From Pamphlets to Privacy: How the Printing Press Helps Us Understand the Internet Age

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Introduction

Pervasive cultural change caused by Internet technology has fueled a debate about the advantages and disadvantages of Internet-connectedness. Do the benefits of a networked world outweigh the threats to individual rights and privacy? How do we get perspective on this?

Kierkegaard reminds us that life is understood backward but lived forward. We are living forward through the Internet revolution but are struggling to foresee its long-term effects on civilization. Only if we could time travel forward several centuries would we be able to glean how a networked world ultimately shaped human destiny.

Luckily, there is another invention from nearly six centuries ago that offers insights into our future. The printing press was the first technology to enable the spread of information and knowledge across space and time. It spawned several revolutions and forever changed culture and society. During the Renaissance, it allowed scholars to compare classical works from across the centuries, facilitating the first feedback loops that identified inconsistencies in texts previously considered authoritative. During the Reformation, it allowed upstart Protestants like Martin Luther to challenge Catholic beliefs and papal power in unprecedented ways. By the time of the Scientific Revolution, the printing press made it possible for real scientists (apothecaries) to distinguish themselves from charlatans (alchemists) by making refereed scientific papers possible and codifying the scientific method.

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[1] This article draws from a chapter in a forthcoming book, Leslie Gruis, *Privacy: Past, Present, and Future* (Washington/London: Academica Press), 2020.

This article traces the contributions of the printing press during Western Europe's evolution from medieval times to an early modern world. It describes the changes wrought by the printing press, and derives lessons learned which are instructive in our modern-day debates about privacy and cyberspace.

The lessons of history cannot be understood without context. Every aspect of our understanding of civilization is historically nuanced, standing on the shoulders of giants. Luther and Galileo posited and propagated alternate views of the spiritual and temporal world that undermined Catholic authority. The printing press catalyzed their success. Their stories are illustrative of the times and substantiate the quintessential role the printing press played. The reader will be rewarded with a deeper appreciation of the lessons learned by first reviewing this history.

Before the Printing Press

The world was a very different place before the printing press. Knowledge was recorded in books and scrolls made of perishable materials like papyrus, parchment, and vellum. Books were laboriously copied by scribes, who introduced changes to the content. They made textual mistakes and introduced new errors in translations. They left out diagrams and illustrations they were unable to reproduce. Books were scarce, and most of the population was illiterate.

Wars and the fall of empires led to the abandonment and destruction of libraries, as well as the exodus of scholars able to read and understand ancient texts. The great library of Alexandria—containing many ancient texts in Greek, Egyptian, and other languages—was burned during a war in 48 BCE. Its daughter library in the nearby Serapeum temple was destroyed around 491 CE in an effort to eradicate paganism as Christianity took hold in the Roman Empire.

After the fall of the Roman Empire, the church provided the only safe haven for books. The church came to control education and learning. Monasteries contained both libraries and scriptoria,

where monks made copies of books by hand. Byzantine monasteries typically contained books in Greek whereas Western monasteries contained books in Latin. Many Greek classics migrated to and were preserved in the Muslim world, to be recovered in the West later.

The Revolutions Spawned by the Printing Press

The Printing Press and the Renaissance

The printing press first appeared in Europe in 1440. The continent was well into the Renaissance (1400–1527), a period of revived learning that brought renewed interest in classical studies and values. The Renaissance benefited greatly from the flight of scholars with classical books and manuscripts from Constantinople after it fell to the Turks in 1453. The printing press made it possible for Renaissance scholars to compare different sources of the same Biblical text and to identify inconsistencies. Comparison between ancient Greek versions and later Latin versions revealed corruption in translation. Scholars believed that purification of the texts was necessary to restore the original messages, understood to be revelations from God. Scholars accomplished this by creating authoritative versions in Latin for the academics, and in the vernacular language of the region for non-Latin readers.[2] Erasmus purified the Vulgate, St. Jerome's fourth-century Latin version of the Bible by harmonizing original sources into a combined Greek and Latin version of the New Testament in 1516. Martin Luther translated Erasmus's Greek into German, publishing his version of the New Testament in 1522.[3]

The printing press was the Internet of its day. It made knowledge available to anyone who had access to a book and could read. The availability of books meant an increase in the number of

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[2] Elizabeth Eisenstein, *The Printing Press as an Agent of Change* (Cambridge, UK: Cambridge University Press, 2009), 191.

[3] S. H. Steinberg, *Five Hundred Years of Printing* (Mineola, NY: Dover Publications, 2017), 43.

people who became self-educated. The authorship market opened up to non-academic writers, who wrote self-improvement works snatched up by an increasingly literate population. "How-to" books challenged the medieval tradition of guild apprenticeship by revealing traditional techniques and secret recipes.

There were, however, liabilities associated with this bibliophilic revolution. For the scholars, even authoritative versions of religious texts revealed discrepancies with real world evidence. How could the purified word of God be wrong? For the average Johannes, books revealed historically mysterious information. The newly literate were not yet discerning enough to distinguish between legitimate sources (like apothecaries) and charlatans (like alchemists). Both these dilemmas festered away, presaging the arrival of the Reformation and the Scientific Revolution.[4]

The Printing Press and the Reformation

Luther's Challenge

Martin Luther was the first person to use the printing press to go viral. The 95 Theses he publicly posted in 1517 in Germany were a match to the tinder of an increasingly powerful and corrupt Catholic Church. Corruption had bred discontent across Catholic constituencies, and Luther used the printing press to spread his reformist ideas across Europe. The Reformation became a tidal wave that even the Pope could not contain.

Had Luther lived in our Internet times, he might have been a popular blogger. In his own time, he became a prolific writer who adopted the radical practice of writing in a clear and direct style for the Christian citizen in the vernacular. This extended the debate beyond Latin-literate

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[4] Eisenstein, *The Printing Press as an Agent of Change*, 272–73.

theologians to a broader public.[5]   Luther's work contributed significantly to the standardization of modern High German to ensure broadest comprehensibility across German speaking peoples.[6] His was the first movement to use the power of the press "for overt propaganda and agitation against an established institution."[7] Luther's success was also aided by the fact that Germany was still only a patchwork of pro- and anti-Papist city states and princely domains. Censorship of printed matter was a local affair, and printers capitalized on this by distributing locally banned books to more sympathetic German jurisdictions.[8] People came to accept the printing press as a blessing from God intended to emancipate them from Rome and enlighten them with true religion.[9]

Luther's break with the Catholic Church left a gap in how individuals would be educated in the new faith, which he filled by publishing his Large Catechism and Small Catechism. The former was intended as a guide for clergy to teach their congregants, and parents to teach their children. The latter was intended for those with less education, combining language and religious training. Luther's catechismal format would contribute greatly to the emerging market of textbooks. It would become a mainstay of "instructional writing of the Protestant tradition,"[10] and generate a steady source of income for many European printers.

Luther also concluded that education could not be left to parents or the church but should be given over to local government. Luther's work turbocharged the authority of local jurisdictions to provide compulsory education for future generations of ministers and leaders. Such education systems became part of the Protestant tradition.[11] This spurred literacy in vernacular languages,

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[5] Andrew Pettegree, *Brand Luther* (New York: Penguin Press, 2015), xii.
[6] John Man, *The Gutenberg Revolution* (London: Bantam Books, 2009), 271–72.
[7] Eisenstein, *Printing Press as an Agent of Change*, 304.
[8] Pettegree, 217–18.
[9] Eisenstein, 305.
[10] Pettegree, *Brand Luther*, 262.
[11] Pettegree, 262–63.

enabling Protestants to read their own Bibles and instruct others, all without benefit of Catholic clergy and its Latinized liturgy.

The Catholic Church attempted to fight printing press technology with one arm tied behind its back. It ended up shooting itself in the foot. Firstly, it eschewed leveraging the power of the press as Luther had. Its antiquated business model called for the paternalistic church to educate its congregants with Latin liturgy, not through vulgar vernacular print. As a result, it lost the media war. Secondly, the Catholic Church responded to the printing press by trying to control what printers produced. The more tightly it clung to this model, the more quickly printers relocated to Protestant safe havens. The media continued to proliferate. Thirdly, it convened the Council of Trent (1543–1563), where it reiterated traditional Catholic beliefs and declared the Latin Vulgate the only authoritative version of the Bible. The Council began maintaining an Index of Forbidden Books (*Index Librorum Prohibitorum*) in 1559. Luther was top of the pops, but the list continued to grow with each subsequent update.[12] Publishers discovered that appearance of their publications on such lists enhanced the reputations of authors and spurred sales, leading booksellers to understand the power of such passive publicity.[13] Both legitimate and underground markets expanded to meet demand. To its chagrin, the church discovered that banned books sell.

England

Just as the Internet is used today to sway public opinion, so too was the printing press used by English monarchs and their opponents. England officially became Protestant in 1534, when Henry VIII repudiated papal authority and became the head of the new Church of England. Henry VIII's agent Thomas Cromwell used the printing press to mount the first government propaganda

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[12] Man, *Gutenberg Revolution*, 279.
[13] Eisenstein, *Printing Press as an Agent of Change*, 406, 639.

campaign against the Catholic Church. He did this as skillfully as the Lutherans, using propagandists and publications in the vernacular.[14] The opposite side of this coin was the spread of anti-royalist propaganda, which Henry and his successor Mary I[15] took steps to curb, issuing at least ten indexes of banned books between 1526 and 1555.[16] These books were deemed heretical works, a serious charge in an era when heretics were burned at the stake.

Elizabeth I also understood the power of the press when she came to the throne in 1559. Restricting the crime of heresy to a nonbelief in Christian fundamentals, she would steer English censorship toward the other thought crime: treason.[17] Political censorship in the Tudor-Stuart period focused on lies and libel, specifically seditious libel about the monarch which implied treasonous intent. Not surprisingly, the majority of Royal Proclamations about libel during the time of Elizabeth I were against exiled English Catholics on the continent.[18]

Along with this came regulation of the presses and what was printed. Mary I had granted the first Royal Charter to the Company of Stationers in 1557 to remedy the publication and printing of "seditious and heretical books rhymes and treatises."[19] Two years later, Elizabeth I reiterated the need for books to be licensed by the queen's agents before they were printed in order to avoid publication of works that were "heretical, seditious, or unseemly for Christian ears."[20] In 1662 Parliament finally passed a licensing law, which prevented the printing of "seditious, treasonable, and unlicensed books and pamphlets" and regulated printing and

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[14] Eisenstein, 312.
[15] Mary I was Catholic, so England slide back into Catholicism during her brief reign.
[16] Debora Shuger, *Censorship and Cultural Sensibility: The Regulation of Language in Tudor-Stuart England* (Philadelphia: University of Pennsylvania Press, 2006), 56.
[17] Shuger, *Censorship and Cultural Sensibility*, 56–57.
[18] Shuger, *Censorship and Cultural Sensibility*, 15.
[19] The Royal Charter of the Company of Stationers, https://en.wikisource.org/wiki/Royal_Charter_of_the_Company_of_Stationers, accessed January 23, 2019.
[20] The Injunctions of 1559, https://history.hanover.edu/texts/enref/er78.html, accessed January 23, 2019.

presses.[21] This would be succeeded by the Statute of (Queen) Anne in 1710, the first statute anywhere to recognize intellectual property rights of an author and his right to derive income from them.[22]

English monarchs also understood how important it was to their anti-Vatican campaign to make a Bible readily available in English. By 1538 Henry VIII of England authorized the first official English language version of the Bible, known as the Great Bible. In 1541 he issued a proclamation (in English) which required a copy of this Bible to be made available to the public in all parishes.[23] Elizabeth I adopted a 1568 revision of the Great Bible as the official Bible of the kingdom. It remained so until the King James Bible appeared in 1611.

Social and Cultural Effects across Europe

Technology can be liberating. When the Internet first emerged, some people hoped it would remain a free, unregulated world where they could do anything. It didn't work out that way.[24]

In its own time, the printing press was liberating. It permitted individuals to develop a sense of independence and self-reliance. A new capitalist bourgeoisie emerged, further eroding the antiquated authority of the feudal aristocracy and the church.[25] Protestant presses published Catholic philosophers like Galileo and Descartes, who were prohibited from publishing in their native lands.[26] Printers' workshops —salons of artists, printers, academics, aspiring. authors, and others—became centers of patriotism and democratic thought, which vexed the Counter-

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[21] Carl Stephenson and George Marcham, *Sources of English Constitutional History: A Selection of Dcouments from AD 600 to the Present* (New York: Harper & Row, 1937), 548.

[22] The Statute of Anne, 1710, http://www.copyrighthistory.com/anne.html, accessed January 23, 2019.

[23] Alfred William Pollard, ed., *Records of the English Bible* (London: Oxford University Press, 1911), 262.

[24] See Lawrence Lessig, *Code: And Other Laws of Cyberspace* (New York: Basic Books), 1999.

[25] Eisenstein, *The Printing Press as an Agent of Change*, 388.

[26] Eisenstein, 409.

Reformation.[27] Across Europe, the printing press drove literacy and language standardization, formalizing the vernacular and unifying a people around their mother tongue.[28]

In Protestant regions, learning from books became a part of everyday life. Parents, not priests, became responsible for the spiritualization of the household. As a result, Eisenstein says, "Puritan tradesmen who had learned to talk to God in the presence of their apprentices, wives, and children were already on their way to self-government."[29] This change bred self-esteem, self-mastery, and self-worth. Book learning became part of family life. Children could now receive formal instruction from primers and other textbooks instead of living the life of an apprentice or page.[30]   Printers began publishing periodicals and newspapers for this expanded market of literates.[31] Popular opinion was becoming something that mattered and could move nations.

The Printing Press and the Scientific Revolution

Five hundred years before the Internet Revolution, there was another revolution involving invention and technology. During the Scientific Revolution, classical sources were discarded in favor of a new science that used theoretical ideas to explain empirical facts.[32] Folklore was replaced with abstract reasoning, and the "scientific method" was used to substantiate or refute hypotheses within a theoretical framework. This work could be printed and distributed with books, and feedback allowed corrections to be made to future editions. The idea of man's knowledge continuing to expand challenged fundamental Christian beliefs in the infinitude and unfathomability of God's mysteries.[33] Nowhere is this better illustrated than in the case of Galileo.

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[27] Eisenstein, 389.
[28] Eisenstein, 117–18.
[29] Eisenstein, 425.
[30] Eisenstein, 133, 427, 432.
[31] Steinberg, *Five Hundred Years of Printing*, 118.
[32] Eisenstein, *Printing Press as an Agent of Change*, 477, 511.
[33] Eisenstein, 479, 518.

In the spring of 1609, Galileo Galilei began making observations using a newfangled thing called a telescope. His book *The Sidereal Messenger* (published in 1610 by a Catholic press) described his astronomical discoveries and made him famous.[34] In 1613, Galileo wrote a letter to a student about inconsistencies between Copernicus's heliocentric theory and the Bible. This garnered negative attention from the Vatican, which insisted that all scientific discoveries contradicting the Bible were heresy. Galileo expanded on these thoughts in another letter two years later, suggesting that such contradictions arose because the Bible had been interpreted incorrectly. He affirmed that "the holy Bible can never speak untruth—whenever its true meaning is understood."[35] He reiterated the words of an eminent ecclesiastic (Cardinal Baronius): "That the intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes."[36] Even though this had been uttered by one of their own, the Catholic Church took exception to the idea that its authority did not extend to the physical as well as spiritual world. The Vatican condemned all books which spread Copernican views in vernacular language in 1616. It became risky for Catholic presses to publish such work.[37] Galileo got the message to sit down and shut up.

In 1624, the Pope gave Galileo permission to write a book about the universe but warned him to only treat Copernicanism as hypothetical. Galileo completed his work *Dialogue Concerning the Two Chief World Systems, Ptolemaic and Copernican* around 1630 and it was published in Florence in 1632. Galileo was summoned before the Inquisition in 1633 and accused of not treating the Copernican model as hypothetical. He was found guilty, suspected of heresy, and placed under

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[34] Eisenstein, 652.

[35] Galileo Galilei, "Letter to Grand Duchess Christina of Tuscany, 1615," *Modern History Sourcebook*, Fordham University, Fordham University, https://sourcebooks.fordham.edu/mod/galileo-tuscany.asp, accessed January 6, 2018.

[36] Galilei, "Letter to Grand Duchess Christina."

[37] Eisenstein, *Printing Press as an Agent of Change*, 653.

house arrest until his death in 1642.[38] His last work, *Dialogues Concerning Two New Sciences*, was smuggled out of Italy and published in the Netherlands in 1638.[39]

Galileo's story illustrates how the Scientific Revolution was bringing about a golden age for publication. The Catholic Church's power to enforce its view of the physical universe waned as the scientists gained ground with their theoretical models substantiated by empirical facts. Censorship by the Catholic Church backfired, boosting banned book sales. The fear of intellectual property theft—a serious concern that deterred would-be authors—was overcome in time with the creation of scholarly societies, professional journals, and intellectual property law. The first such society was the Royal Society of London. It was founded in 1660 and began publishing its *Philosophical Transactions* in 1665. Over time, such societies would publicly recognize scientists and their intellectual property. They would validate and publicly attribute scientific discoveries in referred journal articles. The first intellectual property law followed, as previously mentioned, in England in 1710.

Summary on the Effects of the Printing Press

180 years after the invention of the printing press, Francis Bacon eloquently acknowledged its revolutionary effect. In 1620 he stated that this invention (along with gunpowder and the compass) "changed the appearance and state of the whole world."[40] He understood that such inventions gave rise to ambition. The ambition bred by the printing press made Christian populations uncomfortable. The sinful greed and pride of printers and authors violated the Christian virtues of charity and humility. But, printed books helped people. Bacon argued that it was noble to put personal ambition aside and "to endeavor to renew and enlarge the power and empire of

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[38] Eisenstein, 653.
[39] Eisenstein, 637.
[40] Francis Bacon, *Novum Organum*, https://www.gutenburg.org/files/45988/45988-h/45988-h.htm, accessed January 6, 2018.

mankind … over the universe."[41] And as a modern historian put it: "By a marvelous alchemy, print transmuted self-seeking activities into a public good."[42]

The Protestants abandoned Catholicism, not their faith in an almighty Christian God. They disagreed with the Vatican claim that all scientific discoveries were heresy unless they were consistent with the Catholic Bible. Many believed that God empowered man with the ability to make discoveries about God's mysteries. As Bacon reasoned: "… let mankind regain their rights over nature, assigned to them by the gift of God, and obtain that power, whose exercise will be governed by right reason and true religion."[43] The printing press helped end the Vatican's stranglehold over scientific discovery. By the time of the Scientific Revolution, it enabled formal differentiation between empirical science, religious belief, and charlatanism.

Protestantism increased the importance of reading in Protestant nations. The spread of reading to a more general population created new markets for vernacular Bibles, devotional literature, primers, and self-help books.[44] The notoriety of banned books brought increased sales in Protestant markets.[45] Literacy empowered people—individually and collectively—to act against the tyranny of Rome, fueling political consciousness, activism, and nationalism.[46]

Galileo's work exerted a tremendous influence on the Scientific Revolution. Because of the printing press, his condemned *Dialogue* could be republished in Protestant lands and made widely available. His *Discourses* were published and available as a foundation for Newton and his classical physics. And luckily, Newton would come along later, in the right society at the right time, in a tolerant country open to publication of his radical views.[47]

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[41] Bacon, *Novum Organum.*
[42] Eisenstein, *Printing Press as an Agent of Change*, 558.
[43] Bacon, *Novum Organum.*
[44] Eisenstein, *Printing Press as an Agent of Change*, 78.
[45] Eisenstein, 676.
[46] Eisenstein, 422.
[47] Eisenstein, 677–78, 682.

From Printing Press to Cyberspace

Like the printing press before it, the Internet empowered individuals to compete in unprecedented ways with the established order. It tantalizingly offered early adopters a virtual world imbued with "freedom without anarchy, control without government, consensus without power."[48] In this, it failed.

Because of cyberspace and its internetwork, information now permeates every corner of the earth more quickly than ever before. Internet technology and code allow the commercial world to access, collect, search, sort, analyze, synthesize, aggregate, correlate, manipulate, lease, share, and sell information about consumers in unprecedented ways. In order to remain competitive in today's market, businesses have learned to morph adeptly in virtual space and cyber time. This also allows them to color around existing laws and regulations intended to protect the individual rights of the consumer and the collective good. Democratic government can only respond slowly, trying to enforce shifting norms with consent orders, judicial proceedings, and legislation. Such instruments of government are quickly obsolesced by new technology and commercial creativity. Collective norms and the individual right of privacy begin vanishing in the dust of cyber-charged commercial profit motives.

This is complicated by the emergence of international cyberspace, that place where individuals from different countries meet to exchange ideas, goods, and services. How much should local, state, national, and international laws apply in cyberspace? Many laws, rules, and norms of real space are unenforced and/or unenforceable in cyberspace. The world's nations, from totalitarian to democratic, have responded in different ways. The Chinese built the Great Firewall of China to regulate the Internet, limiting their citizens' access to foreign websites and

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[48] Lessig, *Code*, 4.

content. The Europeans passed the General Data Privacy Regulation (GDPR) to protect the

"fundamental rights and freedoms of natural persons and in particular their right to the protection

of personal data."[49] Rooted in the American values of its birthplace, the Internet is being

modified overseas to cohere with other nations' concepts of individual rights and the collective

good.

All this freedom has made the issue of free speech intractably complicated in the cyber

era. Some people think they should be free to say or post anything. Others complain that the

content is offensive and want the intermediaries, like Internet Service Providers (ISPs),

Facebook, and Twitter, to censor it. In our modern times, censorship has a negative connotation.

Book banning is antidemocratic and bad, free speech rules! In 1996, Congress codified the

liability exemption for any provider or user of an interactive computer service who made

available *or* restricted access to any material posted by a third party. Under this amendment,

Facebook quite legally restricts some content, to include disinformation, propaganda, and

offensive posts. Is that right? Is that wrong? Meanwhile, the commercial world is starting to

argue that its First Amendment rights are being violated when the government prohibits

companies from sharing/selling information about private citizens to others.

The Internet has also brought tremendous challenges to intellectual property rights and

law. We had a preview of this in the early twentieth century, when broadcast media began using

things like photographs, recorded music, and motion pictures. Now it's digital technology and

ubiquitous networks which are challenging intellectual property rights in similarly significant

ways. Cyber-enabled technologies continue to come fast and furious, rendering copyrighted

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[49] General Data Privacy Regulation, Art. 1., https://gdpr-info.eu/art-1-gdpr/, accessed November 1, 2019.

work -- extremely vulnerable to theft and piracy. As an enshrined value in the US Constitution, intellectual property rights are an acknowledged public good. Their exclusive use by the originator for a limited time is an individual right intended to remunerate and encourage creativity "To promote the Progress of Science and useful Arts."[50] Cyber has eroded that.

Cyber technology challenges our sovereignty today in ways that the printing press challenged the sovereigns of its era. Cyber actors, both foreign and domestic, can attack our critical infrastructure, causing havoc with hacking, advanced persistent threats, ransomware, and social engineering and phishing attacks. Government, businesses, and individuals are not always prepared to repel these invasions into our way of life. We embrace new devices and services which promise efficiencies, without necessarily thinking about our increased vulnerability in cyberspace. Too little, sometimes too late, we realize we should have proactively managed the risks to our individual rights and collective values with better network and information security.

Because of the Internet, ubiquitous networks transcend the territorial boundaries so carefully constructed after World War II. They provide opportunities for many actors, not just nation states, to exercise state-like powers in cyberspace. Now sovereign states find their territorial integrity violated by not just by peers, but non-nation states, terrorists, and others. The foundation on which the Internet was built—a utopian ideal of openness—has left our cyber borders porous to malevolent actors.

In 1963, the historian Lewis Mumford suggested that a democracy which yielded to the efficiencies of technology without incorporating the "human personality" could lead to a kind of technological authoritarianism.[51] I paraphrase by suggesting that Mumford's human personality

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[50] The Constitution of the United States, Article I, Section 8.
[51] Lewis Mumford, "Authoritarian and Democratic Technics," https://www.collier.sts.vt.edu/eng14874/pdfs/mumford_1964.pdf, 1-2. Accessed October 22, 2019.

included individual rights and collective values. In a similar vein, Lawrence Lessig argued in 1999 that "government is necessary to help establish [and support] the conditions necessary for [collective values like] liberty to exist. This is because there are collective values that, acting as individuals, we will not realize…. The freedom to contract, to own property, to travel, to vote—all of these rights require massive governmental support."[52]

We should not blithely sell our democratic souls to the cyber tyrant. Privacy is a core tenet of democracy worth preserving. As an individual right, it has been defined as "the right to be left alone" and "the right to control information about oneself." But such a right can only be enjoyed if government protects it as a collective democratic value.

Modern Lessons Extrapolated

In the grand scheme of civilization, we are not yet displaced far enough from the creation of the Internet to understand its overall impact on humankind. But the lessons gleaned from the printing press experience can be instructive. By recasting them with technologies from our modern era, we are permitted a glimpse of our story arc toward the future.

New technology has both short-term and long-term effects.

The short-term effects of technology are evident, but they don't necessarily reveal how it will shape civilization's long-term trajectories. Luther understood that the printing press was helping him get his message out in the short term but could never have conceived the worldwide impact his movement would have in the long term. Just a few decades after the Internet emerged, children live in a connected world we could never have imagined as kids. It presents fantastic benefits, like knowledge on demand. It also poses serious risks, like cyberspace-delivered attacks.

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[52] Lessig, *Code*, 209.

We remain unable to foresee how the Internet will have shaped the overall human experience by the twenty-second or twenty-third centuries.

The proliferation and maturation of technology is limited only by time, money, and imagination.

In the fifteenth and sixteenth centuries, early printers struggled to make ends meet until the lucrative anti-Catholic market emerged with Martin Luther. In the twentieth century, the technological advances of World War II and the Cold War spurred US investment in innovative technologies like computers, ARPANET, and data storage. Now a few decades later, our technology is leaps and bounds beyond that. The commercial world has brought us mobile phones, allowing us to communicate 24/7 nearly anywhere with nearly anyone on the planet. Such devices allow us to access the Internet, a worldwide network containing a vast repository of digital information. Who could have foreseen this in 1970? Technology continues to proliferate and mature as long as markets for it continue to emerge and exist.

It takes time for public opinion to normalize about the innovations of technology.

In the early days of the printing press, an author's ambition was seen as anathema to Christian values. Some cast the technology as an instrument of the devil. But once authorship was transmuted into a public good, it became a more respectable profession. Today, public opinion about new technology changes as fast as the technology itself. We love the capabilities brought by new technologies, until we grasp the liabilities they bring with them. One-click shopping was once the *ne plus ultra* of modern life. Now we understand that it came at the cost of retailers commoditizing our private information. This catapulted the public debate about privacy to the forefront. As public opinion and social norms stabilize around a majority view, democratic nations will find it easier to respond meaningfully with appropriate legislation.

Proponents of new technology foresee its potential to create new opportunities.

Luther knew he had a good thing, and he didn't let it go. In the cyber era, the early adopters of online shopping foresaw its convenience. Early adopters of social media anticipated better communication and connectivity with family, friends, and business colleagues. Their successful experiences created a tidal wave of interest which bred adoption by millions of others.

Entrenched entities often respond negatively when new technology threatens their interests.

The Catholic Church responded negatively to the printing press because it undermined Vatican hegemony over Europeans' temporal and spiritual lives. Today, established companies resist new technologies that threaten to undermine their established business models. Many department stores, having successfully built market share in their traditional way, failed to embrace the new technology which made online shopping popular. As a result, many brick-and-mortar stores have closed, made extinct by the convenience of shopping on the Internet. In point of fact, all of today's established vendors, including successful Internet-age companies, are learning they must adapt-or-die to market shifts induced by new, technologically fueled products and services.

Government response to new technology is measured.

The Vatican and governments took no interest in regulation printing presses or their products at the outset. That began to change once they understood how the technology could be used to challenge their own sovereignty. In modern times, law, regulation, and policy in democracies lags behind technology, by design. In anticipation of an increasingly connected world, US legislators and regulators have been nibbling at the edge of protecting individual information and privacy for decades. The United States' first federal consumer privacy law was the Fair Credit Reporting Act (FCRA) of 1970.[53] Congress enacted the Privacy Act in 1974 and the Health

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[53] Chris Jay Hoofnagle, *Federal Trade Commission Privacy Law and Policy* (Cambridge, UK: Cambridge University Press, 2016), 270.

Insurance Portability and Accountability Act (HIPAA) in 1996. Concerns raised by the Federal Trade Commission (FTC) induced Congress to quickly enact the Children's Online Privacy Protection Act in 1998. Overseas, the European General Data Protection Regulation (GDPR) went into effect in 2018. And stateside in the same year, California passed its own Data Protection Act. American commercial interests—many already contending with GDPR compliance—began supporting federal privacy legislation, seen as a far less costly alternative to compliance with fifty different state privacy laws. A consistent demand for privacy from US constituents will help additional federal privacy legislation become a reality in the near future.

Conclusion

The printing press irrevocably altered civilization. In the short term, it fueled ongoing debate between Catholic and Protestant constituencies. Sovereigns and popes understood its power to persuade and dissuade, and responded in different ways. Those that adapted to technological change, thrived. Those that did not adapt, declined. In the long term, no one could have predicted its influence on the self, culture, and society. Nearly six hundred years later, we can see that the printing press powered the rise and fall of empires. It engendered individualism, nationalism, and democracy across Western Europe. One might even argue its influence fueled the birth of a nation in the New World.

The lessons of the printing press are instructive in modern times. When recast in the context of modern technology, they allow us to glimpse the story arc into our future. Time, money, and imagination are necessary to create and use new technologies which will capture market share. We don't always understand the potential benefits and risks of new technology. Early adopters see the benefits and can help the technology virally proliferate. Businesses that fail to adapt to changing

market conditions brought by new technologies are vulnerable. New technologies fuel public debates.

Privacy, as an individual right and a collective value, is the prominent debate in our Internet age. Constituents in Western countries are normalizing toward greater control over the private information they entrust to technology. Democratic governments are beginning to respond with privacy laws. Public opinion, international regulation, state law, judicial decisions, and regulatory responses today all lean toward increased privacy protection on the Internet. As long as citizens remain vocal about their privacy rights, governments will respond by updating laws rendered obsolete by new technologies. If this remains true, then privacy will persist as important part of civilization's story for centuries to come.

Churchill said that we are condemned to repeat the history from which we don't learn. Whatever the Internet may become, it seems clear that ubiquitous connectivity and privacy concerns are in our future. Let us study and learn from the past, so that we can remain in control of that future.