INTRODUCTION

A PROBLEMS WITH TECHNOLOGICAL DETERMINISM

Technology has the amazing power to change lives. Many years ago, I came across the exciting news that laser technology was being adopted in eye surgery to cure near-sightedness. As I was quite troubled by near-sightedness in my left eye, I enthusiastically consulted an eye doctor in my city to see whether such surgery could effect a major change in my life. She was a famous doctor who had received post-doctoral training in eye surgery at Harvard Medical School. After examining my eyes, she encouraged me to have laser surgery and not to worry about the potential side effects. I can still vividly recall her quick response to my concerns: “You don’t need to worry about side effects. Technology always advances. It will cure side effects in the future.” This response did not assuage my concerns. Instead, I asked a follow-up question: what if technological advancement was unable to eliminate side effects? The doctor immediately responded: “Please believe in technology!” Our conversation ended there, and I left the consultation room deciding not to have the surgery.

In January 2019, I was celebrating with Professor Barton Beebe a public lecture on technology and legal futurism that he had just delivered at the University of Hong Kong. During the lecture, he had shared with the audience a range of thought-provoking ideas about how technologies, from the Internet, to 3D printing, to space technology, shape the law. Enjoying the spectacular night view of Hong Kong across Victoria Harbor as we continued the discussion, I had a flash of insight. I told him that it seemed to me that any project concerned with how...
technology changes the world must also deal with the ways in which it can bring about pain and death and even the end of the world. I worried about the very real potential for technologies to be egregiously misused by human beings. After all, we have already produced technologies such as nuclear weapons that can destroy the planet, bringing humanity to an end.

I am sure that many readers will think that I am overly concerned with technology’s harms. Why not have followed that famous doctor’s advice all those years ago and enjoyed the correction of my near-sightedness by laser technology? Why not just focus on technology’s transformative power in improving the quality of human life without thinking about pain and death? After all, technology is no evil monster. It is a necessary and inevitable force that transforms not only individual lives but the whole world.

Indeed, humanity’s past is a history of the invention of tools and techniques that have transformed individual lives and the world as a whole. Our Stone Age ancestors figured out how to make stone tools, fire, clothing, and shelters, thereby securing their survival. From the ancient to medieval to early modern periods, human beings have strived to utilize metal tools, wind power, and water resources to improve agricultural and manufacturing productivity, promote trade, and facilitate transportation. The two Industrial Revolutions spanning from the mid-seventeenth to early nineteenth centuries ushered in new technologies such as steam engines, chemical products, electricity, and petroleum-powered machines that massively boosted productivity and transformed lifestyles. The twentieth century saw the rapid development of even more innovative technologies, including automobiles, telephones, radio, television, and computers. Technology changes the material conditions of human existence. It also improves the quality of life by promoting cultural and political aspects of society. For example, the invention of the printing press and the Internet greatly facilitated the dissemination of knowledge and, in turn, the development of political institutions.

Where technology permeates individual lives and the fabric of society, technological determinism comes to the fore. Many scholars and policymakers have elevated technology to a governing force in

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1 See Hannah Arendt, The Human Condition 144–53 (2d ed. 1998) (examining the history of technological developments related to human activities such as labor and work).
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society, with technological development determining historic progress and social change. For example, Karl Marx expected the construction of railways in India to dissolve the caste system, and Thorstein Veblen asserted that “the machine throws out anthropomorphic habits of thought.” Jacques Ellul concluded that “[n]o social, human, or spiritual fact is so important as the fact of techn[ology] in the modern world.” Following technological determinism, many people overwhelmingly support the faster and greater supply of technology as a panacea for their problems and for social ills. The historian Charles Beard captures the essence of such popular support for technological determinism in his statement that “[t]echnology marches in seven-league boots from one ruthless, revolutionary conquest to another, tearing down old factories and industries, flinging up new processes with terrifying rapidity.”

However, in their embrace of ever faster and greater development, adherents of technological determinism have turned a blind eye to the ethical issues and even humanitarian crises brought about by technology’s use. Martin Heidegger once cautioned that technology’s dominance in human society is “danger in the highest sense.” In reality, the history of technology is synonymous with a history of pain, despair, and death.

Powered by technology, the weapons deployed in war have killed countless individuals and caused massive damage and destruction of public facilities and private property. In the case of World War I and World War II, this devastation was on an almost inconceivable scale. Although nuclear technology promised to generate a range of energy and health benefits, the 1986 Chernobyl disaster caused a nightmare for the people affected and horrifying damage to the environment. The pervasive use of various technologies in manufacture and consumption

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3 See Karl Marx, On Colonialism 85 (1974).
has led to a global environmental crisis. Climate change, for example, is the defining crisis of our time, and it is happening even more quickly than we feared. Human activity is producing greenhouse gas emissions at record highs, accelerating global warming and its catastrophic effects.

How should we deal with these ethical crises so as to develop and apply technology in the public interest? Back in 1962, Rachel Carson was already warning us of technology’s harmful effects on the public interest in her book *Silent Spring*. She revealed the adverse environmental effects of the indiscriminate use of pesticides and accused the chemical industry of spreading disinformation, and public officials of accepting the industry’s marketing claims unquestioningly. Carson offered one of the leading lessons she had learned from the crisis:

No responsible person contends that insect-borne disease should be ignored. The question that has now urgently presented itself is whether it is either wise or responsible to attack the problem by methods that are rapidly making it worse. The world has heard much of the triumphant war against disease through the control of insect vectors of infection, but it has heard little of the other side of the story – the defeats, the short-lived triumphs that now strongly support the alarming view that the insect enemy has been made actually stronger by our efforts. Even worse, we may have destroyed our very means of fighting.\(^8\)

Carson’s thoughts remind us that we must take a broad-based assessment of how technology should be developed and applied in the public interest. The public has the right to be assured that technologies promote societal interests in environmental protection. Technology companies must take corresponding responsibilities seriously. To deal with the problems Carson warned of sixty years ago, I believe that the public should be bestowed with a right to technology. This right would empower the public to enjoy technological benefits with minimal harmful effects upon the environment. Technology companies must also take responsibility for informing the public of those harmful effects and for taking proactive steps to minimize them.

\(^8\) *Rachel Carson, Silent Spring* 266 (1962).
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However, these public interest-oriented measures have not yet come to fruition. Rapid technological development has created new and even more formidable problems and challenges for our society. For example, unethical uses of digital and health technologies are harming the public interest in unprecedented ways.

In this digital age, technology companies reign supreme. In collecting enormous amounts of data from the public, technology companies have gained ownership of one of the world’s most valuable resources. They also regulate all kinds of speech activities on their platforms, operating as governors of social communication in the digital age. They have developed new technologies such as artificial intelligence, acting as decision-makers for the future of humanity. However, the powers gained by leading technology companies far exceed the responsibilities they have assumed. They have thus far reaped their rewards with impunity, demonstrating no commitment to a conception of corporate responsibility commensurate with the nature and extent of their ever-expanding powers.

The major technology companies have been accused of being even more irresponsible than the financial institutions that caused the 2008 financial crisis. While the public has invested their trust and support in technology companies such as Facebook, these companies have ignored their attendant responsibilities. Instead, they have created a “black box society” and new forms of oppression. Privacy breaches have become routine in the technology sector. Tax evasion or avoidance by technology companies is occurring more frequently and on a larger scale than ever before, with Apple being named one of

9 The World’s Most Valuable Resource Is No Longer Oil, but Data, ECONOMIST (May 6, 2017).
11 Saqib Shah, Banks Behind Financial Crash Were Better Behaved Than Facebook, Says Ex-Goldman Sachs President Gary Cohn, SUN (Aug. 7, 2018) (“[B]anks were more responsible citizens in ’08 than some of the social-media companies are today. And it affects everyone in the world. The banks have never had that much pull.”).
13 Stephen Hawking concluded that “[a]lthough the benefits, AI will also bring dangers like powerful autonomous weapons or new ways for the few to oppress the many.” Stephen Hawking Launches Centre for the Future of Intelligence, U. CAMBRIDGE (Oct. 19, 2016).
14 Andrew Rossow, Why Data Breaches Are Becoming More Frequent and What You Need to Do, FORBES (May 23, 2018).
the largest tax avoiders in the United States and Amazon paying no income tax whatsoever.

Meanwhile, unequal access to technological benefits has become a pressing social justice issue. Recent studies show that even in the United States, a technologically advanced country, access to technology has become a determining factor in the knowledge divide between rich and poor youths. It is time to decide whether the general public or a small group of elites has the final say over how the benefits of technological progress are distributed. Moreover, it is also a matter of urgency that we deal with the new forms of racial and gender discrimination being facilitated by new technologies across the globe. However, digital technology companies have to date done very little to deal with the unjust distribution of technological benefits.

The COVID-19 pandemic has exposed another ethical crisis resulting from health technology. Major pharmaceutical companies possess the know-how to manufacture medicines and vaccines and own numerous medical patents, the rights to which must be exercised in a socially responsible manner. In the face of this unprecedented global public health crisis, a public policy priority should be ensuring that technology companies assume responsibility for swiftly and expansively benefiting the public through their medical innovations in COVID-19 research. In doing so, they should attach less importance to their existing or potential patent rights over those innovations.

However, major pharmaceutical companies have failed to react to the global call for greater responsibility. To accelerate and broaden global access to vaccines, treatments, and diagnostics, an international group of scientists, entrepreneurs, and lawyers launched the Open

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COVID Pledge (OCP) in April 2020, and the World Health Organization launched the COVID-19 Technology Access Pool (C-TAP) in May 2020. The OCP and C-TAP urge patent holders to responsibly share their patented technologies in the public interest by altering their dedication to exclusive rights protection. As the key institutions in bringing an end to the pandemic, the major pharmaceutical companies have yet to take part in either initiative. The OCP has engaged many companies, including IBM, Facebook, and Uber, and has obtained over 250,000 pledged patents, none of which are owned by the major pharmaceutical companies. The C-TAP has not yet started to function because “no technology or treatments have been shared,” and no pharmaceutical companies had voluntarily joined it as of March 2021.

B HOW TO DEVELOP AND APPLY TECHNOLOGY IN THE PUBLIC INTEREST

Amid these ethical crises, a profound question arises: how should technology be developed and applied in the public interest? In my opinion, this is one of the most important yet difficult issues facing the current and future operations of humanity. Few would doubt the fundamental importance of this issue as technology has already become the driving force of economic, social, and political development in our society. But why is it so exceedingly difficult to tackle the relationship between technology and the public interest?

21 *Id.* (“However, the Pledge has not yet seen wide adoption in certain key industries. For example, it does not appear that the Open COVID Pledge has been embraced by the pharmaceutical or medical device industries.”).
23 Selam Gebrekidan and Matt Apuzzo, *Rich Countries Signed Away a Chance to Vaccinate the World*, N.Y. TIMES (Mar. 21, 2021) (“Not a single vaccine company has signed up [for the C-TAP].”).
The first difficulty arises from the fact that “the public interest” is itself one of the most perplexing concepts. Technology is already a complicated concept, and determining the nature and scope of the public interest is a much more daunting task. Synonymous with concepts such as the common good, general welfare, and public values, the public interest is one of the most-used concepts in public discourse and is deemed vital in the making of public policy.

Nonetheless, the public interest has been criticized as “semantic chaos,” “vague [and] impalpable,” the least defined and the least understood,” and even dismissed as “vacuous, deceptive, and generally useless.” Therefore, there are concerns that the public interest is vulnerable to misuse and even manipulation by those in power.

Three main factors contribute to the elusiveness of “the public interest” and the concept’s lack of universally acceptable philosophical and practical foundation. First, it lacks a single theoretical formula to define its nature and scope. It has been understood as the common interests of all members of a polity, a theory which, assuming interests of all are compatible, suggests “the fulfillment of all human persons and communities now and in future,” exercise of governmental power “only for the public good,” and promotion of justice for “the...
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common good.” Utilitarianism, however, defines the public interest as “the sum of the interests of the several members who compose it.”

Through aggregating of interests, it prioritizes interests of the majority of people in a society. Second, public interests may be competing with each other, making it difficult to protect them as a clearly defined concept. When it comes to the Trump administration’s decision to shut down the operations of TikTok and WeChat in the United States, freedom of information promoted by these social media outlets as a public interest conflicts with national security invoked as a public interest ground on which to penalize those outlets.

Third, public interests may vary among societies and countries. People with different religions, ethnicities, or classes may support totally different and even conflicting groups and societal or national interests.

The other major difficulty in promoting technology in the public interest stems from the “wealth maximization” mentality that positions technology companies to put their profits before the public interest. In the past ten years or so, major technology companies have become the world’s richest and most politically powerful corporate institutions.

Given that they are institutionally designed to maximize wealth for their shareholders, technology companies may make every effort to forestall any legal reforms that seek to properly tighten regulation of their businesses for the public interest. Meanwhile, this wealth

36 Jean-Jacques Rousseau, The Social Contract (Book II) (1762), https://bit.ly/3DmEb4x (“If the object is to give the State consistency, bring the two extremes as near to each other as possible; allow neither rich men nor beggars. These two estates, which are naturally inseparable, are equally fatal to the common good.”);
40 See John Dewey Liberalism and Social Action 81 (2000) (“Of course, there are conflicting interests; otherwise there would be no social problems.”).
42 See Jane Johnston, Public Relations and the Public Interest 1 (2016).
43 See Jamie Bartlett, The People Vs Tech: How the Internet Is Killing Democracy (And How We Save It) 1 (2018); Stephen Johnston, Largest Companies 2008 vs. 2018, a Lot Has Changed, Milford (Jan. 31, 2018), (“Technology companies not only dominate our daily lives (how many times have you checked your iPhone today?) but also the ranking of world’s biggest companies.”).
maximizing posture has won a lot of popular support. The powers held by technology companies far exceed any responsibilities they have assumed in promotion of the public interest. Rather than interrogating the responsibilities of technology companies, there has been a far greater media focus on celebrating the astounding wealth they have amassed from stock markets and users through the exercise of their power.

Despite these difficulties, I present the “rights and responsibilities” ethos as a new ethical approach to promoting the development and application of technologies in the public interest. The approach strives to dynamically protect the right to technology and enforce the responsibility of technological companies. The fusion of this right and responsibility, as I will show, would generate a thorough, forward-looking understanding of the nature and scope of public interests that should be promoted by the development and application of technology. Instead of wrestling with a theoretical definition of the public interest in the first place, this ethical approach starts from setting systematic agendas for promoting the public interest through protection of the right to technology and enforcement of technology companies’ responsibilities. Therefore, this approach first sets in motion a dynamic protection of the public interest and then attempts to ascertain the nature and scope of the public interest related to the development and application of technology.

In applying this approach, I refute the sole reliance on technological determinism and its resultant silence on the ethical issues posed by technology. Instead, I argue that the answer to technology does not lie in technology. Single-minded reliance on technology’s power – without any consideration of the public rights and private responsibilities attached to it – is not the path toward a better future for humankind. Rather, the development and application of technology must be subject to an ethical examination of how to protect the public’s right to technology and to enforce technology companies’ responsibility.

Concerning the right to technology, I suggest that we must examine how this right could be effectively protected as a human right under international law, as a collective right under domestic civil rights law, and as potentially a fundamental right under domestic constitutional