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## The “Nature” of the Internet

The best products don't win. The ones everyone use[s] win. I know a lot of people don't want to hear this. . . . But make no mistake, growth tactics are how we got here.

—Facebook Vice President Andrew Bosworth, internal memo titled “The Ugly,” June 18, 2016

In February 1996 John Perry Barlow, best known as a lyricist for the Grateful Dead, published a short manifesto titled “A Declaration of the Independence of Cyberspace.” In turgid prose that recalled Hegel more than Jefferson, Barlow asserted that the internet was immune to regulation and entirely divorced from the “Industrial World.”<sup>1</sup> The internet was “the new home of Mind,” where “whatever the human mind may create can be reproduced and distributed infinitely at no cost. The global conveyance of thought no longer requires your factories to accomplish.” Governments could not hope to govern cyberspace, because the internet was not just a technology but “an act of nature.”

Barlow was hardly the first to invoke “natural” laws or biological metaphors in talking about the internet. Southern California’s tech culture had been shaped by both *Whole Earth Catalog*-tinged counterculture<sup>2</sup> and Joseph Schumpeter-inspired “evolutionary” capitalism. But Barlow’s treatise gave such views a wider audience. The essay was quickly mirrored on forty thousand other sites, making it arguably the most impressive example of viral content up to that point. Today the Declaration is often cited as the zenith of 1990s techno-utopian silliness. Barlow himself, when asked

about the declaration in a 2004 interview, quipped that “we all get older and smarter.”<sup>3</sup>

In crucial ways, though, we have *not* gotten smarter about the internet. Misconceptions about the “nature” of the internet are still the explicit rationale for our public policies. We hear them on the lips of the secretary of state and the chairman of the FCC and even the president of the United States. We read them in peer-reviewed publications and best-selling books. Half-trillion-dollar corporate Goliaths worry loudly about the threat they face from students in a garage—often falsifying their own underdog origins in the process.<sup>4</sup>

The problem in writing about “the” internet, then, is that there is not one internet but two. The first is the actual-existing internet most of us use daily, if not constantly. The second is what we will call the *imaginary internet*—the idealized, fictionalized, reified internet that “everyone knows” is democratizing communication and economic life. Again and again, our understanding of the real internet has been obscured by unfounded faith in the idealized one.

The gap between the imagined internet and the real one is not just a matter of emphasis or optimistic tone or rhetorical flourish. As this book has shown, confusing the two internets leads to basic factual errors.

On the imagined internet, many still suppose that audiences are spread thinly across tens of thousands of outlets. On the real internet, by contrast, a third of web visits go to the top ten firms. While the former FCC chairman Tom Wheeler imagines that the internet “spread[s] out . . . economic activity,”<sup>5</sup> the real one lets two firms control more than half of online ad revenue. Trump administration FCC chair Ajit Pai similarly imagines that the internet provides “countless” online local news sources, while the FCC’s real-world data shows most Americans have just a few real local online choices. On the imagined internet, personalization favors small sites. On the real one, scale economies and the mathematics of targeting mean that only the biggest sites can personalize ads and content efficiently. The imagined internet might be “post industrial,” but on the real internet nearly all the profits go to those firms building giant factories. Scale economies dominate whether the heavy machinery is refining data or iron ore.

The imaginary internet also misleads us about the dynamics of digital audiences. On the imagined internet, audience churn is a leveling force.

In reality, unequal churn is what *creates* such intense digital concentration. The real web changes far faster at the bottom than at the top, while the largest sites enjoy relative security. On the imagined internet, switching costs are trivial and competition is “only a click away.” On the real one, customers are *more* loyal to digital stores than brick-and-mortar retailers.

Our misunderstanding of the internet is especially consequential for news and civic content. On the imagined internet, the local newspaper audience is “larger than ever”; on the real one, attention to local news is just a rounding error. On the imagined internet, hyperlocal sites are supposed to capture small-but-valuable audiences; on the real internet, small-but-valuable audiences are an oxymoron. The economics of advertising, which used to pay higher per-reader rates to local versus national media, has been turned on its head.

Our fictionalized version of the internet does not even get the technical architecture right. The imagined internet is still a peer-to-peer network just as it was in 1995. Today on the real internet, though, most traffic never touches the public backbone. Small sites are not remotely equal in their computing hardware or their software stack or their fiber—unless of course they depend on digital giants like Amazon or Google to do the hosting for them, making the inequality even more profound. Content delivery networks and paid peering mean that big sites take a shortcut to users.

One goal of this book is to bridge the gap between the imaginary internet and the real one—between the internet so many celebrate and the more important, more complicated, and less equal internet now interwoven into our lives. Pointing out specific areas where reality fails to match up to our assumptions is the first step in that process.

But mythbusting means little if it cannot replace vapid folk theories of the internet with something better. Ironically, clearer thinking about the internet comes from taking all this talk about the “nature” of the internet seriously.

### AN EVOLUTIONARY MODEL OF AUDIENCES

The use of biological metaphors has a long history in the rhetoric of technology, from Stewart Brand’s focus on human “co-evolution” with technology to Schumpeter’s discussion of technology change as “industrial

mutation.”<sup>6</sup> Recent communication scholarship on media “niches”<sup>7</sup> and “audience evolution,”<sup>8</sup> too, has relied on biological language to explain important shifts in the media landscape.

Yet if we want to understand online audiences, it is worth returning to Darwin’s thought—and taking it rather more literally than previous scholarship has. Building upon what we’ve seen in earlier chapters, I propose an *evolutionary model of digital audiences*. Like Darwin’s original argument, this model can be reduced to a series of premises that build on each other.<sup>9</sup>

Let’s start with the first premise: *almost all sites online can support more audience than they currently have*. The technical architecture of the web allows near-instant audience growth. Audiences are not limited by printing capacity or broadcast range. Well-designed websites can stay up even when ten or even a hundred times the number of expected visitors arrive.

Second, *categories of content show stable audiences*. The collective audience share for news or weather or shopping has been remarkably consistent over time. The biggest audience shifts have been about opening up new content niches (e.g., YouTube and Netflix) or using the internet in previously difficult situations (e.g., smartphone and tablet devices). But the portion of audience going to news content, for example, has held steady at roughly 3 percent for twenty years.

Third, for both consumers and websites themselves, *resources are limited*. Work, family, and sleep compete for users’ attention, as do myriad other types of media. Site revenue is limited. Staffing is limited, with true talent and expertise in even shorter supply.

Put these three premises together and the result (fourth premise) is *fierce competition for attention*. The notion that the web produces a no-holds-barred fight for audience is already something of a cliché, as we saw in chapter 1. But while severe competition for online audiences undeniably exists, the character and consequences of that competition have been grossly misunderstood.

Audience competition online has been assumed to result from a radical leveling of the playing field. Competition is so brutal, the argument goes, because it is so equal. Clay Shirky, for example, channels Thomas Hobbes in arguing that online competition is “the war of each against all.”<sup>10</sup> It is a rare and revealing slip—not least because Hobbes himself notes that scientific endeavors and the “arts grounded upon words”<sup>11</sup> are a key exception

to his claims about human equality. Most analysis of digital audiences has stopped at this point, with supposedly self-evident equality producing an intensely egalitarian melee.

But following the rest of Darwin's argument shows why equal competition cannot last. Consider the fifth premise: with limited resources, *websites differ in traits that allow them to build audiences*. As we have catalogued, some site characteristics matter enormously in the task of audience building. Site load time matters. Technical architecture matters. Layout, branding, and user learning matter. Countless other characteristics matter too—some across nearly all websites, others only within a given online niche.

Lastly, *sites with favorable traits grow their market share over time*. Favorable traits make a site stickier: they make users more likely to visit, more likely to stay longer when they do. For convenience we will term this model *audience selection*, after natural selection in biology. The label of audience selection may sound empowering, even meritocratic. But in fact, audiences rarely get to choose among many equally good options.

Darwin's account left out many key details, and indeed it was written a century before the discovery of DNA. But it still carried enormous power to connect macroscale biology—species and ecosystems—with the pressures on individual organisms. In Darwin's account, his eureka moment came while reading Thomas Malthus. Malthus argued that society is doomed to outstrip its food supply because human population grows geometrically. If every couple has four surviving children, for example, the population will double every generation. In a flash, Darwin realized that natural selection would not be cumulative, but *compounded*: the population of organisms with favorable traits multiplies with every succeeding generation. Natural selection is powered by exponential growth.

The central challenge of internet scholarship is similar. Scholars have publicly struggled to connect the macro structure of digital audiences with micro-level behavior—individual choices about what to click on, read, watch, and listen to.<sup>12</sup> This book shows that the intuitive leap is the same for digital media as for biology: to understand that even tiny daily differentials in audience growth compound exponentially. Hundreds of features on a site influence how long users stay, and how likely they are to return—everything from the speed at which the page loads to the general layout

to the freshness of the content. Tiny effects multiply with every user visit, and publishers with above-average stickiness grow their market share over time. This process is responsible for the macro-level structure of the web.

Audience selection thus means that growth is a function of how large a site’s audience *already is*. Only current visitors get to appreciate a bounty of fresh content or speedy load times. Moments of competitive equality are thus fleeting. A small early edge can snowball into an insurmountable advantage. Half a percent more in daily growth can turn into a fivefold size advantage in less than a year.

The news gets worse for small organizations. As we have seen, stickiness is expensive. Large sites not only have a bigger user base across which to spread those costs, but they also earn more per visitor. The same user is worth much more to Facebook or Google than she is to a local newspaper. Treating audience churn as an organic and evolutionary process, then, does not lead to radical leveling. The internet’s destructive energies—“creative” or not—are not applied equally.

### DIGITAL DISTRIBUTION IS NEVER FREE

This evolutionary model of traffic has profound consequences for every aspect of digital media. First and foremost is this: when competition for attention is a ceaseless Darwinian struggle, *digital distribution is never free*.

Economist Milton Friedman (among others) was fond of the phrase “There’s no such thing as a free lunch.” Friedman’s point was that someone somewhere is always paying the cost of a “free” meal. When American pubs before prohibition invented the practice of “free” lunches, those lunches were paid for by raising the cost of drinks—and by making the free food extremely salty, so that patrons would need high-priced drinks to quench their thirst.

The same principle holds for digital audiences. Someone always has to pay the costs of digital distribution—which is to say, *the costs of audience building*. The billions of dollars spent on server farms and software platforms are distribution costs. Site design and mobile app design are distribution costs, since clunky interfaces stunt audience growth. Fresh content is a distribution cost, since few readers want to read the same piece twice.

Distribution costs also include search costs, which are spread across digital giants, smaller publishers, and users alike. Google and Facebook pay by filtering through billions of items to find those most likely to satisfy users. Publishers pay search costs, too, by optimizing their content for visibility in search engines and social sites, or simply by buying advertising. BuzzFeed and the Huffington Post pay millions of dollars to ensure that Facebook features their stories—money that goes to everything from site design to content management platforms, testing infrastructure to writers' salaries. These are distribution costs just as surely as if Facebook was paid directly to publish BuzzFeed's content. Not least of all, individual consumers pay part of these costs by spending the effort to find content that suits their interests.

These distribution costs upend our understanding of the internet as a neutral platform. The Internet Protocol won out over early competing network standards in large part because of its minimal, bare bones approach. A reliance on “rough consensus and running code” meant that the internet was already running on millions of machines while corporate or government-backed alternatives were still on the drawing board.<sup>13</sup>

But the internet's minimalism is now a critical weakness. With key functionality for audience-building missing, digital publishers are forced to rely on proprietary platforms: Google, Facebook, the iOS and Android operating systems, even Amazon's AWS and Microsoft's cloud hosting services. Every recent rapidly growing publishing upstart—from BuzzFeed to the Huffington Post, Gawker to Upworthy to Vice to Vox.com—has been utterly dependent on these private platforms.

The most important question is this: *do small publishers have a reasonable chance to build an audience?* Today the answer is no, not without help from big digital firms.

### *Political Voice*

These expensive but unconventional distribution costs challenge our notions of internet openness, and force us to reconsider an enormous volume of internet scholarship.

Hundreds of pieces of scholarship have claimed that the internet expands political voice, and makes it cheaper for citizens and groups to



reach audiences. In the words of Jennifer Earl and Katrina Kimport, the internet is supposed to provide “cost affordances” to groups, individuals, and small-scale publishers.<sup>14</sup> Yet Darwinian competition for attention has destroyed most of these cost affordances over time. To be sure, there has been enormous *shifting* of distribution costs. Google and Facebook invest billions in their platforms, which can be leveraged by myriad groups and publications for audience building. Some groups and organizations can even pay for audience building in nontraditional currencies. But it is a profound mistake to see digital distribution as cheap or even “free.”

Expensive distribution helps explain continuing inequalities in digital participation. Many studies continue to find that the political internet remains a “weapon of the strong.”<sup>15</sup> Blogs hosted on independent sites have been pushed to the brink of extinction (see chapter 7), with evolutionary dynamics funneling political discussion to a few popular sites. While this is a partial check on a fragmented public sphere, it limits the shelf space for political debates and curtails much of the internet’s promised openness.

The same difficulties are visible in the organizational layer of politics. Interest groups especially are supposed to benefit from the cost affordances of the internet. Work by Trevor Thrall, Dominik Stecula, and Diana Sweet, though, has found that cost affordances are minimal, and that interest groups actually find it *more* difficult to attract public attention in the digital media environment.<sup>16</sup> David Karpf’s book *Analytic Activism* has similarly shown that new data-driven political organizing benefits from massive scale.<sup>17</sup> Fearsome attention competition means that it is still difficult for small-scale activists to achieve public notice.

### *Peer Production of Content*

If attention competition handicaps political groups, it is especially discouraging for peer production of civic content.

Several of the most widely cited works of internet scholarship have claimed that the internet would make distributed content production commonplace. Loose collections of citizens would be able to function as media outlets, publishing civic information, political opinions, and even original reporting. Wikipedia and political blogs have both been invoked repeatedly as successful examples of distributed content creation.

Yet as work by Yochai Benkler, Aaron Shaw, and Benjamin Mako Hill has noted, the question is not whether peer production is possible, but instead under what conditions is peer production *likely to succeed*?<sup>18</sup> Again and again, real-world peer production of content has been unable to compete with traditional corporate models.

Evolutionary audience models explain this failure by highlighting the intractable problem of stickiness. Fast load times, good web designs, A/B testing platforms, streamlined mobile apps, constantly updated content—among dozens of other features—are far easier to achieve with a hierarchical organizational structure. Even sites that depend heavily on users to make and filter content, such as Facebook, Twitter, and Reddit, are for-profit corporations that rely on command and control for important decisions—not to mention billions of dollars of private capital.

Scholarship on peer production of content is much like the study of island ecologies to understand evolution.<sup>19</sup> Wikipedia has from its inception enjoyed rare protection from corporate competitors. Encyclopedia Britannica and even Microsoft Encarta could not match Wikipedia on price, speed, or coverage of popular culture. But Wikipedia's highly unusual niche undermines the claim that peer production can be a model for other types of content. Wikipedia is the digital equivalent of the dodo bird: a fantastic evolutionary solution that works only when isolated from competition.

#### INTERNET GOVERNANCE, NET NEUTRALITY, AND ANTITRUST

Better models of digital audiences are crucial, too, in reframing scholarship on internet governance.

Over the past two decades, scholarship has highlighted the way in which states, private firms, and other institutions exert power over the internet. One worry has been corporate actors' ability to shape the information ecosystem with little public debate.<sup>20</sup> As Robert G. Picard argues, big digital firms "are increasingly shifting the mechanism of control and influence over media from public to private spheres, reducing the ability of the public to influence it through democratically determined policy, and making public oversight of media and communication systems and operations more difficult."<sup>21</sup> This influence stems partly from the fact that seemingly neutral technical decisions often reinforce power relationships:

in Laura DeNardis’s words, “Arrangements of technical architecture are arrangements of power.”<sup>22</sup>

This book adds to the internet governance literature in several ways. First, evolutionary models of traffic strengthen the link between big firms’ *architectural* power and their *economic* power. From firms’ perspective, their ability to control stickiness—to ensure their own growth—is key to their influence. This book provides a better explanation of how audience concentration emerges, and how firms’ investments and technical choices serve to entrench their own position.

Some media scholars have worried that because “content is king,”<sup>23</sup> the internet will reproduce concentration among content producers. This belief in the market power of content producers has long been the centerpiece of academic critiques about media concentration. For example, Benjamin Bagdikian’s 2004 book *The New Media Monopoly* noted with particular concern that five large content firms controlled 80 percent of media revenue.<sup>24</sup> Scholarship by Eli Noam, among others, has challenged this view, arguing that distribution not content production is the crucial bottleneck, and that this gap will only grow in the future.<sup>25</sup>

This book is similarly worried about monopolies in distribution—but it argues that *distribution must be considered more broadly still*. Distribution is not just ISPs and physical pipes, but rather *all* the components of stickiness that go into audience building. Big firms like Google and Facebook need to be seen as *attention utilities*. They provide crucial distribution architecture for which there are no adequate substitutes. Being demoted in the news feed or the results page has dire consequences for content producers.

### *Net Neutrality and Beyond*

A broader understanding of infrastructure is crucial, too, in understanding renewed debates about net neutrality. The evolutionary, constantly-compounding audience models in this book offer a new and better explanation of why net neutrality is both *indispensable* and *insufficient* for an open internet.

The founding myth of the internet, and later the World Wide Web, was that the technology treated every computer online and every packet of data equally.<sup>26</sup> Yet internet service providers have repeatedly tried to create

a “fast lane” for certain favored companies who pay for better access to customers.

In February 2015 the Federal Communication Commission issued a major decision in support of network neutrality. The FCC order prohibited internet providers from blocking lawful content, throttling sites or types of usage, and charging for traffic prioritization. And unlike previous FCC efforts, the 2015 decision reclassified internet traffic under Title II, the core part of its mandate under the Communications Act of 1934. The 2015 net neutrality order, though, provided only a fleeting victory. With the election of Donald Trump, and the elevation of Ajit Pai from commissioner to chairman, the FCC repealed net neutrality protections in December 2017.

Evolutionary models of digital audiences help explain why the end of net neutrality enforcement is such a dire threat to content producers, and especially *smaller* content producers. If service providers like Comcast and Time Warner and Verizon can require publishers to pay for fast-loading sites and apps, content producers will be forced to pay up or face a growing audience gap. Comcast and Time Warner are thus in a position for a mafia-style shakedown: “Nice site you’ve got here, it would be a shame if load times increased and you had snowballing traffic losses.” To be sure, ISPs have repeatedly argued that any impact would be small, a claim belied by the millions of dollars they have spent opposing the regulation. If this book has taught us anything, it is this: small effects compounded hundreds of times over are *not* small effects.

The Trump FCC’s repeal of net neutrality is discouraging. Yet one of the core lessons of this book is that *net neutrality alone is not enough*. Even if we could return the internet to its original end-to-end architecture, that would not be enough to eliminate the concentration of audience and power in a few big sites. Ensuring an open internet is thus not just a job for the FCC or international telecom regulators. It requires help from a broader set of regulators, too.

### *Strengthening Antitrust Enforcement*

Net neutrality, then, is not enough on its own. In order to maintain meaningful internet openness, regulators in the United States and the European Union need to aggressively enforce existing antitrust law.

Understanding the compounded, evolutionary nature of digital audiences is crucial for that effort. The ability of firms to control their own growth is a key element of monopoly power.

The United States and European Union account for roughly 80 percent of Google and Facebook’s revenue, making these two markets key for shaping the firms’ behavior. Though basic antitrust laws are similar on both sides of the Atlantic, since 2013 there has been a growing split about how to apply the law—a disagreement with enormous consequences.

U.S. law defines a firm as a monopoly if it has “significant and durable market power—that is, the long term ability to raise price or exclude competitors.”<sup>27</sup> In the first part of this test—the ability to alter prices—the market power of these firms is obvious. Google, Facebook, Microsoft, Amazon, and Apple all have market share far beyond the established thresholds for market power in their core business. All except Amazon have produced 30+ percent profit margins year after year after year, an impossibility in competitive markets with unrestricted entry.<sup>28</sup>

Yet U.S. regulators have been gun shy even when firms have been caught red-handed. In 2012, for example, Google was caught promoting its own products and services over those of competitors, even when its own data showed that users preferred outside content.<sup>29</sup> This is textbook anti-competitive behavior, and Federal Trade Commission staff concluded that there had been “real harm to consumers and to innovation.” Yet in 2013 the full Commission voted against taking the case to trial, instead settling for a weaker settlement that left Google free to demand exclusive contracts with partner sites.

Some raised the specter of political influence: the *Wall Street Journal* documented extensive contact between Google and Obama administration officials in the weeks before the FTC’s decision. But when a key confidential FTC report was accidentally leaked, it became clear that Google’s mythmaking operation played a key role too. Even in a report expected to be kept confidential, the FTC’s lawyers blithely repeated the claim that “competition is only a click away.”<sup>30</sup> They concluded that Google users “are not locked in,” using a misunderstanding of lock-in refuted by Google chief economist Hal Varian himself.<sup>31</sup> And the report concluded that the “durability of Google’s monopoly power is questionable.”<sup>32</sup>

The FTC's 2013 decision not to pursue Google ended its previously-close partnership with EU antitrust regulators. In June 2017, EU officials concluded their investigation by slapping Google with a €2.42 billion fine for promoting its own comparison shopping product over those of competitors.<sup>33</sup> Margrethe Vestager, the European Commissioner for Competition, suggested that there may be more cases against Google to come. Some U.S. commentators and Google itself have archly suggested that the EU's decision was motivated by protectionism. Yet the EU's decision is sound, according to both U.S. and EU rules.

Google's durable market power is crystal clear if we judge internet firms by the same rules as *every other industry*. Other firms' factories are seen as barriers to entry, but Google's data factories are somehow left out of the analysis. Microsoft's multimillion-line code base and army of locked-in customers are viewed as durable advantages; Google's somehow are not. The biggest digital firms are all marketmakers that take roughly a third of all revenue that moves through their ecosystem. Marketmakers are infamously difficult to displace once established.

Google and other digital giants certainly have a few novel advantages. Targeting economies provide pricing power, ensuring that firms with a larger user base are able to extract more dollars per user. A/B testing can dramatically reduce the risk of missteps by big firms, and limit entry opportunities for new competitors (chapter 2). But those advantages are *in addition to* plenty of old-school advantages that matter just as much as they do in bricks-and-mortar industries.

Historically, communication technologies have tipped quickly from open to locked down—a pattern that the telegraph, telephone, and broadcasting (among others) all followed.<sup>34</sup> The internet has now passed this tipping point in nearly all of its established niches. Over the past decade, even the best-funded competitors have failed to break into established digital niches—as examples like the Google Plus social network and Windows Phone operating system show. Even the nominal success of Bing, which has managed to become the number-two search engine, is only a pyrrhic victory. Microsoft spent more than a decade, investing tens of billions of dollars and absorbing an astonishing \$12.4 billion in cumulative losses,<sup>35</sup> to establish Bing as a credible competitor. It is cheaper and easier to build a manned space program than it is to build a modern search engine.

One key feature of U.S. antitrust law, dating back to the 1890 Sherman Act itself, is its concern about harm to small businesses even—or rather especially—if these small businesses were not direct competitors to the big trusts.<sup>36</sup> The goal of antitrust regulation, as even conservative jurists like Frank Easterbrook emphasize, is to promote social wealth.<sup>37</sup> Society as a whole is poorer if Standard Oil doubles the price of gasoline, or if farmers have to pay extortionary railroad fees to get their crops to market. Antitrust laws are supposed to prevent monopolists from pursuing private gains at the expense of big costs imposed on others. Today that risk is enormous and pervasive throughout the digital economy, which forms an ever-larger portion of the economy as a whole.

Ironically, the history of firms like Google, Facebook, and Amazon show why antitrust is so crucial. In the latter half of the 1990s, Microsoft managed to beat Netscape in the so-called browser wars. Microsoft’s strategy was to deliberately break the open standards that the web had been built on, and make the internet into a walled garden that could be accessed only with Microsoft’s products. The Justice Department’s lengthy investigation of Microsoft produced a modest settlement. But far more important, the ongoing investigation curtailed anticompetitive conduct that would have crushed then-nascent firms like Google, Amazon, or eBay.

If antitrust enforcement is critical, the tools these firms have used obsessively to grow their audience can also make the work of regulators easier. A/B testing, in particular, is a powerful way to measure digital firms’ power in ways that go beyond longtime yardsticks like HHI. Regulators can see, with real-world experimental data, just how much big firms’ choices matter for sites downstream, and just how locked in current users really are. Even more helpful to regulators is that much of the data they need to make better decisions already exists, in the thousands of online experiments running around the clock. Asking for this data, and regularly incorporating it into rule-making and enforcement, is key to twenty-first-century antitrust law.

## DEMOCRACY AND NATIONAL SECURITY

Yet, as important as fights over net neutrality and antitrust law are, recent events have shown that the rise of digital giants isn’t just a threat to innovation or to the pocketbooks of consumers. It also strengthens

the hands of state actors—including state actors working to undermine democracy. Two decades after Barlow’s Declaration, cyberspace is less independent from state power than ever before.

Part of state influence comes from online surveillance. The 2013 Snowden disclosures sparked a heated public debate about the capabilities of the NSA, Britain’s GCHQ, and other allied intelligence services. Pervasive digital surveillance remains a critical issue, and one that this book has been able to address only in passing.

State surveillance, though, is closely intertwined with the power of big digital firms. The NSA’s capabilities have piggybacked upon the networks, tools, and techniques of companies like Google, Facebook, and Verizon. The NSA’s infrastructure copies digital giants’ data warehouses, it depends critically on software architectures that Google and Facebook developed, and it even hires former Facebook staff. And, of course, the biggest digital firms increasingly serve as a one-stop-shop for all kinds of personal data: email, browsing history, location data, and increasingly even credit-card purchase data. The temptation for governments to use this data through legal or covert means is strong.

Any effective response to “surveillance capitalism”<sup>38</sup> must begin with the evolutionary audience dynamics that led us here. User surveillance at firms like Google came first and foremost out of the imperative to grow faster than others. A/B testing and audience data collection were used to improve and personalize recommendations even before they were applied to targeted advertising—indeed, before Google had a clear business model at all.

Any attempt to curtail surveillance, then, has to deal with the growth imperative. Surveillance undergirds techniques that produce faster growth. It is essential for autocomplete search results, for location-based services, for voice-activated assistants, for personalized news recommendations and social media timelines, and countless other highly sticky features.

This means, like it or not, that individual firms *cannot* simply decide not to track their users. *Slower growth on an evolutionary web is just slow-motion suicide*. Privacy advocates whose only proposal is “don’t track us” miss the key role of stickiness and compounded audience. Actions by firms like Apple, which has integrated machine learning to block third-party trackers in its Safari browser, are one possible step—one giant taking unilateral



action to hurt rivals like Google and Facebook. By contrast, solutions that depend on voluntary action by a few small firms are untenable on their face. For firms that do want to limit their collection of private data, there is currently no solution to this prisoner’s dilemma. Strong regulation is the only way out of this catch-22.

### *Public Discourse and Disinformation*

Evolutionary audiences create other vulnerabilities, too: they provide novel and often insidious ways for states to influence public discourse. Recent work by Samantha Bradshaw and Phil Howard has catalogued the rapid emergence of “cyber troops”—organized government, military, or political party teams trying to shape public opinion on social media—in more than two dozen countries.<sup>39</sup>

Some states have developed and used these capabilities to constrain domestic media. For example, China’s internet is set off from the rest of the world by a “great firewall” that filters political content, and the Chinese government monitors online behavior and intervenes to limit collective action. At critical moments the Chinese government mobilizes hundreds of thousands of citizens to shape online discussion, though usually by distraction rather than directly confronting disfavored speech.<sup>40</sup>

Even more disturbing is the example of Russia, whose efforts go far beyond just domestic censorship and surveillance. As we have seen, the web provides business models for fake news and other types of questionable content. But Russia seems to have used coordinated campaigns at unprecedented scale to amplify these dynamics and shape the news agenda.

While the full extent of Russian influence on the 2016 U.S. election is still unclear as of this writing, what we do know is disturbing. Russia employs thousands of professional internet trolls, each typically controlling numerous fake accounts. Eight of the ten most popular Facebook stories in the months before the election were wholly fabricated.<sup>41</sup> In key battleground states, such as Michigan, false news stories were shared on Twitter more often than real ones in the weeks before the 2016 election.<sup>42</sup>

These digital methods are particularly effective because they are supplemented by traditional spycraft. Rule-breaking or illegal “black hat” methods of improving placement in search engines and social media

have long been an annoyance, but state intelligence services have gone far beyond what ordinary criminals or talented hackers can accomplish. For example, *Time* magazine reports that a Russian programmer who worked in the United States “returned to Moscow and brought with him a trove of algorithms that could be used in influence operations,” promptly being hired by the Russian intelligence services.<sup>43</sup> Pervasive industrial espionage was also a key factor in Google’s decision to pull out of mainland China.

In the aftermath of the 2016 campaign, Google, Facebook, and Twitter all announced efforts to fight fake accounts and this kind of influence operation. But these kinds of state actor threats are incredibly difficult for even the largest private firms to defend against. Consider just one point of vulnerability: the thousands of tech industry workers who live or have family in foreign countries. The core algorithms behind Facebook and Google are secret from the public, but they are frighteningly accessible to hostile governments. Vladimir Putin has a larger, smarter, better financed, and far more ruthless social media strategy than any news organization. Large digital firms have become a single point of failure not just for communications networks, but potentially for democracy itself.

### NEWSPAPERS: HE WHO PAYS THE PIPER

Hostile nations’ ability to hack digital media is a new and worrying threat. But in the long term, the changing economics of media is just as ominous. It is no longer true that local media is more targeted than national media. National media usually gets more money than local media for the same readers, and the democratic consequences of this grand advertising inversion are profound.

The modern American newspaper emerged in the mid to late 1800s, when the rotary press and cheap pulp newsprint allowed successful papers to get far bigger—and in the process put hundreds of smaller papers out of business. The shift in the economics of news also meant the birth of press independence, as papers in more valuable advertising markets increasingly became independent of political parties.<sup>44</sup> As Joseph Pulitzer himself explained, “Circulation means advertising, and advertising means money, and money means independence.”<sup>45</sup>

The past decade has demonstrated that Pulitzer’s equation also runs in reverse. Newspapers’ print circulation has been more than halved, and their digital audience remains just a fraction of a percent of time online. Ad revenue has cratered as audiences have declined. Despite constant talk about a “shift” to digital, online audiences at most newspapers continue to shrink.<sup>46</sup>

All of these changes threaten newspapers’ influence and independence. Critically, though, this threat comes because distribution costs have been *shifted* instead of *lowered*. As we have seen repeatedly, everything that goes into audience building is a distribution cost. The fact that these audience acquisition and maintenance costs are mostly paid by other firms is a curse instead of a blessing, because newspapers no longer control their own audience.

Much industry discussion and scholarly debate has obscured this key problem. Claims that the internet reduces distribution costs are ubiquitous—even this author has made them in previous work. It is false that newspaper audiences are larger than ever, or that newspapers have a revenue problem without an audience problem. And even discussions of “postindustrial journalism,” while insightful in some ways, get key parts of the problem wrong. A print newspaper is not less “industrial” because it rents its presses instead of owning them outright. By the same token, digital newspapers are not “postindustrial” if they depend critically on the industrial plants of Google, Facebook, or Apple in order to attract an audience. Smokestack economies remain a key reason, though hardly the only one, why digital audiences are so concentrated.

Google, Facebook, and Apple have now all made bids to move news organizations’ content onto their own platforms. Facebook’s Instant Articles, Google’s Accelerated Mobile Pages (AMP), and Apple News were all pitched as a way to improve many news sites’ ugly, broken, and dismally slow mobile performance. Facebook and Apple’s solutions are particularly damaging to the autonomy of news outlets, as they work only within Facebook and Apple’s own apps and platforms. Open-source AMP is better, but it still breaks web standards and increases publisher dependence on Google—with news articles often hosted directly from Google’s own caching servers. AMP may be better than the alternatives, but it magnifies the loss of control news organizations have already experienced.

Newspapers are not wholly helpless, as we have seen. With a better understanding of stickiness, newspapers and civic content producers can make smarter investments and maximize their chance to build an audience. In the midst of the panic over fake news, many citizens who hate “mainstream media” still have strong affection for their local newspaper. This goodwill remains an enormous asset, and mid-size newspapers have little to fear from small hyperlocal startups. But there is no hiding the fact that many newspapers—and increasingly other news organizations—now depend on the actions of policymakers and digital giants for their very survival.

The theory of evolution is also the story of extinction, not just growth. Species and ecosystems can be stable for millions of years until, suddenly, they are not. When the food is gone, the niche is too, and tipping points are not always obvious in advance. Boilerplate language about “ecosystems” and “diversity” is little comfort given how real ecosystems work. And in any case, what we have built online is not an ecosystem at all, but a pair of commercial monocultures. Nearly the entire internet energy pyramid now rests on the Facebook and Google duopoly. As events like the Irish potato famine show, every monoculture is only a single pathogen away from destruction.

At some point, inevitably, we reach the limits of biological metaphors. The evolutionary model can help us understand the dynamics of digital audiences, but the internet remains a wholly artificial realm. The internet has no “nature.” If the internet destroys local news, or subverts democracy, or ushers in a new gilded age, this is not the inevitable result of natural laws, but the consequence of human choices. The hope of this book is that, by understanding how our choices add and multiply together, our decisions will be wiser. But it is also a warning about complacency, about misunderstanding the character of the internet we all depend on. If we want the internet to remain open we must first understand it—and then we must fight for it.