing stakeholder interests and goals. With these insights, it then becomes possible to discuss and envision alternatives that inform preliminary sketches for a modern property and tax prototype.

3 Sketching a Modern Property and Tax Prototype

Structuring a tax and property paradigm that facilitates the identification, tracing, valuation, taxation, and collection of co-owned wealth starts with designing a prototype for discussion, debate, and ongoing improvements.²⁹⁷ The graphics below may activate new thought pathways on taxing and pre-distributing humans' collective and cumulative cognitive inheritance. This prototype also explicitly separates property created or "cultivated" by modern innovators.²⁹⁸ The model designates these tangible and intangible assets as separate property (shaded text) until intellectual property protections lapse, thus becoming part of humans' shared patrimony.

Technology Justice: Tax and Property Paradigm

New/cultivated individual or corporate property	Separate new/cultivated property Subject to taxation
Collective and cumulative cognitive inheritance <ul style="list-style-type: none"> ▪ Accumulated human knowledge over the millennia ▪ Not traceable to a single creator who retains <u>current</u> ownership/property rights 	Co-owned property Subject to use fee, rental or royalty payment, tax, or another formula (e.g., Simon's 70–80 percent)

296. BOYLE, *supra* note 27, at 160–61 (outlining some relevant inquiries).

297. *See generally* COOTER & ULEN, *supra* note 84, at 118 ("The development of high technology industries challenges both economic theory and the law. Almost all questions regarding intellectual property are open. This fact makes the subject both exciting and confusing.").

298. PAINE, *supra* note 19, at 12, 14 (noting that "the value of the improvement, only" represents "individual property," and stating that the "additional value made by cultivation . . . became the property of those who did it").

The mechanics of how the Technology Justice tax and property paradigm works in action can be illustrated by using Elon Musk's enterprises as an example. Since Musk's solar, transportation, and space endeavors have and continue to benefit from public investment, human-developed knowledge and expertise, and breakthrough science and technological advancements,²⁹⁹ we can see that while Musk's twenty-first century innovations are impressive, great minds and discoveries from the past undergird his enterprises' recent advancements.

Technology Justice: Elon Musk, Tesla, and SpaceX

Elon Musk, Tesla, and SpaceX's new/cultivated property	Separate new/cultivated property Subject to taxation
<p>Collective and cumulative cognitive inheritance <u>Example:</u> electrical knowledge now in the public domain created by these legendary innovators and others:³⁰⁰</p> <ul style="list-style-type: none"> ▪ Albert Einstein ▪ Nikola Tesla ▪ Thomas Edison ▪ James Clerk Maxwell ▪ Michael Faraday ▪ James Watt ▪ Alessandro Volta ▪ Benjamin Franklin 	<p>Co-owned property Subject to use fee, rental or royalty payment, tax, or another formula (e.g., Simon's 70–80 percent)</p>

Under the proposed paradigm, any of Musk's scientific or technological leaps forward should be considered and protected as separate (cultivated) property. However, because the underlying accumulated knowledge fortifying those innovations represents co-owned

299. Zakaria, *supra* note 284.

300. *See supra* notes 68–73, 197–203 and accompanying text.

property belonging to all humans,³⁰¹ it is both just and fair that Musk's enterprises pay for the use of such knowledge and know-how.

Last, while determining the ultimate formula and type of payment structure will undoubtedly generate high-voltage debates among policymakers and academics, the wisdom and rightness of payment remain sound. Given the myriad ways to define, value, and tax property and raise revenue (e.g., user fees, rents, royalties, taxes, or Simon's 70–80 percent formula),³⁰² this Article leaves those details to scholars and experts capable of designing, testing, and vigorously debating thoughtful definitions, reasonable valuations, and tax structures.

CONCLUSION

The everyday examples of water and electricity demonstrate how humans' evolving understanding, knowledge, and productive use of naturally occurring chemical elements and energy sources will continue to shape modern life. Most importantly, the accumulated human knowledge and know-how of the past serve as the foundation and fuel for novel discoveries, dynamic technologies, and advanced legal paradigms.

This Article outlined three components for implementing Technology Justice. First, policymakers should develop an integrated property and tax paradigm that explicitly recognizes and values the collective and cumulative cognitive inheritance created by our ancestors. Second, this paradigm should transparently tax both the tangible and intangible property that forms such collective and cumulative cognitive inheritance. Third, it should pre-distribute the resulting economic bounty from these co-owned assets to all in the form of a UBI. In sum, achieving Technology Justice adheres to Paine's goal of ensuring that

301. Because there are international implications for this model, the Author invites other thinkers to help design a functional framework. *See generally* RAWORTH, *supra* note 3, at 170 (advocating for a global knowledge commons).

302. *See, e.g.,* PAINE, *supra* note 19, at 8–9 (discussing ground rents); BARNES, *supra* note 16, at 60, 85 (discussing “recycled” rents and user fees); McMahon, Jr. & Abreu, *supra* note 9, at 69 (stating that taxes represent the rental cost of participating in society and the marketplace); VAN PARIJS & VANDERBORGHT, *supra* note 165, at 106 (proposing a 70 percent flat tax or other fees to “fund an unconditional basic income and all other government expenditures”); Simon, *supra* note 128, at 756 (concluding that humans earn 20 percent of their income or wealth and the other 80 percent represents social patrimony); SIMON, *supra* note 171, at 36 (advocating for a U.S. “flat tax of 70 percent”). *See generally* Marian, *supra* note 17, at 574–575 (noting that, “[w]hile not technically a tax, royalties are a common way in which governments raise revenue from extractive industries”). Professor Marian explains that royalty payments “do not require the project to be profitable before revenue is earned and allow taxation of the project from the very beginning. Additionally, royalties are typically easy to administer.” *Id.* at 575.

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everyone reaps and enjoys the natural blessings of the Earth and human progress.

The pursuit of Technology Justice will trigger profound paradigm shifts in property and tax law. When such change occurs, it will force fundamental reconsiderations of property boundaries, rights, and taxation (e.g., identification, tracing, valuation, and apportionment)—topics that could fill countless law review pages.

This Article is only the beginning; may we move forward on our shared path to achieve Technology Justice. By working together, modern “superminds” energized by intellectual lightning bolts can create original solutions that allow everyone to enjoy the blessings of the collective and cumulative cognitive inheritance created by our foremothers and fathers. Let us now debate and design an abundant future for humanity where Technology Justice = economic justice.

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