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INTRODUCTION

An American company was refusing to pay a Bangladeshi supplier, arguing that the delivery wasn't matching their expectations. The amount of money at stake was trivial by US standards but could feed a family for a week in Bangladesh. The supplier had brought an action against the client. It was now Zara Khan's job to examine the evidence, hear the parties' arguments, and adjudicate.[1]

But Khan was not a judge: she was a dispute resolution agent working for a major digital marketplace platform. She didn't have any legal training as such. She came from a pretty modest background and had worked as a virtual assistant before landing her current gig. The technology company had trained her on the "laws" of its marketplace and taught her how to apply them to different types of cases. Now she was resolving disputes worth many thousands of dollars every day.

Most cases were easily resolved. Often defendants didn't respond to a complaint at all within the allotted thirty-day period, perhaps knowing that their case was weak. When that happened, the system automatically issued a default decision in favor of the complainant and released funds from an escrow account where they sat pending the conclusion of the transaction. Khan then moved on to the next complaint.

In this case, though, the defendant was arguing his case vigorously—in ALL CAPS. Khan set aside what she thought about that style of argument

and examined the facts of the case in light of the marketplace's rules. She was expected to handle all cases meticulously and impartially so as to safeguard users' trust in the platform. That said, she was also expected to process up to forty cases a week to max out her performance bonuses.

The process was that she would first try to get the parties to settle the case amicably. She'd mediate between them, explaining at each turn what the applicable rules were, hoping that they'd begin to see eye to eye. In this case, though, the parties' emotions were running high. An amicable settlement seemed unlikely.

Once thirty days had passed without settlement, it was time for Khan to issue a decision. If she ruled in favor of the Bangladeshi supplier, then the funds would belong to the supplier. If she ruled in favor of the US client and there was evidence of deception on the part of the supplier, then she had the power to throw out the supplier from the marketplace permanently.

But in certain types of cases—and this was one of them—Khan's decision was not binding. Either party could still lodge an appeal. The case would then proceed to a legally trained online arbitrator who would handle the case for a further thirty days before issuing a final decision. The costs of the arbitration would be split three ways—between the complainant, the defendant, and the platform company.

Khan was not about to let this case go all the way up to arbitration. Since the amount of money at dispute was not huge, she used a special prerogative that all the virtual judges had: she issued a full compensation to both parties. The client had his money returned, but the supplier was also paid. The platform company took a hit, but it was cheaper than letting the process drag on. Justice—of a sort—was served.

Digital platform companies such as Airbnb, Amazon, Apple, eBay, Google, Uber, and Upwork today engage thousands of people like Khan to handle disputes. EBay alone claimed that it resolved more than 60 million disputes in a single year.[2] In the same year, the UK court system handled about 4 million cases,[3] Chinese courts about 11 million cases,[4] and US courts about 90 million cases, the majority of which were traffic violations.[5] In other words, platform companies together probably resolve more disputes now than the entire world's public courts.

This is not just because people get into more fights on the Internet, though that may be true, too. It simply reflects the fact that so many of

our daily interactions are now played out through these platforms. People use platforms to find food, clothes, transport, accommodation, jobs, drugs, entertainment, friends, and even life partners. Firms use platforms to find customers but also real estate, suppliers, contractors, workers, and new innovations. Supervisors use platforms to manage workers, while professors use them to teach. According to one study, 70 percent of industries in the United States are now influenced by digital platforms, either because customers learn about firms and products through platforms or because the entire business from start to finish is carried out through platforms.[6] If we are lucky and humanity starts taking the climate crisis more seriously, we'll probably end up spending even more time interacting with the world remotely through digital platforms.

Increasingly, then, the rules that we follow in our daily lives are set by platform companies. They have power over what is permitted and what is prohibited, who can interact with whom, what sorts of agreements are possible, and what kinds of rights and guarantees you have in practice if things go wrong. It's almost as though they have become some sort of a digital government. "Is Microsoft a digital nation and does it have a secretary of state?," asks *The Economist*.[7] "Apple is basically a small country now," claims *The Atlantic*.[8] "Who needs a government when you've got Amazon to keep things running," quips a columnist at *The Guardian*.[9] "One Freelance Nation under Upwork," proclaims a blogger.[10]

These comparisons reflect the central role that tech firms now play in underpinning and regulating our economic and social activities. An estimated $490 billion's worth of goods passed through Amazon's marketplace in 2020[11]—more than most countries' entire gross domestic product.[12] The company earned almost $75 billion in fees from merchants who used its marketplace and logistics infrastructure—far more than what most governments earned in tax revenues. The chief executives of leading tech companies are now by many measures more powerful than most countries' heads of state.

However, not everything is well in these virtual "states." Their leaders enjoy immense power without a commensurate level of accountability. Many of the leaders have been discovered abusing that power. Amazon's managers used their God's eye view of the market to identify best-selling products, produce copycats, and ensure that consumers bought the

copycats instead of the originals. "Amazon has taken over the [listing] from me. . . . Saw me making a profit, and decided to take it from me and sell it themselves," deplored one merchant.[13] Major platforms have been caught bending the rules of their marketplaces to favor insiders, demanding extortionate fees from those least able to afford them, and stealing lucrative businesses from small entrepreneurs.

How did we end up here? The Internet was supposed to free us from powerful institutions. It was supposed to cut out the middlemen, democratize markets, empower individuals, and birth a new social fabric based on self-organizing networks and communities instead of top-down authority. "We will create a civilization of the mind in Cyberspace. . . . more humane and fair than the world your governments have made before."[14] This is what Silicon Valley's visionaries promised us. Then they delivered something different—something that looks a lot like government again, except that this time we don't get to vote. Why did things turn out this way? And what is to be done about it?

THREE THOUSAND YEARS OF HISTORY IN THIRTY YEARS

In each of the chapters in this book I will tell the story of an influential person and iconic platform that helped to shape today's platform economy, from household names like Jeff Bezos of Amazon to unsung heroes like Kristy Milland of Turker Nation. The stories are based on years of research by my research group at the Oxford Internet Institute and on the work of many other researchers and journalists.[15] Together the stories trace the evolving institutional structure of electronic commerce from 1980s decentralized cyberbazaars to present-day US megaplatforms. The protagonists' struggles and triumphs illustrate the social and economic forces that shaped today's platform economy and provide lessons to any who would alter it, whether through political action or program code.

Institutions in the sense used in this book are not buildings or organizations but laws, regulations, traditions, social norms, and other "rules of the game" that structure people's interactions in society.[16] A good example is the rule that you must honor any contracts that you sign. The rule is enforced by the state through its courts—and today by tech companies

through their dispute resolution centers. It allows people to enter into deals with strangers with some certainty that they won't get cheated.

In the first part of this book we focus on *economic institutions*, the rules of the game in the marketplace. Western economic thought used to emphasize the self-organizing nature of markets—how exchanges of goods, services, and labor supposedly emerged from nothing but people's coinciding needs. But economic sociologists and historians showed that markets also needed institutions like contract enforcement to be viable. Traders in every age needed some means to find each other, understand each other, and trust each other before exchange could take place. What kinds of institutions can we see underpinning markets on the Internet? The nature of economic institutions matters, because they not only determine how efficient markets are, but also how risks and rewards are distributed—who reaps the benefits and who bears the burdens.[17]

We start in chapter 2 by examining how exchange worked on the old Internet of screeching modems, before giant platform companies existed. Libertarian cybercowboy John Barlow explicitly rejected the state and other formal institutions as the underpinnings of his new online society. He believed that digital markets could be founded on nothing more than simple reciprocity—the informal rule that you should treat others as you would have them treat you. The rule may have worked in small communities like the one around his ranch in rural Wyoming. But it fell apart as soon as the Internet boom started and electronic communities grew into boom towns.

In chapter 3, we examine another informal institution, reputation—that is, the ancient idea that regard for one's good name should keep people honest. At the end of the last millennium, Pierre Omidyar built eBay on the basis of this informal institution. He used technology to stretch its capabilities to new levels. But even with modern technology, there were fundamental limits to how much order reputation alone could sustain. To save his project, Omidyar changed tack and turned eBay into a central authority that formally regulated its marketplace—with surprising results.

In chapter 4, we focus on the role of identities in underpinning exchange. Ross Ulbricht wanted to create an online drug market that would offer absolute privacy to its users: not even he as the market's administrator would know who the users were. But he found that he could not

maintain order without some sort of stable identities that linked people's past actions to future consequences. Like modern states, digital platforms began to assign persistent identifiers to people that the people could not easily leave behind.

In chapter 5, we examine the notion of borders as they pertain to institutions and markets. Straddled on opposite sides of the Atlantic, Odysseas Tsatalos and Stratis Karamanlakis wanted to use the Internet to create a borderless labor market. They constructed virtual institutions that made it possible for people across national boundaries to work with each other as if they were in the same jurisdiction—a platform that is now called Upwork. But to save this new online economy from an economic crisis, they ultimately had to raise their own virtual borders around it.

In chapter 6—the final chapter of the first part—we observe how platform designers began to shift from constructing free markets toward conducting central planning. Uber cofounder Travis Kalanick was a fierce advocate of free-market solutions. Yet insofar as Uber fixed all fares and regulated the numbers of cars on the streets, it was anything but. Thanks to advances in surveillance and information processing technologies, Silicon Valley technologists successfully overcame many of the technical constraints that stymied Soviet planners. Yet fundamental questions about the humaneness of top-down planning remained.

The first part of the book demonstrates that much like historical commerce, electronic commerce started as occasional exchanges with close acquaintances, grew into regular trade structured by personal reputation, and finally multiplied manyfold on impersonal marketplaces secured by organized authorities who controlled entry, kept records of the participants, employed judges to resolve disputes, and enforced rules coercively if necessary. In this sense, the Internet essentially recapitulated the past three thousand years of economic history in thirty years. Now it appears stuck somewhere in the mid-twentieth century, teetering between markets and central planning. The difference is that this time the authorities in charge are not nation states but digital platform companies.

Why did this happen? Why did Silicon Valley technologists end up recreating in digital form the very institutions that they were trying to obsolete? I will address this question in detail in chapter 12. For now it suffices

to say that technology ultimately doesn't change the fundamental social and economic forces that shape how societies are organized. Platform companies don't appear stately merely by virtue of being powerful but are powerful precisely because in certain important ways they emulate the state.

THE ANCIENT PROBLEM

As our economic interactions moved online, tech companies became the new central authorities that set the rules and protected us against fraud and cybercrime. They provided the institutional underpinnings that Internet commerce needed. But this gave rise to a new problem: how could we hold these digital authorities to account? Though they enabled much trade and prosperity, their leaders were not saints—they were not above using their position to bend the rules and exploit their subjects to advantage themselves and their allies.

The same problem has troubled political philosophers for millennia: *quis custodiet ipsos custodes?* Authorities protect us, but who will protect us from the authorities? In part II of this book, titled *political institutions*, we will examine how people in the platform economy have attempted to address this problem. If economic institutions are the rules of the game in the marketplace, then political institutions are the mechanisms through which those rules can be changed and the rulers held to account.[18] We will observe not just ideas and experiments but actual uprisings against the princes of the platform economy.

In chapter 7, we first recall that Amazon founder Jeff Bezos was once hailed as a hero who created an ideal business environment for countless independent merchants. But as soon as Amazon became the dominant marketplace, Bezos turned on his merchants and began extracting extortionate fees and outright stealing lucrative business lines from them. Despite being compared to an autocratic government, Amazon was legally a private corporation. The usual way in which private corporations are disciplined is through market competition: if people don't like a company's services, then they are free to vote with their feet and switch to a competitor. But network effects and switching costs meant that it was very difficult for Amazon's merchants to leave the platform. Competitive

pressures turned out to be entirely insufficient to curb platform autocrats' abuses.

If not through competition, then how else could platform authorities be held to account? In chapter 8, we examine the idea that the whole question could be sidestepped by replacing untrustworthy human authorities with incorruptible machines—solving the ancient problem once and for all with technology. Bitcoin inventor Satoshi Nakamoto and Ethereum cocreator Vitalik Buterin seemed at the cusp of realizing this crypto-anarchists' dream using so-called blockchain technology. But it became apparent that humans were still needed to write the machines' rules and to update them whenever circumstances required it. Blockchain may have automated administration but it did not automate legislation. Politics were not eliminated but merely displaced to less scrutable arenas.

In chapter 9, we begin to examine users' attempts to insert themselves into platforms' rule-making in the old-fashioned way—through collective action. Kristy Milland and her fellow workers on Amazon's digital piecework platform Mechanical Turk organized a campaign to try to improve their lamentable working conditions. The workers demanded that Jeff Bezos give them a say in how the platform's rules were being made. Risks inherent to standing up to the platform prince meant that the campaign failed to amount to any sort of workers' revolution. But it was nevertheless significant in that platform users were now for the first time claiming a moral right to participate in shaping the "laws" that governed them.

In chapter 10, we discover another attempt to influence platform rules via collective action. App entrepreneur Andrew Gazdecki mobilized his peers against Apple over a policy change that threatened to destroy his and many other small businesses that depended on the App Store. The difference to Milland and her fellow digital laborers was that Gazdecki and his peers were affluent members of a rising digital middle class who possessed considerable resources and connections. They applied their resources to mount a powerful campaign, and in a rare win for users, the fruit giant yielded.[19]

The second part of this book demonstrates that even as our economies have moved online, competition has not been able to ensure that platform companies would treat people and businesses fairly. Why do platforms differ from ordinary companies in this regard? I will address this question in

detail in chapter 12. For now it suffices to say that like states, platforms are institutional frameworks, and the choice between alternative institutional frameworks is not an individual choice that can be resolved on a market, but a collective choice. Political institutions for collective decision making are missing from the platform economy, so users find themselves stuck at the princes' mercies.

Attempts to circumvent the resulting political problem with blockchain technology have missed the mark, because they have focused on decentralizing rule-enforcement, even as the real power lies in rule-making. Meanwhile, people and businesses who depend on platforms for their living have begun to rediscover the tools that toppled past autocrats: resources, alliances, and organizing.

INSPIRATION FROM OUR ANCESTORS

In the final part of this book, we briefly examine the platform economy's social institutions. By *social institutions*, I am here referring to institutions whose purpose is to protect and nurture. Modern nation states and especially European welfare states are expected not only to support markets but also to support people through education, hardship, illness, and old age. If platform companies are assuming state-like oversight over markets, are they assuming such oversight over the people who work those markets as well?

In chapter 11, I follow the story of Sofia, an unemployed translator in California. She tries to reskill herself with online courses while paying her bills with gig work but falls seriously ill. A campaign on charity crowdfunding platform GoFundMe is able to stave off financial ruin for her but only for the moment. Sofia's story illustrates how the platform economy is undermining established social institutions, while the alternatives that platform companies have created still fall far short of the need—to the extent that it is starting to cause problems for the long-term sustainability of the platform empires themselves.

In the final chapter of this book, I draw on all the preceding chapters to explain why digital platforms have become the new virtual "states", how they nevertheless differ from our earthly nations, and how we can regain control over them. The whole idea that digital platforms might somehow be commensurate with states seems fanciful. But it would help to explain

a lot about the present situation, in which smaller nations feel compelled to appoint "tech ambassadors" to carry out "digital diplomacy" with Silicon Valley firms.[20] Moreover, it could open up new directions to us as we grapple with the question of how to deal with these companies' power.

Many social scientists today approach platform giants as a new type of monopolistic capitalist enterprise.[21] They argue that governments should use competition law to break up platforms into pieces, or public utility law to regulate or even nationalize them. Both approaches were developed at the turn of the twentieth century to fight abusive industrial capitalists. There are signs today that they might not be up to the task of dealing with digital giants.[22] Scholars are debating how to update them.[23] But what if these approaches were not up to the task not because they are outdated—but because they are too modern? What if instead of drawing precedent from how our grandparents dealt with capitalists, we ought to be drawing inspiration from how our ancestors dealt with aristocrats? These questions I will explore in the concluding chapter.

Drawing parallels between technology companies and states is admittedly dangerous because it risks legitimizing the companies' power: the more we hear that tech companies are like states, the more we may come to accept their rule as natural. But if that is true, then such parallels should also help legitimize another idea that we naturally associate with states: that they should ultimately be governed by their people.

HOW TO READ THIS BOOK

The relationship between digital technologies and society is surely one of the big issues of our time after the climate crisis. There is a sense that digital technologies have in some ways begun to undermine our present social order. Political scientists worry that digital election manipulation compromises governments' legitimacy.[24] Security experts warn that cyberweapons challenge states' ability to protect their citizens.[25] Lawyers argue that gig economy apps and cryptocurrencies undermine the legal order.[26] In this book I take a slightly different approach to the issue. Instead of asking how technologies are undermining our present social order, I ask how they may be constructing an alternative one.

The chapters in this book are self-contained, and each can be read as an accessible introduction to an influential platform, person, or theory that shaped today's digital economy. The chapters are presented in a roughly chronological order, starting from the precommercial Internet and ending in the pandemic, so the book can also be read as a basic economic history of Western online commerce. Much of the action takes place on the West Coast of the United States, where the Internet was first created and where most Internet giants still live. But I follow the platforms' implications to different parts of the world, giving voice to businesses and workers from Europe, Asia, and Sub-Saharan Africa.

If you are thinking about building a digital marketplace yourself and wish to learn about the theory, practice, and pitfalls of doing so, I suggest you start reading from part I. If you are an activist or organizer and wish to learn about the theory and practice of peoples' struggles against platform companies, make sure to read part II.

If you are drawn to ideas of community and decentralization as alternatives to government authority, I suggest you read chapters 2, 3, and 8. If you are interested in remote work, global development, and labor issues, read chapters 5, 6, and 9. If you are interested in competition policy issues, look into chapters 7, 10, and 12. If you are a busy policy maker, I will forgive you for skipping straight to the final chapter.

By comparing digital platforms with states and other institutions, I am attempting to offer a diagnosis of their power that is broad and fresh and yet avoids the kind of exceptionalism in which everything digital is assumed to be novel. As we shall see, seemingly revolutionary technologies often have surprisingly ancient precedents.

I

ECONOMIC INSTITUTIONS

2

RECIPROCITY: THE GOLDEN RULE IN CYBERSPACE

> Therefore, live with self-restraint and pay your best attention to dharma, and treat others as you treat yourself.
>
> —*Mahābhārata Shānti-Parva* 167:9

When John Perry Barlow witnessed social chaos in 1960s India, he longed for the kind of order that government could provide.[1] Yet having gone to school next to ballistic missile silos during the Cold War, he also feared that governments could end up destroying the world. The state exists to protect people, but it can also be their gravest enemy. Like many idealists and theorists before him, Barlow began to search for social order that could thrive without the state. Unlike most others, he went looking for it in cyberspace. And for a moment, he may have found it there.

DIGITAL COWBOY

> Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts . . . A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding.[2]

Thus wrote science fiction author William Gibson in his genre-defining cyberpunk novel *Neuromancer* in 1984. The real Internet of the 1980s was

not nearly as fancy. To get online from a home computer, you first had to listen to a half-minute handshake sequence that sounded like robots screaming. What finally unfolded on your screen was not graphic at all. The World Wide Web, which many people today think of as the Internet, was yet to be invented. The most popular Internet service was email. Other widely used services were Gopher, a text-based precursor to the web, and Internet Relay Chat (IRC), an instant messaging and chat room system.

John Barlow found his way to the Internet relatively late in life. He grew up in the 1950s on Bar Cross Ranch, a 22,000-acre cattle farm established by his great-uncle near Pinedale, Wyoming. His ancestors were Mormon pioneers who came to settle in the great open prairies around the Rocky Mountains. He had no siblings, and his parents forbade him television, so in the isolated ranch house he devoured books, including a twenty-volume children's encyclopedia.

As soon as he could, Barlow bought a little motorcycle that got him out of the ranch. But bullied at school, he grew into an unruly teenager who engaged in petty vandalism. "What would the world be like if everyone behaved like you have?" asked a dean at his residential high school. He took the lesson to heart, finished with good grades, and went on to earn a college degree from the elite liberal arts school Wesleyan University.

For a while, Barlow pursued a career in writing. But after his father fell ill, he eventually took over the family ranch. He wore a cowboy hat, beard, and denims and rekindled his connection with the local community. Following in his father's footsteps, he joined the local chapter of the Republican Party. Every May, everyone in the valley came to the ranch to help him brand new calves, and he served them beer and lunch.

Yet outside the rural idyl, Barlow saw dark clouds gathering. He was disillusioned with national politics. He helped Dick Cheney to become Wyoming's congressman, only to realize "that he was, in fact, a sociopath." Barlow was opposed to the Vietnam War. He worried about the arms race and "the fact that the U.S government was trying to come up with a way to make nuclear war seem somehow winnable or plausible or even thinkable." He deplored the rise of consumerism and mass culture and the fact that traditional cattle ranching was becoming increasingly unsustainable:

> I began to wonder what was going to happen to the idea of community in the absence of little agricultural towns such as Pinedale, which contained in them a

spiritual nutrient that was like the sourdough starter for society. I looked out at television land and the suburbs and I saw little of the sense of shared adversity, willingness to accept differences without suspicion or rancor, or general capacity for samaritanism that had been lovingly commented on by Tocqueville and other early observers of budding American culture.[3]

Like so many of his generation, Barlow at one point sought the seeds of new society in America's drug-fueled counterculture. In college, he hung out with the alternative rock band Grateful Dead, whose "deadhead" fans formed a community that followed the band on tour. He dropped acid with psychedelic experimentalist Timothy Leary, who preached a social order based on mutual regard achieved through consciousness-expanding substances. He switched his major subject from physics to comparative religion and became fascinated by ideas of a humanity-wide nervous system. After graduation, he turned down an offer to study at Harvard Law School to instead travel in India, whose perceived spirituality attracted many Westerners at the time.

But the India trip did not have the expected effect on him. After witnessing beauty but also poverty and chaos, he came back "more of a Republican than I had been." He also witnessed the ugly side of San Francisco's Summer of Love, in which drugs didn't overcome social problems but exacerbated them. And though the Deadheads were peace-loving and had plenty of communal spirit, they were short on other characteristics that Barlow believed vital for society: "[They] didn't seem to have a central gathering place that was reliable. They also didn't seem to have the ability to talk casually about community affairs among themselves. And they had no economic focus."[4] As a rancher, Barlow hired strange cowboys from the counterculture and wrote lyrics for the Dead, but his search for a new sourdough starter came to nothing.

One day in late 1980s, Barlow told Betsy Cohen, a graduate student at Stanford University, about his search. Cohen said to Barlow that he should try search on the Internet. "What's the Internet?" he replied. She got him a dial-up number and an account with Stanford. She helped him get a 300-baud modem that attached to his telephone at the ranch with a rubber suction cup. And then she let him loose. "Immediately, it became clear to me that this was the nervous system . . . that I had been thinking about ever since . . . college," wrote Barlow.[5]

A DECLARATION OF INDEPENDENCE

It was exhilarating for the first time to fire off a message into the void beyond the screen and, after a brief pause, to start receiving replies from strangers. Though everything appeared as monochrome characters against black glass, the real Internet could feel just as immersive as Gibson's fiction. Barlow soon began to refer to it as "Cyberspace."

One popular Internet service that particularly captured Barlow's attention was the Usenet: a massive discussion board network with thousands of groups dedicated to discussing everything from libertarian politics to quilting. It is sometimes called the first social media service, but unlike today's popular services, Usenet and most other Internet services of the time were not owned by any single company. They ran on distributed networks of computers communicating through shared protocols. A company could choose to join the network to participate in producing the service, but it could not own, much less control, it:

> Cyberspace, in its present condition, has a lot in common with the 19th Century West. It is vast, unmapped, culturally and legally ambiguous . . . most of the actual natives are solitary and independent, sometimes to the point of sociopathy. It is, of course, a perfect breeding ground for both outlaws and new ideas about liberty.[6]

Having talent as a writer, Barlow began to write essays and articles about his experiences in cyberspace. His writings attracted a growing readership in both online and print publications. He turned himself into a sort of Alexis de Tocqueville of cyberspace—an observer traveling through the territory, describing its people and customs. He wrote about the politics, the economics, and the laws of cyberspace. In his texts, there was a distinct sense that something historical was about to unfold there:

> In the absence of laws or any credible authority to impose them, human interaction there [is being] ordered according to a more instinctive and pervasive sense of personal responsibility than most governments would impute to their citizenry.[7]

Yet in 1990, something happened in what Barlow had started to call "meatspace." An FBI agent knocked on his door to quiz him about a theft of source code from the Apple computer company. The Secret Service meanwhile executed a series of raids on suspected computer criminals. Uncle Sam was making inroads into the new world. But the law enforcement agents

were clueless about technology. One of the raid targets was Steve Jackson Games, makers of board games and tabletop role-playing games. The *Cyberpunk* role-playing rule book Jackson was writing had been mistaken for a computer crime manual. "I realized right away that before I could demonstrate my innocence, I would first have to explain to [the agent] what guilt might be," Barlow wrote afterward on an electronic bulletin board.[8]

To defend his cybersociety from the ham-fisted actions of an ignorant but powerful government, in July 1990 Barlow cofounded an organization called the Electronic Frontier Foundation (EFF). His cofounders were wealthy computer industry pioneers whom he had met online. Together they argued that "inevitable conflicts have begun to occur on the border between Cyberspace and the physical world."[9] The purpose of the new organization was to defend netizens' liberties—such as freedom of expression and privacy—against government intrusion.

As a director of the EFF, Barlow continued to write about the cyberspace, now explicitly expressing political convictions. In particular, he wrote about how territorial states such as the United States should view the emerging cybersociety. As the Internet grew, so did his readership and influence. In February 1996, Barlow's virtual statesmanship reached new heights as he published a text titled "A Declaration of the Independence of Cyberspace":

> Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather.
>
> We have no elected government, nor are we likely to have one, so I address you with no greater authority than that with which liberty itself always speaks. I declare the global social space we are building to be naturally independent of the tyrannies you seek to impose on us. You have no moral right to rule us nor do you possess any methods of enforcement we have true reason to fear. . . .
>
> You have not engaged in our great and gathering conversation, nor did you create the wealth of our marketplaces. You do not know our culture, our ethics, or the unwritten codes that already provide our society more order than could be obtained by any of your impositions. . . .
>
> We will create a civilization of the Mind in Cyberspace. May it be more humane and fair than the world your governments have made before.[10]

Unlike its inspiration, *the* United States Declaration of Independence, the text was modestly titled "*A* Declaration" because Barlow felt that nobody could make official declarations on behalf of the cyberspace. Nevertheless,

many people shared his sentiments. The Cold War had ended a few years earlier, the world had narrowly escaped nuclear holocaust, and there was a sense that humanity should learn and improve. Marshall McLuhan had previously predicted that electronic communications would contract the world into a "global village,"[11] and the Internet genuinely seemed at the brink of delivering that.

Barlow imagined that this "home of Mind" would soon develop its own globe-spanning digital economy:

> We also believe that [early broadband Internet], whatever its limitations, is rapid enough to jump start the greatest free market the world has ever known.[12]

> [People] are already performing data entry in such places as the Philippines and Sri Lanka. They are part of the explosion of computer programmers working in Bangalore, India, now able to sell their code in a global market at a price they consider princely but which would scarcely support a programmer in Palo Alto. . . . There is a huge voltage potential between all that unused intelligence and the human processing needs of a global information economy. All that is required is the wiring necessary to bridge the gap.[13]

Before the end of the year, the "Declaration" had been republished on the World Wide Web an estimated forty thousand times—a massive number considering that only about 200,000 websites existed at the time.[14] Commentators began to refer to Internet users as *netizens*, citizens of the Internet. Even some serious legal scholars started to argue that the Internet should be seen as having its own sovereignty.[15] It seemed as if Barlow had truly found his sourdough starter and got it going.

In hindsight, we know that subsequent events didn't play out as Barlow had hoped. The Internet did not become sovereign. Territorial nation states—those "weary giants of flesh and steel"—had had a hand in managing the Internet from the very start, when the 'net was first conceived as a United States Department of Defense research project. And insofar as the Internet's explosive growth had initially outpaced nation states' capacities to enforce laws on it, they soon started to catch up. New regulations were imposed on Internet service providers and users, and enforcement officials received new resources, powers, and training. The social order of the meatspace pushed itself into cyberspace, and no globe-spanning cybernation was ever born.

Why, despite all the enthusiasm, did the "home of Mind" so quickly fall under the weary giants' rule? There were plenty of immediate reasons that have been discussed thoroughly by other authors.[16] For instance, in technical and material terms, cyberspace was still very much anchored in specific places. Users, servers, and the organizations that maintained them were all located in specific national jurisdictions. And there was no legal basis for courts and law enforcement officials to ignore some activities simply because they happened to take place over the Internet.

But a more fundamental reason was that despite Barlow's proclamations to the contrary, cyberspace failed to develop its own robust social order. The ensuing disorder pulled national courts and officials into the Internet, and there was at the time no force powerful enough to push them out of it. As a result, the digital economy, such that it existed, emerged not as a great global cybermarket but as a patchwork of border-bound national online shopping malls.

THE PROBLEM OF EXCHANGE

The challenge in creating social order in cyberspace is illustrated by the following quote from an early Internet marketplace:

> You've found a buyer for your cherry pitter in California, but you are in New York. How can you send him the item and make sure you get paid? Conversely, how can he be certain that he'll receive the item in good working order?[17]

When you are buying or selling an item face-to-face, the goods and the payment change hands at the same time. But if you are buying or selling something across distance, it takes time for the goods and the payment to reach their destinations. This creates a dilemma: should you or should you not trust the other party and send your goods or payment as agreed? In social science theory, this is known—among other names—as the *problem of exchange*.[18]

If both parties to the transaction cooperate as agreed, then the deal goes smoothly. But if you go through with your end of the deal while it turns out that the other party didn't, then you end up with nothing, while the other party ends up with both the goods and the money. Worried about the possibility of getting scammed like this, people hesitate to proceed,

and the deal never happens. The problem of exchange thus poses an existential problem for markets over distance: trading never gets off the ground, as nobody is willing to take the risk.

In a national economy, the state ultimately solves the problem of exchange by using its authority to impose order. If the other party to a deal reneges on their contractual obligations, I can take them to court. If it's an outright scam, they might even get arrested. Knowing that the state had their back, people in mid-1990s didn't hesitate to buy goods through television shopping channels and mail order. With the state's backing, a thriving market emerged over distance.

But in Barlow's "home of Mind," there was no state, court, or police. Bad actors couldn't be compelled to pay up or put into jail. "Our identities have no bodies, so, unlike [territorial states], we cannot obtain order by physical coercion," noted the "Declaration." The greatest injury that a netizen was capable of inflicting on another was an angry email, known as a *flame*. Fear of getting flamed was hardly enough to deter a scammer.

How, then, was the emerging cybereconomy supposed to overcome the problem of exchange? Barlow's proposed answer was that we should give up on the institutions of law and return to something more fundamental:

> Throughout the industrial period, we have increasingly offloaded the work of assuring social order and decency to the systems we erected to impose it on ourselves. . . . Our ethics withered while our lawyers and bureaucrats prospered.
>
> Even as it rips away at ordering institutions, the net points toward a future in which order emerges from within the social system itself, based on the fact that in a lawless and universal environment, it is actually practical to do unto others as you would have done unto you.[19]

The Golden Rule: wouldn't it be nice if everyone always followed it? You could send your goods and payments safe in the knowledge that other people will always treat you well. There is no scamming and thus no dilemma. We no longer need to pay lawyers or maintain complex institutions like courts. Exchanges are fast and inexpensive.

You don't have to be a cynic to think that this sounds unrealistic. The Golden Rule might have helped instill order in a restless teenager in Wyoming, and it is surely a wonderful moral standard for everyone to aspire to, but in practice too many people will fall short. Or will they? Has Barlow realized something we haven't? What does he mean by it being "actually practical" on the net?

You can hide in cyberspace, but you can't run. If you spit in the soup, you will have to eat some yourself. On the net, what goes around really will come around, sooner or later.[20]

Barlow is talking about what social scientists call *reciprocity*: someone doing unto you as you have previously done unto them—paying back in kind, being cooperative toward people who have been cooperative toward you and nasty toward people who have been nasty toward you. It's a natural human impulse. And social scientists have shown that under certain conditions, it can result in the spontaneous evolution of cooperative social order.

EVOLUTION OF COOPERATION

Political scientist Robert Axelrod ran a famous tournament where artificial intelligence (AI) bots played a game called the prisoner's dilemma against each other to see which one would win.[21] The prisoner's dilemma is simply an abstract version of the problem of exchange that traders face in real life. It's the same game with different graphics, so to say. The rules are the same: if both players cooperate, then both end up well (three points each); if one player cooperates while the other defects (game theory terminology for failing to cooperate), then the naive cooperator loses badly (zero points), and the defector wins big (five points). If both players defect, then they neither gain nor lose (one point each). Each bot in a pair played a series of around two hundred such bouts against the other bot, and the winner was the one to garner most points overall.

Computer scientists, mathematicians, economists, social scientists, and biologists from six countries submitted a total of sixty-two bots to Axelrod's tournament. Some bots were programmed to use complex strategies to try to outwit their opponents. But the tournament was won by the simplest of all the bots submitted, called Tit for Tat (TT). It simply did to the other bot whatever the other bot had done to it in the previous turn. If the other cooperated, it cooperated. If defected, it defected. It was fully reciprocal. And it was *nice*: it always cooperated on the first turn and so was never the first to defect.

It may seem surprising that such a kind and modest strategy would prevail over dozens of AIs programmed to be as ruthless and opportunistic as possible. But consider that whenever an opponent tried to steal

extra points by defecting, TT immediately paid back in kind. There was really no point in challenging it. The only way to end up on top against TT was to defect on the very first turn, while TT was being nice, and then keep permanently defecting. But such a strategy yielded few points for the overall tournament, since mutual defections didn't score much.

Analyzing the match records, Axelrod concluded that TT succeeded in picking up the most points because "it was nice, provocable into a retaliation by a defection of the other, and yet forgiving after it took its one retaliation."[22] He then ran a simulation where bots were allowed to change strategies to improve their standing. He found that under certain conditions, the entire population eventually became nice and reciprocal. A cooperative social order emerged spontaneously. The problem of exchange was eliminated.

Something similar can happen in real life. Consider a rural community like Pinedale, Wyoming. Every May, your neighbors help you brand calves, and you serve them beer and lunch. Every winter, you get hay from the farmers across the valley, and they let you pay after the cattle auctions. And every now and then, you drink a little at Wrangler Café, running up a tab. Suppose you stopped serving beer and lunch to your neighbors, failed to pay the farmer, or punched the barman in a drunken row: how would they treat you next time? What goes around comes around. If you want to keep living and doing business in the community, you'd better pay your debts and treat others well, or otherwise they'll stop cooperating with you. Even when you meet someone for the very first time, you'll do well to treat them nicely because it could be the first interaction of a long relationship. In such a community, nice and reciprocal behavior is not just morally good but also selfishly rational. It's practical to do unto others as you would have done unto you, just as Barlow observed.

Barlow is also correct in pointing out that to some extent societies have moved away from niceness and reciprocity as the basis of social order and toward order underpinned by formal institutions, such as laws, courts, and bureaucracy.[23] Instead of emerging ground up from interactions between individuals, such order is in a certain sense imposed from above by authority. Sociologists use the term *modernity* to refer to this type of social order. Modernity, according to this usage, is not a time period but a way of organizing society. Spontaneous cooperation still exists under modernity, but it is

subdued. Generally speaking, people who live in modern cities trust their neighbors less than people who still live in traditional rural communities. People in cities are also less likely to help a stranger in need. And in cities there tends to be more crime.

There was no central authority in the "home of Mind," but there was plenty of community. There were lively Usenet discussion groups around pursuits from Linux to libertarianism and horses to historical reenactment. There were numerous IRC channels, where netizens held more intimate gatherings. And there were early marketplaces. Barlow posited that in such a domain, spontaneous cooperation would arise as naturally as in Pinedale. Exchange in the cybereconomy would be as simple and reliable as trading favors with your neighbors.

> I think when enough of humanity spends enough of its time in a social environment where conscience is practical, and law nigh impossible, ethics may at last regain their mountainous obviousness in the social geology. I'm betting on that. I hope it works, because I don't have another answer at the moment.[24]

TROUBLE AT THE ELECTRONIC MARKET

Surveying the "home of Mind" of the mid-1990s from a distance, browsing through its groups and communities, it appears as if social order is indeed emerging along the lines that Barlow proposes. There is a strong sense that participants ought to moderate their own behavior. Netizens use the term *netiquette* to refer to standards of behavior considered acceptable. There is no single authoritative definition of what it entails, but perhaps the most frequently cited expression is technology writer Virginia Shea's 1994 book *Netiquette*.[25] According to Shea, the first rule of netiquette is simply the Golden Rule. On the Internet, doing to others as you would have them do to you is not only a moral imperative but a prerequisite for success, she says.

A wealth of marketplaces has emerged in this "home". Probably the biggest is called simply the Usenet Marketplace. It started as a single Usenet group named "misc.forsale," where netizens posted information about goods for sale, new and used. As trade volumes increased, subgroups were added for different types of goods and services. By 1995, the Marketplace consisted of the main group and over fifty official and unofficial subgroups. Newcomers were greeted thus:

Allow us to be the first to welcome you to the Usenet Marketplace, where anything and everything changes hands at better-than-average prices. Many, many satisfied computer-users have purchased everything from computer accessories to sailboards, houses to rollerblades. We invite you to browse and see what the Usenet Marketplace has to offer.[26]

These were the opening words of "The Usenet Marketplace FAQ" (frequently asked questions), a sort of informal charter for the marketplace. It was a long document that gave lots of practical advice to would-be traders and set out the norms of acceptable behavior. It explained how participants should treat their audience to win their cooperation and avoid their ire: "Many readers frown on . . . As a result, we urge you to . . .":

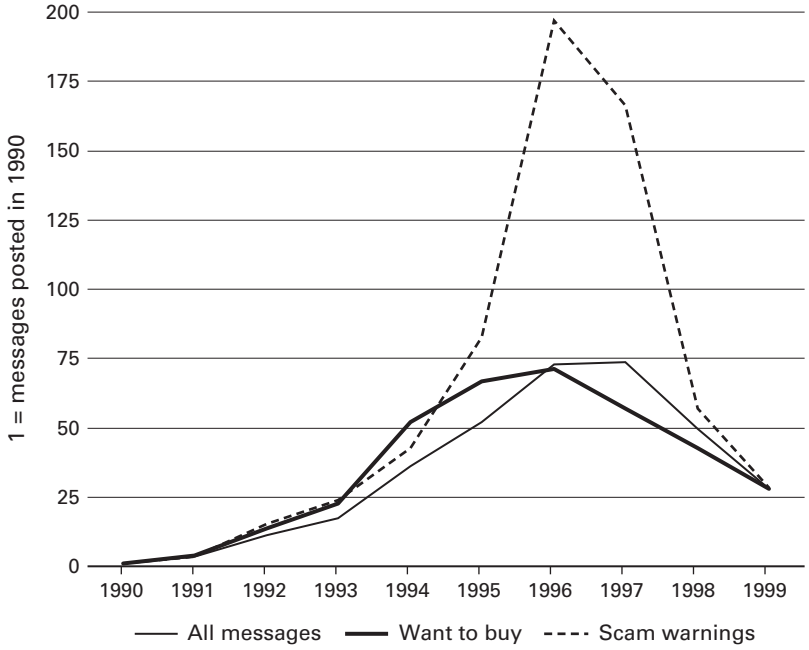
If you post an inappropriate article to an inappropriate group, not only will you suffer by not reaching the right audience, but you will also make thousands of potential customers angry.[27]

In 1995, over 250,000 messages were posted to the groups that made up the Marketplace.[28] Most were offers of goods and services for sale, about 14 percent were want-to-buy ads, and a few percent were other messages (such as warnings about scammers). The busiest subgroup was "misc.forsale .computers.memory," which attracted approximately 1,400 messages each month and an estimated thirty thousand people reading the messages.[29] Certainly, this was nowhere near "the greatest free market the world has ever known." Still, it was an auspicious start for a radically different market order upheld not by laws and bureaucrats but by spontaneous cooperation emerging from the Internet's nice and reciprocal culture. More than one commentator around this time referred to the Internet as an "anarchy that works."

Yet on closer inspection, it seemed as if the problem of exchange was still haunting participants. There were many posts across the Marketplace recounting episodes where people felt they got cheated:

I am one of the victims of the Intellicomp scam. I sent a cashier check of $2,884.00 to the company and got nothing but frustration and headache![30]

In many cases, purchased goods never arrived or weren't as described. Sometimes payments failed to come through, and checks bounced. Disagreement also arose over responsibility in unexpected situations, such as items damaged in transit. If anything, it seemed as if spontaneous cooperation was fraying instead of evolving:



2.1 Messages posted annually to the Usenet Marketplace, by message type, relative to the numbers posted in 1990. Want-to-buy messages were defined as those that mention "wanted" or "WTB" in the subject line. Messages about scams and ripoffs were defined as those that mention "scam," "ripoff," or "warning" anywhere in the message.

Someone or some authoritative body should do something about all the scams that are going on in "misc.forsale.computers.memory." There is really a huge problem there.

Indeed, messages about scams and ripoffs more than tripled from 1994 to 1996, increasing faster than other messages (figure 2.1).[31] A growing proportion of participants were coming away from transactions dissatisfied or worse.

To avoid further trouble, some participants decided to stop trading over distance, using the Marketplace to find local face-to-face deals only. Others dropped out of electronic dealing altogether:

It is very hard sometimes to trust someone on the other side of the state, country, or world. I myself will never deal with anyone on the internet again as far as buying, selling, or trading goods.

Even "The Usenet Marketplace FAQ" acknowledged that things didn't always go to plan:

Every day, perhaps a hundred or more successful transactions take place on the Usenet Marketplace. Most of the time, everything goes smoothly. Occasionally, however, problems arise. It is your job, whether buyer or seller, to catch any potential problems as early as possible.[32]

A hundred plus transactions are not very much for a marketplace that attracts tens of thousands of viewers around the world and could, in principle, be accessed by millions. Internet usage around the time was exploding: the number of Internet users globally tripled from 1994 to 1996. The number of messages posted to the Marketplace exploded along with it, approximately doubling over the same period (figure 2.1). Yet the number of want-to-buy messages grew only modestly during this period and, in fact, fell into decline from the next year onward. Total messages still grew for another year, boosted by a proliferation of spammy ads and suspicious schemes. But by this point, real traders were already leaving the increasingly disorderly marketplace.

Even when buyers and sellers did manage to cooperate and successful transactions took place, it is not clear that the successes could be attributed to the Internet's spontaneous cooperative social order. In fact, to reduce the chances of getting ripped off, "The Usenet Marketplace FAQ" recommended that buyers and sellers seek protection from the authority of the state and other modern institutions:

In court, a cancelled check for the first payment may be enough to convince a judge that the buyer paid in full. . . . In the case of expensive items, you may also wish to draw up a notarized bill of sale . . . essentially a legal contract.[33]

The "Marketplace FAQ" referred to "your lawyer" and recommended that buyers always pay by credit card when available, so that the credit card company could be asked to intervene if there was a problem. One buyer described being saved by Western Union, which had blacklisted a seller for previous frauds and stopped their payment from going through. The "FAQ" noted that international transactions were particularly problematic, as institutional protections available in one country were often not available for transactions that crossed international borders.

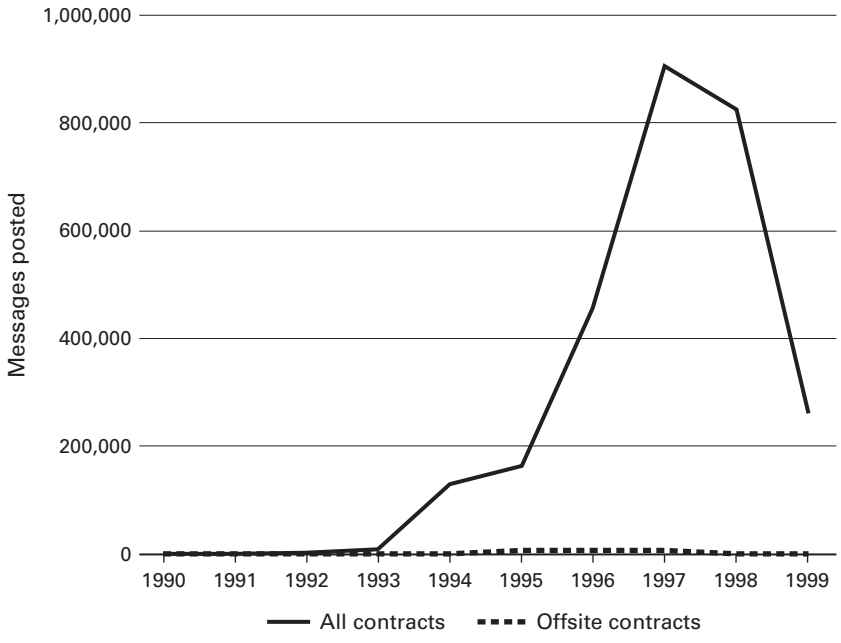
A GLOBAL MARKET FOR LABOR?

Still, the economy of the "home of Mind" did not have to be limited to goods. Another set of groups on the Usenet acted as a virtual labor market.

Companies seeking independent contractors for project work could post openings on "misc.jobs.contract." In 1995, almost 200,000 openings were posted in the group. Banks and airlines with legacy systems sought experienced contractors to hunt down dreaded Y2K bugs (the inability of old software to deal with dates from the next millennium). Startup companies and established technology vendors fought over tech talent as the Internet boom heated up.

Contracts that could be performed remotely over the Internet were labeled as "offsite" according to the group's charter. Programming, writing, graphic design, database administration—most knowledge work could, in principle, be delivered remotely over the Internet. The wiring was in place. Sparks would now surely fly as the voltage potential between the world's unused brain power and the needs of the information economy met in cyberspace?

Alas only a tiny handful of offsite openings were posted in misc.jobs .contract. From 1995 to 1996, the volume of onsite openings tripled, yet offsite contracts never got off the ground (figure 2.2). The employers' version of the problem of exchange is how to ensure workers are spending



2.2 Messages posted annually to the "misc.jobs.contract" Usenet group, 1990 to 1999.

their billable hours on what they are supposed to be spending them on. Employers of the era solved the problem by putting people into cubicles and watching them over their shoulders. Employers used the Internet to find workers, much as they used ads in trade magazines, but the actual work took place firmly in meatspace.

Indeed, the data entry operators and programmers that Barlow had highlighted in South and Southeast Asia were not free agents picking up contracts in cyberspace. They were wage earners sitting at desks arranged into rows, situated in massive office buildings to which American and European firms offshored operations. They weren't able to "sell their code in a global market"; they were only able to sell their labor to a local branch of a multinational corporation. The undersea cables that brought in their orders were originally laid for the British and American empires and often continued to be used in ways that took most of the value elsewhere. Just as spontaneous cooperation did not evolve to support an independent cyber-bazaar for physical goods, it failed to bring about a global labor market.

To make matters worse, hardened criminals soon found their way into cyberspace. From 1994 to 1999, the US Federal Trade Commission observed a "broad range of illegal activity online, from traditional scams like pyramids, medical quackery, and bogus investments to high tech frauds like 'modem-jacking,' 'page-jacking' and 'mouse-trapping.'"[34] It noted that the Internet had become "a fertile ground for fraud: it allows fraud promoters to mimic legitimate business more convincingly—and reach potential victims more efficiently and at far less cost—than any other medium."[35] Barlow's hope that netizens' unwritten codes would "provide our society more order than could be obtained by [state] impositions"[36] was in tatters.

ETERNAL SEPTEMBER

What went wrong? Why did cooperation not flourish in cyberspace as it did in Pinedale? Remember that Axelrod found that nice and reciprocal behavior wins over opportunistic strategies only under certain conditions. A crucial condition is that interactions are repeated: players keep running into each other again and again, indefinitely. If the interactions are purely one-off, then cheats and scammers win over nice reciprocators, and spontaneous cooperation never emerges. As more and more bots are introduced

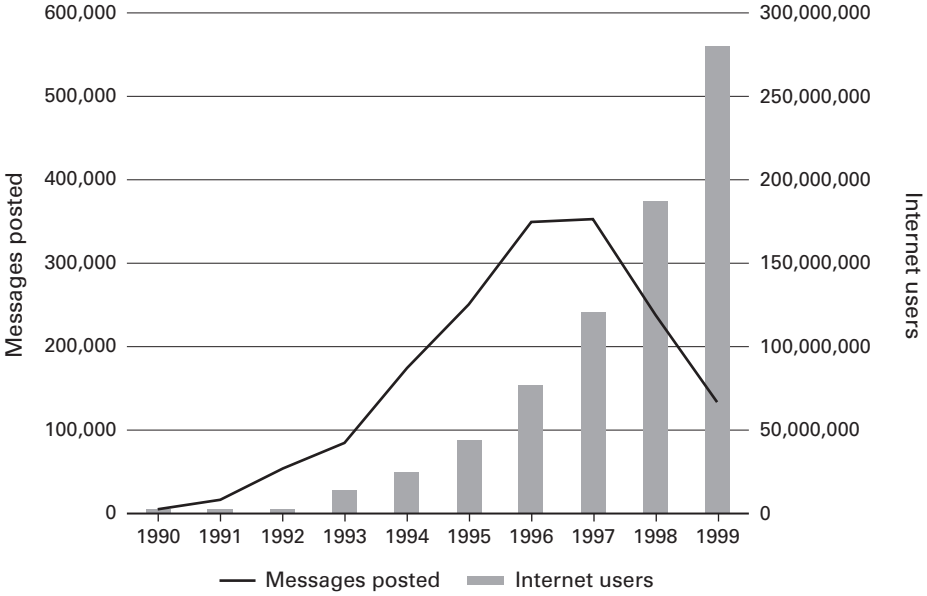
into a simulation, the chances of any two bumping into each other more than once during their lifetimes diminishes. Defection becomes an increasingly profitable strategy, and the chances of a cooperative social order emerging fade.

Back in late 1980s, when Betsy Cohen first persuaded Barlow to go online, the number of people with Internet access was tiny compared to what was to come. Around 150,000 people each month were accessing Usenet groups,[37] and the number of active participants was a fraction of this. Most groups were inhabited by regulars who in many cases had known each other for years. They were a bit like rural communities in Wyoming in that sense.

The biggest Internet service providers at the time were universities. Every September, a wave of newcomers arrived on Usenet, as first-year university students were given their computing accounts. This tended to cause some disorder, as the newcomers were unfamiliar with netiquette. Standards of behavior fell. But by late October, the newbies had usually learned how to get along in the community or else dropped out. Order was restored until the next September.

This cycle continued for years until September 1993. This time, the regulars noticed that something was different. There were more newcomers arriving than usual, and they kept coming. Weeks passed, and newcomers kept arriving. Months passed, and still they kept coming. What had happened was that America Online (AOL), a large commercial online service provider, had opened up Usenet to its rapidly growing customer base, numbering one million at the time. The Internet boom had started (figure 2.3).[38] This caused a never-ending influx of strangers into Usenet's groups. What once could be likened to rural communities grew into boomtowns, and then into one giant suburb where most people no longer knew each other. In old Internet folklore, the new epoch came to be known as the September that never ended, or the Eternal September.

Even if most netizens on the old Internet had been more or less cooperative, after the gates were opened, such innocence attracted opportunists whose abuses eventually changed how people regarded each other, especially strangers. The Marketplace declined not despite skyrocketing user numbers but because of them. Even people who previously might have given strangers the benefit of doubt grew more distrustful. Deals became



2.3 Messages posted annually to the Usenet Marketplace and number of Internet users, 1990 to 1999.

harder to carry through. Markets based on spontaneous cooperation never properly took off. Ultimately, the failure of the early Internet economy is evident not so much in the presence of fraud reports—though they are plentiful, too—but in the absence of all the exchanges that could have been.

> The usefulness of these groups depends to a large extent on the people who inhabit them, though, and a few unscrupulous users can easily sink the whole thing. Whether you are a buyer, seller, or seeker of equipment, remember that your honesty and integrity reflects on the general reputation and usefulness of this forum.[39]

In the era of the Eternal September, the Internet quickly became notorious for its fraud and deception. Only 8 percent of Americans felt comfortable paying for anything online with a credit card in 1995.[40] Government law enforcement agencies around the world were called in to protect netizens. They started initiatives such as "surf days," during which officers patrolled the Internet and intervened in any criminality they witnessed.[41] The National Security Agency, which Barlow called the "American

Occupation Army of Cyberspace," established surveillance over online activities.[42] Large companies, with brand names that consumers could trust, started using the Internet as a sort of electronic mail-order catalog. Order was brought to cyberspace, but at the expense of killing any hopes that it could transcend territorial nation states and their conflicts. Fully settled, cyberspace was no longer a frontier home but a digital extension of television land.

BODILY NEEDS

Barlow was no doubt correct in that many encounters in modern societies are characterized less by a spirit of mutual cooperation and more by mutual distrust overcome only by a vague sense of being protected from the worst outcomes by law and authority. But it's not the case that law and authority themselves killed spontaneous cooperation, at least not directly. People in countries with expansive states, such as the Nordics, tend to be not less but more cooperative and trusting of strangers.[43] It's simply that such a vast and ever-changing nexus of people as a modern metropolis can't offer a firm foundation for order built from the ground up. Wonderful bits of cooperation emerge in neighborhoods and networks. But tremors from the feet constantly coming and going shake them loose before they can join up. Law and authority didn't kill spontaneous cooperation—but they made it possible for us to build cities and markets at a scale that exceeds our capacity for it.

Barlow wanted to establish a "home of Mind" in cyberspace that would be independent of the impositions of territorial states. But while the mind was dreaming big dreams, its body was withering. Netizens exchanged millions of messages, but very few exchanged goods or services. University employees with secure jobs could afford to expound libertarian doctrines on the 'net, and some of the most vocal cyberspace activists were financially independent technology entrepreneurs. But most people had to take care of their material needs somehow. As long as that was not possible on the Internet, it was meaningless to speak of it as a domain on a par with territorial states. A nation that's all politics and no economy is just a mutual hallucination.

3

FROM REPUTATION TO REGULATION: THE BIRTH OF A GIANT

> And the King shall answer and say unto them, Verily I say unto you, Inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me.
>
> —Matthew 25:40

Pierre Morad Omidyar was born in Paris in 1967. His parents had migrated from Iran to France to pursue higher education. When he was six years old, the family moved to the United States so that his father, a urologist, could take up a residency at Johns Hopkins University in Baltimore.[1]

Soon after the move, Omidyar's parents separated. He stayed with his mother, a linguist with a PhD from the University of Paris (Sorbonne). As an early career academic, she traveled and moved around a lot, and Omidyar traveled and moved with her. He didn't end up spending more than a few years in one place until college. It was difficult to keep friends for long. He spent a lot of time playing with calculators and other electronic gadgets.

In seventh grade in Washington, DC, Omidyar began skipping gym classes to sneak into a closet where the science teacher kept the school's TRS-80 Micro Computer System. Omidyar taught himself the BASIC programming language on the "Trash 80" and became so proficient that he was hired by the school to write a program to manage class schedules. "I resisted the temptation to put in some code in there to make sure I never had classes on Friday."[2]

By the time Omidyar was in his midteens, the family moved out of Hawaii, and the lack of long-term friendships was starting to get to him. He was longing to belong somewhere.

> I'd finally in eighth and ninth grade started to make some really close friends in school, and leaving after ninth grade was . . . was kind of tough. It was tough for me personally.[3]

College promised to be yet another period of temporary friendships. By his own account, he was not a very industrious student, but he nevertheless managed to get into Tufts University, a highly ranked research university near Boston, Massachusetts. He went in to study electrical engineering but, put off by the difficulty of the course, switched to computer science instead. There he gained access to the Internet—and what a wonderful discovery it was. In the Usenet discussion groups of mid-1980s, he found communities that he could join and stay in no matter where in the world he traveled. He spent countless hours in deep, irreverent discussions on subjects like Apple computers, financial markets, privacy, and Star Trek. Later he also joined the Usenet group of the Electronic Frontier Foundation, the digital liberties organization cofounded by John Barlow.

After finishing his undergraduate studies in 1988, Omidyar took up a job in Silicon Valley, California, at a company that made software for Apple computers. Now self-identifying as a libertarian and wearing a beard, a ponytail, and a pair of Birkenstock sandals, he fit in well in the valley. But the company fizzled, and many employees, including Omidyar, were laid off. Together with a former colleague and other acquaintances, Omidyar founded a startup that began to develop software for devices operated with a pen stylus.

Alas the market and the technology weren't quite ready for pen computing in early 1990s. After a couple of years, the company changed its name to eShop and pivoted to something different: tools for companies to set up shopfronts on the recently invented World Wide Web. The new direction may not have been to Omidyar's liking, as he left the company soon after. He retained some stock, though, and a few years later the stocks were acquired by Microsoft, earning him his first million. But by that time, he had already stumbled into another venture—one that would go on to earn him billions.

In early 1990s, Omidyar was fascinated by markets and capitalism. In principle, free and open markets afforded anyone, including immigrant outsiders like himself, the same chances at success. He invested in securities and charted and analyzed their prices on his Mac. He also collected historical price data and made it available to others via ftp, the ancient equivalent of Dropbox. In theory, price movements in financial markets should have been equally unpredictable to everyone. But in practice, Omidyar saw that markets were imperfect. Not everyone got the same information at the same time. All around him in Silicon Valley he saw well-connected insiders profiting from information and access denied to others.

Omidyar thought that the Internet, a globe-spanning fiber-optic information network operating close to the speed of light, should be able to fix this. It should be able to give rise to a free market that bypasses old gatekeepers and creates "a level playing field, where everyone [has] access to the same information and [can] compete on the same terms as anyone else."[4]

ECHOBAY.COM

The digital economy that was actually emerging on the Internet did not impress Omidyar. It consisted mainly of electronic shopfronts of big corporations and startup companies funded by the same. They treated people as "wallets and eyeballs" and limited self-expression to typing in credit card numbers. Through the eyes of the industrial world, the Internet was best put to use as a giant mail-order catalog with rotating logos and blinking advertisement banners.

> If you come from a democratic, libertarian point of view, having a corporation just cram more and more products down your throat doesn't seem like a lot of fun.[5]

Omidyar wasn't naive: he knew that peer-to-peer markets already existed on the Internet and that they didn't always work very well. He once offered his old cell phone for sale on the Usenet Marketplace. It was a Japanese NEC P201 with forty memory slots and a flip-up antenna—a fairly recent model. It was in excellent condition, and he asked $225 or best offer for it. But apparently no buyers came forward because two weeks later he posted a much terser ad about the same phone to a group for local trades only. By mid-1990s, he was rarely posting on Usenet anymore, perhaps

because the communal feel that he had once cherished had been diluted away by the Eternal September—the massive influx of new users to the Internet through commercial access providers.[6]

After quitting eShop, Omidyar went to work for another Silicon Valley company. He did occasional freelancing projects on the side, under the trade name Echo Bay Technology Group. The name wasn't a reference to any real-world Echo Bay; he just thought it sounded cool. When he went to register an Internet domain name for it, he found that echobay.com was already taken, so he shortened it to ebay.com.[7]

Omidyar also had many hobby projects at the time, including a chess-by-email program and an Ebola virus information page. His latest project was an online marketplace that could be accessed by anyone with a web browser, the hot new Internet technology. A difference to previous marketplaces was that trading would be based on auctions. Broadly in line with economic theory, he thought that the auction mechanism would yield the perfect price, as each item would sell at the point where supply met demand.

> It was an experiment. . . . I wanted to create an efficient market where individuals could benefit from participating in an efficient market. Kind of level the playing field. And I thought gee, the Internet, the web, it's perfect for this this. It was more of an intellectual pursuit than anything else.[8]

At first, the marketplace had just three functions: list an item for sale, view items, or bid on an item. Items would be listed in categories that Omidyar had thought up: *Antiques and collectibles*, *Art*, *Automotive*, *Books and comics*, *Consumer electronics*, and so on. Everything was presented as blue-black text against a grey background. He called it the AuctionWeb, and he put it on his website alongside the Ebola page and his other projects. He announced the project on the Usenet Marketplace and elsewhere on September 4, 1995. Nobody visited the site. It was Labor Day, a public holiday, and most people were not on the Internet.[9]

But after some days, items started appearing for sale—an autographed Michael Jackson poster starting at $400, a Yamaha 1980 Midnight Special motorcycle starting at $1,350, a Nintendo PowerGlove starting at $20, *The Maxx* comic issue 6 starting at $0.75.[10] Omidyar himself listed a broken laser pointer. People bid on the items. Deals were struck. Omidyar's broken laser pointer attracted several bids and was eventually sold for $14.83 to a Canadian who wanted it for spare parts.[11]

Six months later, the site had grown to a few hundred users. Omidyar's Internet service provider began to complain that it was attracting too much traffic. Omidyar had been running the site on a $30-a-month personal Internet account, on the basis that AuctionWeb was a hobby and not a commercial venture. Buyers and sellers were free to arrange payments between themselves as they saw fit, typically by sending cash or checks via mail. Omidyar didn't charge them anything. But the traffic was now at a point where Omidyar's Internet service provider insisted upgrading him to a $250-a-month commercial account. To offset the cost, he reluctantly decided to start asking for fees from his users.[12]

Omidyar figured that a decent fee would be 5 percent of the final sales price for items below $25, and 2.5 percent for items above $25. He asked sellers to send in their fees via mail. He wasn't sure if anyone was going to continue using the site after this. But they did. He soon started receiving envelopes stuffed with crumpled bills and nickels. At the end of the month, he was pleased to find that the fees amounted to somewhat more than his Internet bill.[13]

However, a more fundamental problem was emerging around the same time. Just as in the Usenet Marketplace, not all deals went smoothly. Goods or payments didn't arrive or weren't as expected. Sometimes it was because of an honest mistake, but sometimes it was because of dishonesty or downright fraud. There were too many users for everyone to know each other personally. Most trades were one-off transactions. A spontaneous social order wasn't emerging or wasn't strong enough to keep everyone honest. Omidyar's fledgling market was in danger of succumbing to the same disorder that had robbed the early Internet of a viable peer-to-peer economy.

FIVE OUT OF FIVE

Many users who felt cheated in a transaction sent emails directly to Omidyar, the site's administrator. Soon he was getting a dozen such emails every day.[14] But he didn't want to get involved in arbitrating conflicts on the site. He thought it would be too much work. Besides, it would have been against his libertarian ethos to assume such a position of authority over others. Instead, he decided to try to engineer a mechanism to promote cooperation. On February 26, 1996, he made an announcement to AuctionWeb's users:

[T]he site has become more popular than I ever expected, and I began to realize that this was indeed a grand experiment in Internet commerce. By creating an open market that encourages honest dealings, I hope to make it easier to conduct business with strangers over the net. . . . But some people are dishonest. Or deceptive. This is true here, in the newsgroups, in the classifieds, and right next door. It's a fact of life. But here, those people can't hide. We'll drive them away. Protect others from them. This grand hope depends on your active participation. Become a registered user. Use our feedback forum. Give praise where it is due; make complaints where appropriate.[15]

A new feature called the Feedback Forum gave buyers and sellers the opportunity to publish reviews on each other's conduct after a transaction. Each review consisted of a numerical feedback rating of plus one, neutral, or minus one, followed by an optional written comment. People considering entering into a transaction could read through the comments to get an idea of what kind of a person they would be dealing with: kind, honest, sloppy, or downright deceptive. The system also tallied up each users' numerical ratings and displayed the total as a number in parentheses wherever their screen names appeared. Omidyar had created the world's first online reputation system. When we buy or sell something online today, we usually are asked to leave a review. But in 1996 the idea was new.

From a social science perspective, reputation works similarly to reciprocity to generate social order.[16] In both cases, the prospect of valuable future interactions acts as an incentive for people to be nice and cooperative toward each other. Defectors can take advantage of someone in the short run but will lose out in the long run by disqualifying themselves from future dealings. The crucial difference between the two is that under reciprocity, defectors lose out on future dealings only with the same person. With a reputation system in place, everyone in the community hears about how you treated someone, so the potential losses are far greater. If reciprocity could be summed up as "Do to another as you would have them do to you," then a reputation system is "Whatever you did to one of us, you did to me."

Of course, reputation itself is not a new concept. In any tightly knit community, there is gossip about members' past conduct, which influences how others deal with them.[17] John Barlow's rural birthplace, which he sometimes wrote about, is a typical example:

I have lived most of my life in a small Wyoming town, where there is little of the privacy which both insulates and isolates suburbanites. Anyone in Pinedale who is interested in me or my doings can get most of that information in the Wrangler Café. Between them, any five customers could probably produce all that is known locally about me—including a number of items that are well known but not true.[18]

Such informal reputation or gossip often works side-by-side with reciprocity to generate spontaneous social order. Traders' regard for how they are viewed in the community probably helped to promote cooperation in early Internet marketplaces, too. Even if repeated trades between the same people were rare, traders could expect to have future dealings with others in the community, a prospect that negative stories could jeopardize. Indeed, "A Guide to Buying and Selling on Usenet" created before the Eternal September advised newcomers as follows:

Most readers of this forum are basically honest and want to maintain their net-image, but the few bad apples should encourage you to only deal with honest, reputable people. . . . If you are unsure of a given seller, ask a net-regular discreetly via E-mail. He or she will be more than happy to either ease your concerns or confirm your suspicions.[19]

But a problem with gossip as the basis of social order is that it often gets distorted as it passes from person to person. People are more likely to pass on information that confirms their existing beliefs and prejudices. A single rumor can be amplified by reaching a recipient through multiple paths, resulting in "items that are well known but not true." Conversely, incriminating information about well-liked or well-connected community members may not circulate at all. Communities can also ostracize people for no good reason, leaving them out of the information loop. So while gossiping can maintain a degree of social order, it's not necessarily a very fair or even economically efficient order.[20]

Moreover, like reciprocity, this traditional informal form of reputation doesn't scale up very well.[21] When a community grows into a town and then into a city, it becomes increasingly difficult to find gossip on a given person. Asking five people in a café or a random old-timer via email won't work anymore. Information on a given person's past conduct still exists, but it becomes very hard to find it, as it's thinly dispersed among

the population. And whenever a member moves on or passes away, the information they held is lost. Once the Eternal September descended on the early Internet, gossip proved just as insufficient as a basis for social order as the Golden Rule.

However, Omidyar's Feedback Forum was a reputation *system*—a formal information system with features that tried to overcome some of the limitations of informal gossip. It collected information on members' conduct from those who observed it firsthand, stored it, and made it directly available to others. This way, information wasn't distorted by passing through multiple people, wasn't lost when people moved on, and could be found with equal ease by anyone regardless of the size of the membership. With the Feedback Forum, Omidyar tried to return to the idea of community as the heart of the market but use the Internet to help scale it up and ensure the same level of information and access to everyone.

BAGS AND BAGS OF ENVELOPES

Could the Feedback Forum work? It may have been the first online reputation system, but it certainly wasn't the first reputation system in history. There was plenty of historical precedent for it in different places and eras, of which Omidyar may not have been aware.

For instance, in early medieval Europe, merchants held business meetings and struck deals at inns and taverns. The innkeeper knew everyone, overheard lots of discussions, and was frequently called in to witness agreements. Thus the innkeeper became a quasi-formal knowledge hub that local merchants could turn to for information on each other's past conduct. From twelfth century onward, notary offices emerged to perform similar functions in a more organized fashion, first in the great trading cities of the Mediterranean and later in northern Europe. At a notary office, merchants could have a deal or debt formally recorded and consult previously recorded information.[22]

Local inns and notaries were less useful to long-distance traders who wanted to ship goods to buyers in faraway cities or to order goods from faraway sellers. Such traders obtained information by exchanging letters with acquaintances in the distant cities. In fact, participating in letter-writing networks was a crucial part of the job of being a long-distance trader. In

time, some traders began to specialize in the information-gathering and letter-writing work, turning into professional information brokers who sent regular newsletters to their subscribers. By the seventeenth century, most European trading cities published weekly or even daily commercial newspapers that reported on prominent merchants' activities.[23] "Who steals my purse steals trash . . . : But he that filches from me my good name . . . makes me poor indeed," wrote Shakespeare in *Othello* in 1603.

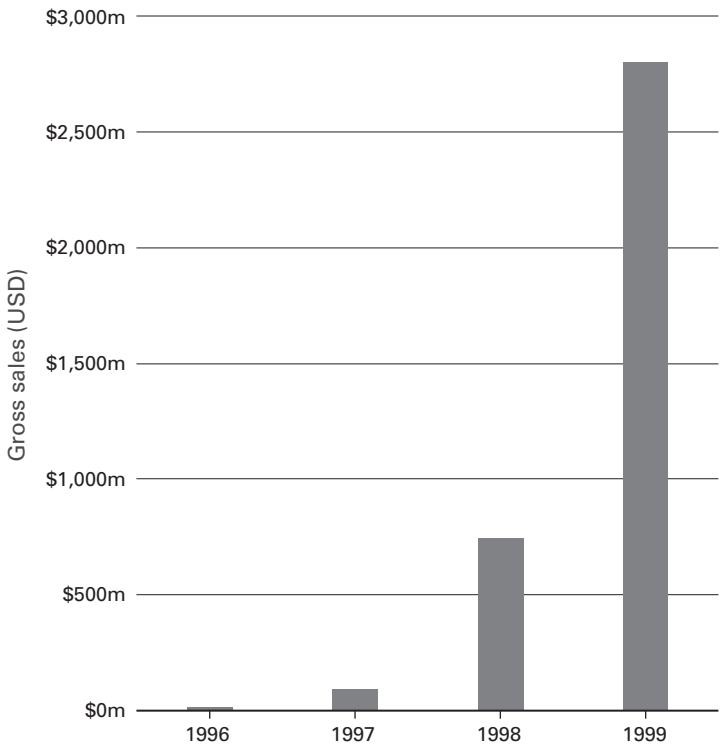
However, there were limits to how much these reputation systems could achieve. Inns and notaries served only people in the same area. Letters and newspapers offered no easy way to search through past issues for information on a given merchant's conduct. The cost of information acquisition, paper, ink, and delivery meant that only some events got disseminated. New reputation systems emerged over time—such as credit information bureaus—but markets built on reputation alone remained limited in size.[24] As the Middle Ages gave way to the early modern era and then to modernity, businesses increasingly relied on state authority and the internal control systems of large corporations to overcome the problem of exchange. The role of reputation systems in disciplining market participants never disappeared completely, but the large-scale, geographically expansive, impersonal markets that surround us today emerged as they did only because they were backed by state authority.

Yet as a new type of fully digital, Internet-based reputation system, Omidyar's Feedback Forum seemed to hold the potential to overcome some of the limitations of earlier reputation systems. Storage space was practically infinite, records permanent, and access instant across the globe. AuctionWeb's users welcomed the system. "Feedback is the greatest thing that's happened to selling online," said a rare-books seller in Oklahoma.[25] Omidyar noted: "I was afraid it might just turn into a gripe forum. . . . But as I watched it develop over the weeks, I was amazed to realize that people actually enjoy giving praise, too."[26] According to journalist Adam Cohen, the system transformed the site into "a virtual small town, where people were known by their reputations."[27]

The town would not remain small for long, however. As Internet usage around the world grew, huge numbers of people were attracted to AuctionWeb. Unlike older segments of the Internet, the web had graphics. And unlike most sites on the web, AuctionWeb had lots of graphics in the form

of digitized photographs of rare and peculiar items. At the start of its second year of operation, in October 1996, the site hosted 28,000 auctions. Just three months later, in January 1997, it hosted 200,000 auctions—more than twice the number of messages the Usenet Marketplace garnered in its busiest month. Yet the explosive growth did not result in chaos. Order endured. The reputation system held together. Every morning, the mail brought in "bags and bags of envelopes" to Omidyar with fee payments in them.[28] He quit his day job, hired staff, got rid of the Ebola page, and renamed AuctionWeb as eBay.

Over the next few years, eBay's explosive growth continued (figure 3.1).[29] By 1999, the site had 10 million registered users. The users listed 130 million items on the site that year, resulting in gross sales of $2.8 billion. With 1.8 million unique visitors each month, it was the fifth most popular



3.1 Gross sales on eBay, 1996 to 1999.

website on the entire Internet.[30] At the turn of the millennium, something like a hundred thousand people from different parts of the world were making their living by selling things on eBay, from computer dealers and carpenters to antiquarians and artists.[31] The electronic shopfronts of big corporations, those that saw the individual's role as merely typing in credit card numbers, had been left in the dust. Omidyar's dream of a level playing field had been vindicated.

And so, in a way, it seemed, had the vision of John Barlow, the cyberlibertarian who dreamed of a virtual society in which order emerged independently of the authority of territorial states. As the early Internet expanded beyond its long-established bounds, the Golden Rule alone proved too weak to sustain peace, and the "weary giants of flesh and steel" stepped in to protect commerce. But here, now, was a thriving global marketplace in which order surfaced from an equally natural source, people's regard for their own good name. It had simply taken some additional technology, a system of bookkeeping of a sorts, to create the trappings in which that instinct could snowball into universal concord. And now that the technology had been discovered, it was starting to spread. New websites sprung up endeavoring to use a reputation system to promote online exchange in all kinds of domains, from virtual goods to digital labor markets. In a keynote address to students at Tufts, Omidyar explained:

> EBay's strength is that its system is self-sustaining—able to adapt to user needs, without any heavy intervention from a central authority of some sort. . . . [It's an] organic, evolving, self-organizing web of individual relationships, formed around shared interests.[32]

BLACKMAIL

As eBay grew, it became apparent that its Feedback Forum might still require some tweaking. One challenge was how to get people to provide feedback in the first place. On announcing the Feedback Forum, Omidyar had appealed to people's sense of solidarity toward the community ("protect others") and presented feedback giving as a sort of civic duty ("This grand hope depends on your active participation"). Merchants of the past likewise saw it as their duty to share pertinent information with friends

and business partners. But noting down such information takes time and effort and, from a strictly selfish perspective, involves giving away insights that could provide a competitive edge. In a larger community, such solidarity tends to become harder to maintain, as some start to free-ride on others' information without bothering to share their own.[33] As medieval towns grew, information mediation evolved into a specialized profession, and information brokers expected to have to spend effort and in many cases money to obtain facts of value. By now eBay was more a megacity than a town, but it still expected traders to give up valuable information for free.

Therefore, as eBay grew, people's feedback giving started to be motivated by something else than mere solidarity. One such motivation was reciprocity. Regardless of how the actual transaction went, both parties stood to benefit if they gave each other mutually positive feedback, so that is what often happened.[34] Leaving negative feedback could even be dangerous, as it might provoke the other party to respond in kind. In other words, much of the time people were leaving positive ratings irrespective of what had actually transpired. This expectation of mutually positive feedback appears to have become so strong as to prompt one user to exclaim, "SELLER DOES NOT RECIPROCATE POSITIVE FEEDBACK!!!" when a counterparty neglected to rate them.

Reciprocal feedback giving also emerged in other websites that introduced a reputation system in eBay's wake. On online labor platform Upwork, some sellers wouldn't even enter into a contract unless it was first agreed that the eventual feedback would be a perfect five out of five.[35] Over time, this resulted in "reputation inflation," where users' average reputation ratings all converge toward the perfect score.[36] Mutually positive feedback benefited the parties involved by boosting their reputation but did so at the cost of leaving everyone else misinformed and increasingly unable to spot the bad apples. Reciprocity in feedback giving was thus not so much an example of "Do unto others as you would have done unto you" as it was of "You scratch my back, and I'll scratch yours."[37]

Weaknesses such as these created openings in eBay for dishonest actors, and the growing wealth of the marketplace provided motivation for them. Fraud and deception started to rise again: the Federal Trade Commission recorded three hundred complaints related to online auctions in the first half of 1998 and six thousand complaints in the first half of 1999.[38] So

while fraud remained rare in absolute terms, it was growing faster than the auctions themselves. "They either didn't send anything or sent something other than what was advertised," explained Dan Anders of the Illinois attorney general's office in a newspaper interview.[39] He was talking about a pair of fraudsters who over a period of months listed dozens of pieces of computer hardware for sale. The pair didn't actually have such hardware but still happily collected the payments. The National Consumers League received five times more complaints about online auctions than about other e-commerce transactions,[40] and more than 20 percent of buyers walked away from eBay transactions at least mildly dissatisfied, according to one estimate.[41] Yet feedback remained as good as ever: 99 percent positive.[42] The system appeared to be failing, and some lawyers started calling for state intervention.[43]

By this time, Omidyar no longer had to deal with such problems himself. EBay had gone public in 1998, and the company's new CEO and president was Meg Whitman, an experienced executive. Omidyar, now a billionaire, was still involved in the company, but many skilled engineers had been hired to develop the site further. The company had also started to collaborate with academic economists to figure out how to improve its reputation system.

At first, eBay's engineers thought that they would change the system so that both traders would give their feedback blindly—without seeing what the other party had given them—after which the reviews would be revealed simultaneously. Retaliation would become impossible, so traders might as well give their honest opinion. But experiments carried out by economists Gary Bolton, Ben Greiner, and Axel Ockenfels suggested that this would reduce traders' overall enthusiasm for feedback-giving.[44] Traders on eBay were leaving feedback only about 70 percent of the time, and it was important that this didn't fall further. Moreover, waiting to reveal feedback until both sides had given it would have introduced a significant delay between when a trader learns that the other party is a fraud and when the rest of the community hears about it. Based on the advice of Bolton and his colleagues, eBay rejected the blind feedback idea.

Another idea that Bolton and colleagues evaluated was to create a second rating system that would operate in parallel with the original Feedback Forum but whose ratings would be secret. Aggregate results would

be displayed in traders' profiles, but traders would not be able to access individual reviews about themselves. This way, even if traders felt compelled to give a positive review in the public Feedback Forum, in the private system they could be brutally honest. Bolton and colleagues' experiments suggested that secret feedback was indeed more honest, and yet it did not result in a significant reduction in overall feedback giving, as reciprocity in the public system motivated traders to go through the same feedback-giving process as before.[45] Following the economists' advice, eBay's engineers went ahead and implemented the secret feedback system. Only buyers were permitted to give feedback in secret, perhaps because dishonesty on the buyer side was not seen as a significant issue at this point.

Once the change was rolled out, public and secret feedback diverged, as expected: some sellers received nearly perfect reviews in public and yet questionable averages on the private side. But this confused new users, who might be reassured by a sellers' public reviews, only to then have a bad experience with them. And since eBay was growing fast, the majority of users at any given time were new users. The fake-positive feedback theater threatened to undermine trust in the whole marketplace.

The engineers at eBay implemented another major change, this time with no apparent input from Bolton and colleagues' experiments. They eliminated sellers' ability to leave negative feedback to buyers altogether. This finally broke the cycle of reciprocity that had been resulting in mutually positive ratings. Buyers could feel free to leave negative feedback in public without fear of retaliation.

So empowered were the buyers, however, that some started abusing their power. A professional jewelry seller in France interviewed by Curchod and colleagues explained the problem as follows:

> There are people who blackmail me. . . . this morning, I received a message. I sold an item by auction, 19.90 euros, and the woman wants it for 9.90 euros. . . . They all threatened to post negative evaluations.[46]

In other words, buyers could now essentially hold up sellers for whatever the value of their reputation was.

DEAD PEOPLE DON'T WRITE REVIEWS

The engineers at eBay proceeded to build features that would improve sellers' position on the marketplace. For instance, sellers gained the ability

to dispute negative or neutral reviews. When a review was disputed, site administrators investigated it and could decide to delete it. Highly rated sellers were also given "feedback protection," which meant that negative feedback against them was automatically deleted so long as the seller fulfilled certain conditions, such as providing free thirty-day returns. Sellers could also report buyers to site administrators for violations such as refusing to follow through on a winning bid.

As the market kept growing and changing, ever more issues emerged, and ever new features and policies were introduced, amended, and occasionally canceled. At this point, the reputation system itself was starting to be less important in maintaining social order on the site. Sellers couldn't assess buyers based on reputation ratings, since negative ratings weren't allowed. If a seller tried to leave a negative review disguised as a positive one, site administrators deleted it. It was now down to site administrators to weed out bad apples from among the buyers. They did this by enforcing policies and freezing accounts considered to be in violation. On the Usenet Marketplace, the worst that netizens could inflict on each other was an angry email, but on eBay, the administrators were empowered to banish people from the community.

It also started to become apparent that the reputation system had never been an effective tool against certain types of bad actors. A man in Texas almost died after taking weight-loss pills he bought from an eBay seller.[47] The blue capsules were laced with sibutramine, a substance once considered effective for weight loss but discontinued after studies linked it to strokes and heart attacks. User reviews for such pills could be positive, as they might appear to be working fine to someone without medical training. Strokes and heart attacks suffered later might not be attributed to the pill. And those with most reason to complain wouldn't even be around to write reviews anymore, as counterfeit drugs bought online frequently resulted in death.

A social order built on reputation is based on the assumption that people are able to accurately assess the value of what they are getting. This may be mostly true for comic books and computer parts. But for things like pharmaceuticals, dietary supplements, cosmetics, antiques, and art, it is often not true. As a professional art dealer said in a newspaper interview in 2000, "eBay is one of the greatest avenues for selling questionable merchandise that's ever been invented. I go on eBay from time to time, and it only takes

me 20 minutes to a half hour to find a scammer."[48] Autographed sports memorabilia, luxury watches, DVDs, and other items routinely turned out to be fakes when inspected by experts. The Texas sibutramine case may have come to light only because the buyer survived and happened to be a qualified medical doctor who could understand what had happened. A European food safety regulator was worried about online food products that tasted great but contained carcinogens or other substances whose damaging effects would not become apparent until years later. A reputation-based economy might be poisoning itself to death without even realizing it.

EBay responded in the same way as modern states did to such market failures: by introducing regulation. Some collectibles could be listed only if their authenticity was first certified by a preapproved grading company. Some items were restricted to preapproved sellers; eBay brought in Butterfield & Butterfield—a venerable San Francisco auction house—to supply inventory to its high-end category. New rival website Amazon Auctions appointed Sotheby's—an auction house founded in 1744 in London—to act as a gatekeeper to listing high-end items on the site. EBay introduced a hotline for brands like Louis Vuitton, Disney, and Microsoft to report fake items. And some high-risk products, such as prescription drugs, could no longer be listed at all. Over time, eBay introduced dozens of policy documents laying out the rules pertaining to different categories of products, such as "Alcohol policy," "Food policy," "Firearms policy," and "Stocks and other securities policy." The "Product safety policy" explained the consequences to violators as follows:

> Activity that doesn't follow eBay policy could result in a range of actions including for example: administratively ending or canceling listings, hiding or demoting all listings from search results, lowering seller rating, buying or selling restrictions, and account suspension.[49]

The enforcement of the rules wasn't perfect; every now and then the media still reports about dangerous diet pills or the like appearing on eBay. But generally speaking, the company's regulatory interventions succeeded in making the website one of the safest and most secure environments for individuals to conduct peer-to-peer online commerce. They ensured that the marketplace kept growing and allowed more and more netizens to start to make a living as professional online merchants. They also assuaged government concerns about rising online criminality. Through court cases

and lobbying, eBay defused attempts to regulate online auctions and established itself as a mere intermediary that bore no legal liability for what happened on the site.[50]

A UNIVERSE OF RULES

Today, many of eBay's policies incorporate references to the laws and product standards of some of the countries in which its users reside. The company also cooperates with law enforcement investigations pertaining to its users.[51] But order on the site is ultimately underpinned by the site's own systems and administrators, not by the courts and officials of any territorial state. The latter wouldn't even have the capacity for it: eBay handles far more disputes in a year than the entire court systems of most of the world's countries.[52]

Omidyar thus ultimately succeeded in creating social order in cyberspace without relying on the authority of territorial states, those "weary giants" that cyberlibertarians like Barlow wanted to liberate humanity from. But in doing so he gave birth to a new giant, one of the first "Internet giants" or massive technology companies that rule over vast swathes of digital territory. As a furniture seller interviewed by Curchod and colleagues noted:

> It's amazing how eBay has created its own universe of rules, a sort of specific legal system. It's impressive. And their rules overwrite existing legislation. . . . With eBay you can't negotiate, because they set the rules.[53]

Like the giant Atlas, the company single-handedly bore a universe on its shoulders. The idea of a community at the heart of the market had in practice been abandoned. Regardless of a trader's reputation among other members, eBay's administrators could exile them or "disappear" them from search results in response to perceived rule violations. Omidyar acknowledged the shift in a 2000 interview:

> We've had to evolve our strategies and our policies from what I built in the beginning, which is a self-policing community of people, to one where we take a more active role in trying to identify the bad actors.[54]

Not long after the company's public offering, Omidyar withdrew from its day-to-day activities and moved to Paris to reacquaint himself with his birth community. He had set out to create a market where information

flowed freely, but in the end, order was achieved only by strategically withholding information, such as when buyers were asked to rate sellers in secret, and sellers were prevented from criticizing buyers. New markets were opened, but also new gates constructed, and in some cases old gatekeepers like Sotheby's invited to continue their work in the new economy. At the turn of the millennium, a nonprofit set up by eBay was trying to get rural Guatemalan craftswomen online so that they could bypass the middlemen standing between them and consumers.[55] At the same time, eBay itself was fast becoming one of the biggest middlemen in history. One form of authority was overcome only by replacing it with another.

Things did not end up this way because eBay's executives were hungry for power. At every stage, rules and policing were introduced only begrudgingly, in response to market failures that could not be otherwise addressed. The outcome simply reflects the difficulty—perhaps impossibility—of realizing self-organizing markets on a large scale. Some other market-making projects managed to stay truer to their libertarian roots, but the market failures inherent to them meant that they remained fringe experiments and never reached anything close to the scale and economic impact that eBay has had on millions of people's lives.

This outcome was not entirely unforeseen by denizens of the old Internet. In March 1995, almost a year before Omidyar launched his Feedback Forum, a group of netizens on the Usenet Marketplace discussed the idea of starting a public blacklist where anyone could report their bad trading experiences. Discussants quickly realized that retaliation and blackmail would undermine the system. "Someone who doesn't like your signature file could put you on it just for the hell of it," noted one. "I suppose [middlemen] may not be such a bad idea after all," concluded another.[56]

Still, for Barlowians hoping that the Internet would set humanity free, this was a troubling outcome. What good was it to be liberated from government bureaucrats only to be policed by site administrators? Many traders complained, with reason, about the high-handed treatment they received from eBay's admins.[57] And eBay was still a relatively benign giant, perhaps owing to its founder's laid-back attitude and love for community. Other giants were following in its footsteps, including Amazon, with distinctly different objectives in mind. Had netizens gotten out of the frying pan only to fall straight into the fire?

4

THE PRIVACY DILEMMA: MAINTAINING ORDER IN A MASQUERADE

> For now we see through a glass, darkly; but then face to face: now I know in part; but then shall I know even as also I am known.
>
> —1 Corinthians 13:12

In 1792, a masked ball at the Royal Opera of Stockholm was graced by the presence of King Gustav III himself. Then a shot rang out over the music. The king cried in pain, mortally wounded. A man dropped a pistol on the floor, shouted "Fire!," and disappeared into the chaos. Guards sealed the exits, but none could identify the assassin, whose face had been covered by a mask.[1]

Ross Ulbricht was born in 1984 near Austin, Texas, in a place that his mother described as "the poorest neighborhood in a good school district." He was a kind and cheerful kid. His friends described him as "bright" although "not whiz-kid bright." He became a Boy Scout and achieved the organization's highest rank, Eagle Scout. Around girls he was shy.[2]

In high school, he steered away from the dominant football culture. Instead, he enjoyed deep discussions. He became interested in Eastern philosophy or what bits of it filtered into suburban America. He was particularly fond of the notion of oneness and of living in harmony with others. At the same time, his horizons were starting to be widened by drugs, especially psychedelics.

Ulbricht found a like-minded girl at his school and started spending time with her. The relationship got serious. Ulbricht thought he had found the ultimate oneness. There was talk of marriage. But it wasn't to be. "There was some cheating and some backstabbing, intrigue," recalled a friend. "I learned a whole lot about . . . how attached and vulnerable you can get with somebody. . . . [I was] naive," said Ulbricht.[3]

The dejected young man enrolled at the University of Texas at Dallas to study physics. There he got acquainted with libertarian political philosophy. Much like his first love of Eastern philosophy, libertarian philosophy questioned authority and envisioned societal harmony emerging from the ground up. But unlike Eastern philosophy, libertarian thought was strictly individualistic. The sovereign individual would not and could not be bound to anything more than temporary alliances dissolved the moment interests ceased to coincide. It would never admit to anything as naive as oneness.

Ulbricht continued his studies in a graduate program at Pennsylvania State University. He did very well and was on track to a research career. But he didn't enjoy the lab work. Instead, his thoughts were increasingly occupied by libertarianism. He was influenced by Ludwig von Mises, an early twentieth-century Austrian economist, and by the writings of contemporary American libertarian activists. He joined the university's Libertarian Club and wore a "Ron Paul for President" shirt to classes. On LinkedIn, he posted that his interests were shifting from science to economics:

> From [libertarian authors'] works, I understood the mechanics of liberty, and the effects of tyranny. But such vision was a curse. Everywhere I looked I saw the State, and the horrible withering effects it had on the human spirit.[4]

Once Ulbricht finished his master's degree in 2009, he decided to abandon his research career. He went back to Austin to start a new life that was more in line with his libertarian values. First, he tried to make money by day trading securities, but it didn't work out. He started a video game company, but it quickly failed. None of his attempts at launching an independent career succeeded. "I had left my promising career as a scientist to be an investment adviser and entrepreneur and came up empty-handed," he later wrote.[5]

To make ends meet, Ulbricht took up editing work he found online. "I edited scientific papers written by foreigners. It sucked. The hours were flexible, but it drained me. I hated working for someone else."[6]

Then opportunity knocked. Ulbicht's downstairs neighbor asked if he'd like to join an online book-selling business. The business was called Good Wagon Books, and the idea was to collect used books and sell them via marketplaces like Amazon. A portion of the profits would be given to charity, and unsold books donated to prison libraries.

Ulbricht decided to give it a shot. He constructed a website for the company and developed a script that would determine a book's price based on its Amazon sales ranking. He also learned inventory management and built bookshelves that could support an inventory of fifty thousand books. He worked hard, and the company's monthly sales soon surpassed $10,000.

But the very next month, the business literally collapsed: the shelves that Ulbricht had built fell down, crashing onto each other like dominoes. There had been a flaw in the construction. Neither Ulbricht nor his business partner had the motivation to rebuild. The neighbor found a job in a different city. Ulbricht, on the other hand, was thinking of a new venture. He had an idea—"something really big," he told the neighbor.[7]

MASK OF DREAD PIRATE ROBERTS

Ulbricht's studies of libertarian thought had led him to the writings of Samuel Konkin, a firebrand activist from California. Like many libertarians, Konkin believed the state and its coercive power to be the main obstacles to a freer society. But Konkin also believed that it would be counterproductive to try to use the state's political system to dismantle the state. Instead, he preached direct action against the state in the form of black-market trade. Black-market trade would starve the state of tax revenues, while simultaneously expanding the participants' personal freedoms. "Evade, avoid, and defy the State," advised Konkin's manifesto, which promised "immediate gratification for those who abandon statist restraint."[8] The vision appealed to Ulbricht:

> At last the missing puzzle piece! All of the sudden it was so clear: every action you take outside the scope of government control strengthens the market and weakens the state. I saw how the state lives parasitically off the productive people of the world, and how quickly it would crumble if it didn't have its tax revenues.[9]

So far, three decades after Konkin's manifesto was published, the state was still going strong. Black market trade remained in the margins. But

Ulbricht thought that he might be able to change this. He thought that he might be able to usher in the revolution using the Internet:

> The idea was to create a website where people could buy anything anonymously, with no trail whatsoever that could lead back to them.[10]

In practice, he was thinking of a website for buying and selling illegal drugs. There was a constant demand for drugs; after all, he was a user himself. Drug trade was a victimless crime as far as he was concerned. And yet the state was using its coercive machinery to inhibit it—a perfect opportunity for kickstarting a revolution.[11] "I want to use economic theory as a means to abolish the use of coercion and aggression amongst mankind," he wrote on LinkedIn.

Ulbricht was not a tech wizard, but he had learned a fair bit about e-commerce from Good Wagon Books. He set to work to make the website a reality. "Programming now. Patchwork php mysql. . . . Got the basics of my site written," he noted in his journal.

The site Ulbricht was building looked a lot like early iterations of eBay—with one big difference: eBay wouldn't allow even prescription drugs, let alone illegal dissociatives and psychedelics. On Ulbricht's site, there were top-level product categories like "Drugs and Lab Supplies"; under "Drugs," there were subcategories for things like "Cannabis," "Hash," "Ecstasy," and "Opiates." "I was calling it Underground Brokers, but eventually settled on Silk Road."

Building a website like the Silk Road was one thing, but concealing it from the authorities was an entirely different matter—a feat of cybersecurity engineering way beyond Ulbricht's or any bedroom hacker's capabilities. Investigators could easily locate a server based on its Internet address and thereafter locate and arrest its administrators and users.

But Ulbricht was counting on help from an unexpected direction: the United States Navy. In late 1990s, the Naval Research Laboratory had developed a technology called Tor that prevented Internet messages from being followed to their sources. The original purpose was to conceal American spies from foreign security services. But navy researchers realized that it could also be used to protect dissidents in authoritarian states like China. President Bill Clinton and many others at the time believed that the Internet would undermine authoritarian governments by enabling free

expression beyond state control. Tor seemed to deliver exactly this, and in 2004 the navy released Tor as an open-source software package available to anyone on the Internet. The Electronic Frontier Foundation—the champion of netizens' liberties against government intrusion—began to fund Tor's development and maintenance.

Ulbricht figured that if Tor could conceal dissidents, it could also conceal drug traders. Tor worked by routing messages through a maze-like network of relays—like making detours to multiple houses on the way to a party venue and changing costumes at each stop to throw off followers. Moreover, the guests would be blindfolded throughout the journey to the venue and back. Government agents could visit the party, but they could not determine where it was physically located, nor could they follow anyone home.

Another problem Ulbricht had to solve was payment. Platforms like PayPal and Visa keep customers' personal information on file. A drug merchant accepting credit card payments would quickly be identified and caught. But during Ulbricht's brief tenure as a day trader, he had come across an open-source digital payment system called Bitcoin.[12] It was a peer-to-peer network that could be used to transfer virtual "coins" from one account to another. Like Swiss bank accounts of old, Bitcoin accounts were identified only by number, and the bitcoins could be exchanged back to dollars at an online exchange. Ulbricht thus adopted bitcoin as the medium of exchange on his drug bazaar.

One more issue was how the marketplace would overcome the problem of exchange—that is, how it would ensure that its participants delivered on their promises.[13] In the eyes of the state, the participants were going to be criminals no matter what they did, so laws were not going to deter them from defaulting on their payments and shipments.

EBay used a reputation system in which people posted public feedback on each other's conduct.[14] But Ulbricht wanted to allow trading "anonymously"—a term that strictly speaking meant "without names." A reputation system works only if the feedback is attached to some kind of a name that singles out the subject whom the feedback concerns.

The solution was to make the site pseudonymous: users appeared under made-up names, their everyday identities concealed from each other like the identities of participants in a masked ball. Pseudonymity allows actions to have consequences within the context in which the pseudonyms are

used but not outside it. In Renaissance Europe, masquerades allowed aristocrats to transgress sexual norms of their time; on Silk Road, Ulbricht hoped they would let participants evade drug laws.

Ulbricht himself chose the alias "Dread Pirate Roberts," a reference to a 1987 American fantasy film called *The Princess Bride*, in which Roberts is a mask-wearing pirate with a fearsome reputation. Having enriched himself sufficiently, the fictional pirate passes his name and mask on to another raider, leaving the troublesome reputation behind and retiring with a clean slate. Ulbricht hoped that he might one day be able to do the same.

Armed with Tor, Bitcoin, and a pseudonymous reputation system, Ulbricht believed that it was finally possible to create a hidden shadow economy beyond the reach of state institutions:

> In 2011, I am creating a year of prosperity and power beyond what I have ever experienced before. Silk Road is going to become a phenomenon and at least one person will tell me about it, unknowing that I was its creator.[15]

A MOST BRAZEN ATTEMPT

In January 2011, Silk Road opened for business. The name of the site was written in large green letters at the top of the page, and below it were the words "anonymous marketplace." The first listed merchandise was a ten-pound batch of psilocybin mushrooms that Dread Pirate Roberts had cultivated himself. To drum up interest, he started posting messages to online forums, pretending to be a normal user. "Has anyone seen Silk Road yet? It's kind of like an anonymous Amazon.com. I don't think they have heroin on there, but they are selling other stuff," he wrote on a forum called Bitcoin Talk under the alias "Altoid."[16]

Buyers showed up and started ordering his produce. He mailed out shrooms in ordinary envelopes, often directly to buyers' homes. Even if authorities intercepted an envelope, the recipient could deny any knowledge of it since the purchase had been carried out under a pseudonym. Other sellers started appearing, with names like SelfSovereignty and Libertas, and more listings were added. By the time Roberts's mushrooms were gone, the marketplace was bustling. "The market began its path to maturity," he noted in his journal.

Then in June 2011, web publication Gawker wrote a story about the new "eBay for drugs." Usage exploded. "When you look at the historical [numbers], you can see right when it happened. A huge spike in signups," Roberts observed.[17] Uninhibited by drug laws, participants traded in everything from Red Joker Ecstasy pills and strawberry LSD to Caramello hash, Mercury's Famous uncut cocaine flakes, Mario Invincibility Star XTC, and white Mitsubishi MDMA. One vendor tempted buyers with a black tar heroin called the Devil's Licorice.[18]

If authorities hadn't been paying attention to Silk Road before, they did after the Gawker article. Within days, two US senators addressed the press. Senator Charles Schumer was furious:

> Literally, it allows buyers and users to sell illegal drugs online, including heroin, cocaine, and meth, and users do sell by hiding their identities through a program that makes them virtually untraceable. It's a certifiable one-stop shop for illegal drugs that represents the most brazen attempt to peddle drugs online that we have ever seen.[19]

Senators publicly called on the Drug Enforcement Administration (DEA) and the Department of Justice to shut down the "online drug bazaar." Roberts noted in his journal:

> Two US senators came out against the site and against bitcoin. They made a big deal out of it and called for a shutdown of the site. . . . The US govt, my main enemy was aware of me and some of its members were calling for my destruction. This is the biggest force wielding organization on the planet.

But months passed, and nothing happened. The masks stayed up. More traders joined. During the first year, Roberts noted that he was earning $20,000 to $25,000 per month in transaction fees. Next year, his revenues were estimated at $120,000 per month.[20] Soon thousands of drug dealers paraded on the Silk Road, distributing hundreds of kilograms of drugs to over a hundred thousand buyers around the world.[21] The gross value of the trade was measured in hundreds of millions of dollars. Emboldened, Dread Pirate Roberts gave an interview to business magazine *Forbes*:

> We're talking about the potential for a monumental shift in the power structure of the world. The people now can control the flow and distribution of information and the flow of money. Sector by sector the State is being cut out of the equation and power is being returned to the individual.[22]

Still, it wasn't all smooth sailing. Hackers had begun to target the marketplace's riches. Roberts realized that he would need help and advice from more experienced technologists to strengthen the site's security. He logged in to Bitcoin Talk as Altoid once again. He posted that he was looking for "an IT pro in the Bitcoin community" for "a venture backed Bitcoin startup company."[23] He was able to find ideologically committed help, and major disasters were avoided.

However, a more fundamental problem was starting to become evident. Just like eBay's Feedback Forum, Silk Road's reputation system was in reality not perfect.[24] There was no clear incentive for buyers to leave accurate feedback beyond possible solidarity toward other users. Even as the market grew and reports of fraud started appearing on forums, 96.5 percent of buyers still left a full five-star rating.[25] The feedback system alone was not going to be enough to maintain order in the long run.

Just like eBay's engineers, Roberts addressed the weaknesses of the reputation system by complementing it with rules and procedures enforced by a central authority—himself. For a libertarian radical, he was surprisingly unabashed about taking up this role. He held a "State of the Road" address that echoed the State of the Union Address given by US presidents.[26] Users embraced his leadership. One member remarked, "We are a community, and Dread Pirate Roberts is our president in a sense."[27] Of course, Roberts was not really an elected official: he was the landlord.

But Roberts tried not to compromise on one principle. He respected the participants' pseudonymity: he did not peek behind their masks. The site did not spy on its users or collect dossiers of data. Buyers' mailing addresses were automatically deleted from the site's database when shipments were marked sent. Even if Roberts's power within the virtual domain of Silk Road was absolute, that was as far as it went. Participation was voluntary, and people could release themselves of his power simply by walking out. Participants were free to "evade and avoid" him as they evaded and avoided the state:

> You are here voluntarily, and if you don't like the rules of the game, or you don't trust your captain, you can get off the boat.[28]

This principled position made the Dread Pirate's reign more ideologically compatible with the libertarian revolution it was meant to further.

Yet it began to cause difficulties when it came to maintaining social order on the site.

HOLIDAY SURPRISE

A major weakness of pseudonymous online reputation systems is that they are susceptible to "whitewashing": disgraced participants can wipe their slates clean by reentering the site with a new name, as if substituting a new mask for a tarnished one. EBay combatted whitewashing by requiring new sellers to prove their identities with government-issued identification. A vendor with a tarnished mask was prevented from picking up a new one. But Roberts couldn't ask participants for government identification. A spotless reputation became an even weaker guarantee of cooperation on Silk Road than it was on eBay.

Roberts had to innovate. To combat whitewashing, he started charging a $500 security deposit from anyone creating a new vendor account. This way, whitewashers would at least incur costs, making small-time scams uneconomical. He also created an escrow system. Under the system, buyers first transferred their payments into a so-called escrow account controlled by the site administrator. The administrator informed the seller that payment was secured, and the seller shipped the item. Once the buyer confirmed that the shipment had arrived in good order, the administrator released the payment to the seller, minus a transaction fee. If there was a dispute, then the administrator acted as a makeshift judge.[29]

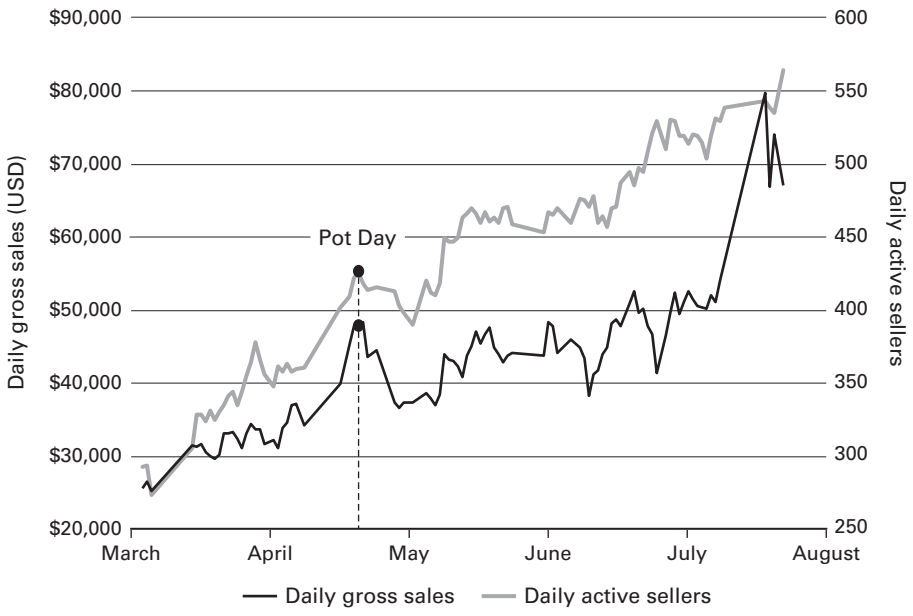
At first, Roberts played judge himself. But as the site grew, he started looking for assistants. "Someone to answer messages, manage the forum and wiki, and eventually even dispute resolution."[30] The pirate king eventually hired several administrators to help him run the site, paying their salaries in bitcoin.

However, in this masked and cloaked environment, Silk Road's administrators had little reliable information on which to base their decisions. Many established sellers grew tired of fraudulent buyers claiming nondelivery and started asking buyers to "finalize early"—that is, to release the payment before the merchandise was shipped. Early finalization was also requested because bitcoin's value fluctuated wildly and could be a fraction of what

it had been by the time a shipment arrived. Thus, in practice, traders often didn't use the escrow system at all.[31]

In January 2012, a user named Tony76 joined Silk Road. He introduced himself as an experienced drug trader: "I have been in the game for over 20 years, so I can pretty much get my hands on anything so long as there is money to be made." To prove his credentials, he started sending out free samples. The reviews were glowing: "Tony76 has the best MDMA on SR hands down," wrote one user. "Packaging was awesome, very inconspicuous, blends in perfectly with normal mail," testified another. "Look[ing] forward to many future orders," wrote a third. By mid-April, Tony76 had fulfilled more than five hundred orders and racked up great reputation scores.[32]

April 20 was going to be a special day on Silk Road. In North American counterculture, the day is known as "Pot Day," an unofficial holiday for celebrating cannabis consumption. The date comes from "four twenty," an old slang expression for smoking cannabis. A live countdown on Silk Road's top page displayed hours and minutes until the big day. Vendors offered holiday discounts, special deals, and free extras in the lead-up to the day. Customers placed unprecedented numbers of orders: daily volumes were up by around 30 percent from a month before (figure 4.1).[33]



4.1 Daily gross sales (29-day moving average) and active sellers on Silk Road in 2012.

Cannabis was the most popular category, but all kinds of other drugs were also discounted. On Pot Day itself, there were going to be further discounts and even a prize draw organized by Dread Pirate Roberts himself.

Three days before the event, Tony76 announced his own "MASSIVE 4/20 SALE." "At first I wasn't going to participate in this 4/20 sale, but seeing all these other amazing deals from vendors got me excited," he wrote. By this time, he was hailed as one of the very best vendors on Silk Road, if not the best. His much-anticipated sale consisted of significantly reduced prices on drugs such as MDMA, LSD, and heroin. On cannabis, he cut the price by more than anyone else did, making it the second-most popular product on the entire site.[34] Whereas previously he had shipped only to the United States and Canada, this time he announced that he would accept orders from anywhere in the world. And as for his terms of trade: "FE [finalize early] is required."[35]

One Silk Road administrator estimated that Tony76 managed to pocket up to $250,000 worth of bitcoin before the negative reviews from nondelivery started to pile up. People vented their anger at his user account, but the person behind it was gone, and so were the bitcoins. Many people's Pot Day festivities were ruined. Afterward, the coup inspired many copycats. Known as an "exit scam," to this day it remains a constant threat in the world of darknet markets and cryptocurrencies.

The idea of an exit scam is much older, however. Such scams were frequent in premodern economies. For instance, in 1431, a man introducing himself as John Knight appeared in Danzig. He claimed to be an English nobleman traveling around Prussia. He drank and made friends with local merchants and bought many wares on credit. But when it came time to pay, "John Knight" was nowhere be found. It turned out that he was not a nobleman at all but a conman, likely using a made-up name.[36]

In medieval Europe, a person's "name" for legal and administrative purposes was often just a description that singled out the individual in the context at hand, such as "John the Smith" in local proceedings or "John of Bristol" when further afield. Even when people had fixed surnames, the names were liable to change at will. All names at the time were thus in a certain sense pseudonyms.[37] And just like centuries later on the darknet, pseudonyms proved, time and again, a slippery foundation for commerce.

UNMASKED

Authorities still didn't seem to have a clue who Dread Pirate Roberts was or where his black market was hosted. The pseudonyms and other evasions appeared to be keeping state agents in the dark. But the lack of reliable identities continued to create problems for Roberts, too. Exit scams turned out to be a relatively minor inconvenience compared to what was about to unfold just a few months later.

A long-standing Silk Road seller known as FriendlyChemist messaged Dread Pirate Roberts. In contravention of the site's rules, the chemist had amassed a database of thousands of customer and vendor names and mailing addresses through his dealings with them. He was threatening to publish the information on the Internet unless Roberts paid him $500,000 in bitcoin. Such a release would likely mean the end of the journey for Silk Road as a trustworthy marketplace.

The fictional pirate was powerless in the face of such threats. The absolute worst punishment that Roberts could inflict on villains like FriendlyChemist and Tony76 was to freeze their Silk Road accounts. That was hardly a deterrent given the stakes now at play. Roberts realized that if he was to maintain control, he would have to let go of the masquerade and find out the culprits' real names.

Roberts found a Silk Road user who claimed to be the chemist's associate. According to the associate, the chemist's name was Blake Krokoff and he was thirty-four years old, lived near Vancouver, Canada, and was married with three children.

Armed with this information, Roberts approached another Silk Road user, whom he knew as a high-ranking member of the Hells Angels Motorcycle Club based in the same region. Roberts asked the Angel to track down Krokoff. The idea was to scare Krokoff off the blackmail. The Angel replied:

> If I find his location, and you use it against him to scare him, there is a chance he will switch locations again. Speaking from experience, it will become a lot more difficult to find him again.[38]

Instead, the Angel proposed a more conclusive solution:

> If you want to deal with him the other way, we can talk about that too. . . . If you want it to look like an accident, it would cost a lot more. . . . He would just leave home one day and not return.[39]

Even as Roberts exchanged messages with the Angel, he continued to receive demands from FriendlyChemist. The extortionist issued an ultimatum: Roberts had seventy-two hours to pay up before the names and addresses of five thousand buyers and about two dozen vendors would be released. The man behind the pirate mask made a decision. He wrote to the Angel:

> This kind of behavior is unforgivable to me. Especially here on Silk Road, anonymity is sacrosanct. It doesn't have to be clean. . . . I would like this done asap.[40]

A little later Roberts also uncovered the identity of Tony76, the exit scam artist, and ordered him killed, too. Learning that Tony76 lived and worked with three other people, he paid to have all of them killed. In a few years' span, the libertarian radical had gone from wanting to "use economic theory as a means to abolish the use of coercion and aggression amongst mankind" to commissioning extrajudicial killings in the name of order. "Necessities like this do happen from time to time for a person in my position," he justified his actions.[41]

And yet it is not clear that he ever actually managed to kill anyone. Police never found any physical evidence that such murders happened. Canadian authorities had no record of any resident called "Blake Krokoff." No people matching the description were reported missing.[42] It's possible that the supposed unmasking and subsequent contract killing of FriendlyChemist and Tony76 were simply scams by the villains themselves designed to extract more money out of the hapless marketplace owner. Another murder Roberts thought he had commissioned turned out to have been faked by law enforcement agents who pursued him. Without any reliable means of identifying people, the would-be murderous autocrat relied on what people told him, which in many cases turned out to be elaborate fantasies. He was hemorrhaging cash to hitmen, extortionists, and hackers, and even a corrupt law enforcement officer stole bitcoins from his coffers.

Before things got any further out of the fictional pirate's control, his own real-world identity finally began to catch up with him. When recruiting technologists on Bitcoin Talk, he had asked candidates to email rossulbricht@gmail.com.[43] Although he had been careful not to mention Silk Road in the recruitment advertisement, he had posted about Silk Road earlier using the same alias. This and other slip-ups eventually allowed FBI investigators to identify the man behind the Dread Pirate Roberts mask.

On October 1, 2013, Ross Ulbricht was arrested in a San Francisco public library as he was administering the narcotics marketplace on his Samsung 700Z laptop. The arrest itself was an exercise in deception. Agents realized that Ulbricht's laptop and thus all the hardest evidence against him would likely end up being locked away behind encryption the moment he closed the lid. To prevent this, two agents posed as a quarreling couple, distracting Ulbricht while a third agent snatched the computer.

In court, Ulbricht claimed that although he had built Silk Road, somebody else had been wearing the Dread Pirate Roberts mask when the bad things had happened. A peace-loving libertarian "softy" like him could not have ordered killings, he argued. But history knows plenty of well-intentioned revolutions that ended up as bloodbaths. The libertarian philosophy that so animated Ulbricht permitted deadly violence in defense of life and—in more radical versions—of property. Samuel Konkin's anarcho-capitalist version in particular envisaged markets for contract killings as a method of maintaining order. In any event, the jury was not convinced by Ulbricht's pleadings. He was found guilty on all counts and sentenced to double life imprisonment plus forty years.

Perhaps the masquerade's end also brought some small relief to Ulbricht. He had been trying to reach out to women again to find, if not oneness, then at least a frank connection. But secrets and masks kept getting in the way:

> I went out with Jessica. Our conversation was somewhat deep. I felt compelled to reveal myself to her. It was terrible. I told her I have secrets. . . . I'm so stupid. . . . I always thought honesty was the best policy and now I didn't know what to do. . . . I had to tell half truths. It felt wrong to lie completely so I tried to tell the truth without revealing the bad part, but now I am in a jam. Everyone knows too much.[44]

THE PRIVACY DILEMMA

Guards at the Royal Opera of Stockholm could not identify which of the guests at the masked ball had shot the king, so they had to let everyone go, among them the assassin. But the next morning, the pistol that the killer had left behind at the murder site was taken to Stockholm's gunsmiths. One gunsmith recognized it as belonging to Jacob Johan Anckarström, a known adversary of the king. On questioning, Anckarström admitted to

the crime. Convicted of regicide, he was sentenced to have his right hand cut off, his head removed, and his corpse quartered.[45]

Anonymity can protect us from persecution and government abuse. But at the same time, it can expose us to other harms, insofar as it undermines social order by allowing wrongdoers to evade detection and punishment. Ross Ulbricht started out with an ideological commitment to anonymity but soon discovered that he could not maintain a market without some sort of stable identities that linked people's past actions to future consequences. He tried to make the pseudonyms in his shadow economy sticky by requiring a deposit, but this deterred only small-time scammers. To deal with bigger threats, he resorted to researching the culprits' legal identities and eventually obliged all of his administrators to verify their identities to him with government-issued documentation. To maintain his market, Ulbricht thus ultimately had to rely on the identity system of the very state he was trying to "evade and avoid."

Like Ulbricht, Internet visionary John Barlow and eBay founder Pierre Omidyar also started out as resolute proponents of privacy and anonymity. Like Ulbricht, they had to change tack when personally faced with the problem of maintaining social order.

For years, Barlow advocated for privacy-enhancing technologies and opposed government attempts to circumvent them. In 1991, he fought a bill introduced by Senator Joseph Biden that was intended to ensure lawful government access to encrypted communications.[46] Barlow's Electronic Frontier Foundation also advocated against the use of social security numbers to link people's identities across contexts, such as when insurance providers shared customer information between each other to combat fraud.

Yet when Barlow had to imagine how social order would actually be maintained in the cybersociety that he envisioned, his solution involved giving up on privacy. People's actions would be fully transparent to each other, resulting in spontaneous cooperation. Privacy-enhancing technologies were only a stopgap measure until netizens attained the moral consciousness not to abuse one another's information:

> The Global Village would resemble a real village, at least in the sense of eliminating the hermetic sealing of one's suburban privacy. Everyone would start to lead as public a life as I do at home. . . . I am protected in Pinedale, not by the restriction of information, but by a tolerant social contract which prohibits its

use against me (unless, of course, it's of such a damning nature that it ought to be used against me).[47]

Omidyar was likewise a privacy enthusiast. He participated in the social security number discussion in EFF's Usenet group. He described how he had personally refused to share his social security number with an insurance provider. But when his marketplace experiment was threatened by fraud, his solution was to ask his users to give up their anonymity and "register" themselves into his database. At the time, most sites on the World Wide Web could still be browsed anonymously, so eBay led the way in introducing identification to the 'net. Not long after, eBay also started requiring sellers to provide proof of their legal identities.

YOUR VIRTUAL PASSPORT

Libertarian technologists failed to figure out a way to maintain social order without the kind of stable identities that the state provides. But that does not mean technologists will always be reliant on the state to provide such identities.

The notion of a legal identity is a relatively recent innovation. Some medieval churches maintained records of births and marriages, and secular governments occasionally coopted their records for local administration. It wasn't until the eighteenth and nineteenth centuries that rivalry between Europe's emerging nation states led them to attempt to identify every person within their territories, to maximize taxation and conscription, and to thwart spies and fraudsters. People were assigned "user accounts" with their governments in the form of identity documents and government records. To make extra "user accounts" difficult to create, authorities collected documentary evidence such as birth certificates and recorded photographs and biometrical data on the individual's body.[48]

Viewed in this way, a legal name is essentially just another pseudonym that has been made exceptionally hard to replace. But the state no longer has a monopoly on pseudonyms that are hard to replace. Since the FBI pulled the plug on Silk Road, over a hundred new darknet markets have been launched. Their administrators now encourage their users to link their virtual identities across multiple darknet marketplaces, with the help of cryptographic signatures. This way, users feel the repercussions of

their actions not just on the site in which the deed occurred but across an entire archipelago of marketplaces, multiplying the stakes.[49]

And consider that the archipelago of darknet markets is tiny compared to the digital empires of giants like Apple, Facebook, and Google. As more and more aspects of everyday life and business flow through the platforms that they operate, the identities that they assign to us become that much more important and painful to lose. Though they claim no dominion over our physical bodies as territorial states do, our virtual identities—the identities that increasingly matter—are entirely in their hands. As a result, even without knowing our government-enforced names, platform giants are able enforce a degree of order over us. Indeed, when online merchants today want to have a handle on your identity, they increasingly ask not for a scan of your government-issued passport or driver's license—which could be faked anyway—but for your Apple ID, Facebook ID, or Google ID.

In some ways Ulbricht was right, then, in thinking that the Internet could spawn a shadow economy, one that may starve the state of tax revenue. To some extent this shadow economy may even conceal us from the state. But what it cannot do is conceal us from its own coercive authorities.

5

DEATH OF DISTANCE, RESURRECTION OF BORDERS: LABOR MARKETS IN CYBERSPACE

> To reside in a suitable locality, to have . . . vast learning, skill in handicrafts . . . and to be engaged in peaceful occupations—this is the highest blessing.
> —*Mahā Maṅgala sutta*[1]

In early 1970s, Greece was controlled by a US-supported military dictatorship. The Regime of the Colonels, as it was known, crushed dissent with censorship, surveillance, beatings, and torture. The country was isolated from European affairs, and its entry into the European Community—the precursor to the European Union—blocked.

In 1973, students at one the country's most prestigious universities—the National Technical University in Athens—went on strike. They occupied the university's main buildings and started chanting slogans against the regime. Thousands of people came out to the streets in their support. The crowd was jubilant. Speeches were given.

But the regime's forces quickly surrounded the dissidents. Snipers opened fire. Students barricaded themselves inside university buildings. Physically cut off from the outside world, they used laboratory equipment to cobble together a makeshift radio station. Over radio, they kept on chanting their revolutionary messages, this time to an even wider audience:

> This is the Polytechneion! This is the Polytechneion! . . . People of Greece, the Polytechneion is the flag bearer of our struggle, of your struggle, of our common struggle against the dictatorship and for democracy![2]

The following night, the regime's forces put a violent end to the radio transmissions. A tank crashed through the students' barricades. But the message had already been received. It triggered a series of events that led to the dictatorship's fall. The first free parliamentary elections since the dictatorship were held exactly a year later.

During these events, a boy named Odysseas Tsatalos was growing up in Athens. His father was a lawyer, and his parents wanted their son to become a doctor. But the boy was far more interested in technology. He was particularly interested in a new study area called information technology (IT) that the National Technical University had introduced after the dictatorship's fall. His father thought that information technology was "an end of the career before it even began."[3] But Tsatalos's best friend, Stratis Karamanlakis, shared his interest in IT. And times were changing. Greece joined the European Community, borders were opened, and funding for IT development poured into the schools.[4]

In 1983, Tsatalos and Karamanlakis took up studies in information technology at the famed Polytechneion, and in 1988, both men graduated with degrees in computer science. But after graduation, their paths diverged. Karamanlakis started a career in Greece. Tsatalos was admitted to a pioneering computer science graduate program at the University of Wisconsin at Madison in the United States.

THE TYRANNY OF DISTANCE

By 2001, Tsatalos's life in the United States had taken him to California. He was working as the chief technology officer of a startup company that he had cofounded called Intacct Corporation. The company was based in San Jose, the unofficial capital of the Silicon Valley, and it was building a digital accounting system for large enterprises. The system's special feature was that it could be accessed remotely over the Internet using a web browser.

But as migrants do, Tsatalos missed his native country. He missed the people that he had left behind to pursue this path. One day, the pain and nostalgia coincided with business requirements: a need came up for Intacct to hire a contractor with skills that matched those of his old best friend, Karamanlakis. Karamanlakis had also become an experienced IT

professional. But he had built a life on the old continent and could not be convinced to uproot and migrate 11,000 kilometers to San Jose.[5] A work visa was not necessarily easy to obtain, either, as numbers were capped.

The two friends thought that they could work together remotely over the Internet. After all, the Internet was supposed to transcend borders, as John Barlow had proclaimed, and provide the "wiring necessary to bridge the gap" between distant knowledge workers and employers.[6] Other thinkers had made similar proclamations. "All persons tapped into the global communications network . . . have ties approximating those used in a given metropolitan region."[7] As a result, "What once had to happen in the city can now take place anywhere."[8] The information superhighway made actual highways unnecessary because "it is no longer necessary to leave your home to work."[9] The world was turned into a "spaceless city" where "the whole population might require no more than the 30 atom diameter light beam of an optical computer system."[10]

Even if some of these visions did seem a bit overblown, broadband Internet connections were now over two thousand times faster than Barlow's original 300-baud modem. Tsatalos and Karamanlakis were both information technology professionals, and Intacct was a software company whose main product was a remote access system. The inputs and outputs of Karamanlakis's work were lines of software code that could be easily transmitted over the Internet with standard tools like ftp and cvs. If the Internet was going to transcend borders anywhere, this was about the easiest scenario that could be imagined.

Yet Intacct's CEO rejected the idea. The reasons had nothing to do with Internet speeds or ways to transmit code. The issue was managerial. The typical contractors at the time sat at desks at the company's office where others could collaborate with them—and where they could be effectively monitored. How else would managers ensure that contractors spent their billable hours on what they were supposed to be spending them on?

Social scientists call this the *principal-agent problem*: the problem of ensuring that agents (the contractors) truly work in the interest of the principal who hired them (the company). It is a sort of labor-market equivalent of the problem of exchange,[11] and like the problem of exchange, it is exacerbated when the two parties are at a distance from each other.

The principal cannot directly monitor the agent from a distance. Softer means, such as building a shared sense of purpose, are likewise harder to accomplish without close contact.

The principal-agent problem helps to explain why, despite the Internet's explosive growth, the visions of work moving from physical offices into a "spaceless city" had not been realized. In fact, the opposite had happened. People in search of jobs were flocking into actual cities like San Jose, Berlin, and London faster than ever before. They came from the countryside and from countries with fewer jobs. Many of the migrants were highly skilled programmers, artists, writers, and they came because they had found little use for their skills in their native regions. But cities were getting congested. In many places, rents skyrocketed. At the same time, remoter regions lost many of their brightest, and friends and families became separated.

The Internet might have made it easy for files to cross vast distances in milliseconds. But monitoring and trusting still depended on proximity, with the result that getting hired remained almost infinitely easier in person. Distance imposed a tyranny that humans had not yet overcome.

Tsatalos and Karamanlakis, perhaps unaware of these daunting facts, set about cobbling together a software tool that would address their CEO's concerns. Intacct was building a system for remote accounting management. Couldn't the same be done for contractor management? The more objections the CEO raised, the more features the friends added to their tool.[12]

The core of Tsatalos and Karamanlakis's tool was a remote monitoring system that made it possible for a manager to see a screenshot of what was happening on a remote contractor's screen once every ten minutes or so. The manager could also see a measure of the intensity of the contractor's keyboard and mouse use. All this surveillance was meant to simulate the shared office environment in which the rest of the team worked—where a manager could take glances at contractors' screens and hear their keyboards clicking. This not only reassured managers that billable hours were being spent productively—hardly an issue in this case, since the friends trusted each other—but also reassured on-site workers that everyone was being subjected to the same level of scrutiny. "The motto was, how can we make remote work feel like, look like, be like, local work," said Karamanlakis.[13]

By the time Tsatalos and Karamanlakis were finished, they had built an entire suite of remote collaboration and management tools. It included features such as instant messaging, an automatic time tracker, and tools for creating time sheets and sending invoices. They called their system the "online desk" or "oDesk" for short.

ODesk solved the problem that the friends had set out to solve: how to make it possible for Intacct to hire Karamanlakis. But by this point Karamanlakis and Tsatalos were no longer interested in working for Intacct. They realized that other managers and contractors around the world could also benefit from oDesk—not because they were long-separated friends but because it would allow them to reap the benefits of migration without anyone actually moving.

"YOU MAY SAY YOU ATTENDED HARVARD . . ."

In 2005, Tsatalos and Karamanlakis successfully raised venture capital for their startup—oDesk, Inc.—and rented an office in Redwood City, in Silicon Valley. The funders complemented the team with Gary Swart, an experienced executive. Swart took over as chief executive officer, while Tsatalos and Karamanlakis continued to develop the technology.

On the business side, the team immediately faced a problem. Their product allowed firms to manage contractors in distant places. But firms didn't yet have contractors in distant places. They had contractors only in their local areas.

For any project, there might well have been a candidate somewhere in the world who could do the job better and charge less than a local contractor. The contractor could be in an Indian megacity, in Kenya's budding Silicon Savannah, in one of Eastern Europe's post-Soviet technical universities, or even in the US Midwest. A firm in Silicon Valley, where the costs were now sky high—or in Berlin's Silicon Allee or in London's Silicon Roundabout—could benefit greatly from finding that candidate and hiring them remotely. The candidate stood to benefit likewise. But in practice, there was no easy way for the parties to find each other.

In economic terms, the problem was that of search costs. Pinpointing the right candidate from the haystack of the world's labor pool required

lots of effort. The Internet had lowered search costs to a certain extent. A firm looking for a remote contractor could post information about the opening to Usenet's misc.jobs.contract group or its web-based successors and receive résumés via email. But evaluating foreign candidates' qualifications remained almost as difficult as before. What skills does this person have? Are these references from reputable firms? Is this degree from a good university? How do I know if this degree certificate is real? Each country had its own institutions and cultures of evidencing competence.

Contractors had similar questions about prospective clients and their credentials. For both parties, local prospects remained much easier to read. As a result, despite whatever voltage potentials might have existed in terms of labor prices and skills, search costs tended to make distant labor contracts uneconomical to pursue. To overcome the tyranny of distance, it wasn't enough to solve the principal-agent problem; the search cost problem also needed to be addressed somehow.

At first, oDesk's team addressed search costs by doing the legwork on their customers' behalf. CEO Swart explained:

> We would screen all of the clients. We would screen all of the talent, and, we would put the two together. . . . So essentially we were a staffing firm helping you to find, hire, manage, and pay talent . . . in a high touch way.[14]

By manually searching for clients and contractors around the world and carefully researching their skills and requirements, oDesk's team was able to make some good matches happen between distant parties and in this way acquire some initial customers for their remote management system. Tsatalos and Karamanlakis also recruited some skilled software development contractors from Eastern Europe for their own team.

But all that manual screening and matching was costly, and it didn't get any cheaper as they added more customers. It wouldn't scale up like eBay or Google, whose services relied more on technology and the work of the users themselves. This probably didn't please oDesk's investors, who had invested in a technology company, not in a boutique staffing agency. Tsatalos, Karamanlakis, and their team of remote contractors thus started looking for a technical solution to the search-cost problem. They began to build an "online talent marketplace"—a sort of eBay for freelancing in which technology, not customer service, would allow users to overcome search costs and prevail over the tyranny of distance.

In practice, the team built a website on which contractors could browse jobs posted by clients and apply to work on them; clients could browse contractor profiles and invite them to apply. But unlike a conventional job board like misc.jobs.contract, the site displayed lots of standardized information about the clients and especially about the contractors. In particular, it displayed information that was reported not by the users themselves but by other users or by the system itself as it observed the users.

For example, the profile of a contractor named Gustavo indicated that he was a "PHP Developer / Full-Stack Developer" based in Portugal.[15] The profile was adorned with tags for various skills (such as PHP, MySQL, and system administration) and indicated that his standard rate was $57.50 per hour. The profile also presented results from computer-administered skill tests that Gustavo had taken on the platform.[16] He had obtained a full 5.00 grade from the PHP, MySQL, and UNIX tests. According to the platform, this placed him in the top 10 percent of test takers. His English grade was 3.75, placing him in the top 30 percent. As another contractor explained:

> Once you're able to take a test for that skill you've acquired, you're telling your potential clients that I'm capable of doing this stuff: "Hey you can go see my profile; I'm capable of doing that."[17]

Instead of references from past employers, the profile displayed information on past projects carried out through the platform. Gustavo's latest project was titled "Bug fix web app and add features," for which he had charged 506 hours and earned a full five-star rating, with written feedback praising his technical skills. Another 224-hour project had been somewhat less successful, earning him only 3.5 stars and the following note: "He can do the job, speaks good English, is intelligent, but is often, if not always, late." The platform also displayed the total number of projects that Gustavo had completed, the total amount of money that he had earned, and various other statistics about his experience and track record.

These bits of information reduced search costs in two ways. First, because they were collected in a standardized format, they could be used to perform rapid automatic searches. For instance, a client could ask the platform to list all full-stack developers with an hourly rate between $30 and $60 who were fluent in English. Second, and perhaps most important, clients could place a fairly high degree of confidence in the information because it wasn't just self-reported bragging but instead it was qualified

data—some provided by other users and some observed directly by the platform itself. As one contractor explained:

> You may say I attended Harvard, I have this, I have that. . . . Nobody is going to pay you based on that. . . . While your skills are very important and all that, the validation comes from the client feedback.[18]

Through statistical analysis of transaction records, my colleagues and I found that clients did indeed pay higher rates to contractors who had completed more skill tests, obtained better feedback, and amassed longer track records.[19] A one standard deviation increase in the number of skill tests completed—which in this case corresponded to about six additional tests—was associated with a 3 percent increase in the contractor's hourly pay. A standard deviation is a statistical measure that makes it possible to compare the effects of variables that are expressed in different units. A one standard deviation increase in the contractor's average reputation rating—corresponding to about three-quarters of a star on a five-star scale—was associated with 7 percent more pay. And a one standard deviation increase in the contractor's project experience—about eighty additional projects—meant 19 percent more pay. Many contractors' experiences accorded with these findings:

> I ask for more money now than I asked for 5 years ago. I have more experience and . . . many good feedbacks, and clients can trust me on projects.[20]

> I [effectively] choose how much I get paid. I have got to that level where I have sufficient experience and sufficient feedback to set my own rates. . . . I am grouped [by the platform] under expert.[21]

We also found that university degrees and other formal qualifications that contractors mentioned on their profiles were not associated with any extra pay. This is not to say that education wasn't useful in remote contract work. On the contrary, remote contractors were on average more highly educated than the general population. But it appeared that in this transnational labor market, degrees were not an effective way of evidencing the skills that education provides. Instead, workers and employers relied on the digital qualifications developed by Tsatalos and Karamanlakis as evidence of skills and competence.

SAME WORK, DIFFERENT PAY

With the talent marketplace set up to overcome search costs, and the monitoring system fortified with a dispute resolution center to handle inevitable disagreements, oDesk's cloud labor market was ready to take off. CEO Swart launched marketing campaigns that would bring clients to the platform. He knew that client demand would attract contractors. "Looking for offshore technology professionals? With oDesk it's as easy as 1-2-3," said the home page.

Contractors started signing up—first in the thousands, then in the tens of thousands, and then in the hundreds of thousands. In February 2012, the company announced that it had signed up a total of 1.6 million contractors. Clients hired contractors and projects were delivered; the marketplace worked.

The great majority of contracts—approximately 90 percent—took place between a client and a worker based in two different countries.[22] Had knowledge work finally transcended national boundaries? Was the tyranny of distance overthrown?

> It's much easier getting jobs when you're not from Kenya. . . . It feels demoralizing that people think that you're unskilled if you're from the third world. Third-world people are only offered low-skilled jobs.[23]

Thus spoke Gradus, a twenty-seven-year-old remote contractor based in Nairobi. He spoke fluent English and had studied actuarial science at a university. Yet contracts that he felt qualified to do tended to go to Europeans, Americans, and Australians instead. Even though the nationality of someone who wrote reports and performed calculations on a spreadsheet should not have mattered, it was starting to become apparent that clients on platforms like oDesk discriminated against contractors from lower-income countries. This was ironic because it was precisely these workers who, in principle, could have delivered the greatest savings to clients and gained the greatest improvements to their own livelihoods. As Annika, a thirty-six-year-old freelance writer in Johannesburg, South Africa, explained:

> There's . . . the perception that the quality will not be as good, the English language skills will not be as good, and for some people that holds true. [For] a lot of people on this continent, that's not true at all. We speak, read, and write excellent English.[24]

In practice, these prejudices meant that to win contracts from clients, workers like Gradus and Annika had to accept pay rates that were extremely low, even by the standards of their countries' generally lower wage levels.[25] Discrimination was of course not unique to remote freelance work. Migrant workers, agricultural producers, and manufacturing firms from lower-income countries all had to battle negative country stereotypes when entering global markets. Perhaps even a digital online labor market could not hope to transcend discrimination based on race and geographic origin.

But as time passed, something interesting began to happen. Workers from both rich and poor countries obtained higher rates as their experience grew—but for workers in poorer countries, this effect was in some cases noticeably faster. For instance, an average graphic designer in the United States earned about $20 per hour, but one standard deviation's worth of additional project experience was associated with an increase of only 0.1 percent in their pay rate. Designers in the Philippines earned much less to begin with—about $9 per hour—but their gain from additional experience was over 5 percent. Indian designers likewise earned about $9 per hour but gained over 8 percent from additional experience. As a result, the more experience these workers racked up, the narrower became their pay gap with workers from rich countries. The same also applied to skill tests and star ratings. Some contractors had noticed this. An audio transcriber in Manila claimed:

> Once . . . you do get those first few projects and you get good feedback for that, then it doesn't really matter anymore that you're from the Philippines.[26]

A software developer in Lagos, Nigeria, agreed:

> I had almost 250 jobs and all of them were five stars. . . . Most of the time, when I send the invitations, they say, "Hey, I see your profile and I see you're a very good programmer, can you help me with this?" They don't say, "Hey, I see your profile, you're a Nigerian."[27]

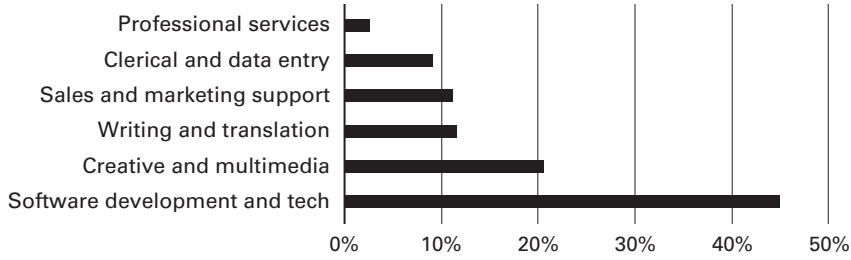
Some of the discrimination that workers from lower-income countries experienced in the global online labor market thus appeared to have been what economists call *statistical discrimination*: employers hesitated to pay these workers the full rate not necessarily because of any deep-seated hatred or animosity but because they believed—rightly or wrongly—that untested workers from such countries would, on average, be less competent than

their North American and European peers. Once hard evidence of the workers' competence started to pile up, employers' behaviors changed, as they could see for themselves that the workers were in fact highly competent. American and European workers' rates didn't improve nearly as much, since employers were assuming them to be more competent to begin with. This way, the platform's digital qualifications helped knowledge workers from some of the world's more marginalized regions to overcome some of the prejudices that they faced and win more contracts at better rates.[28]

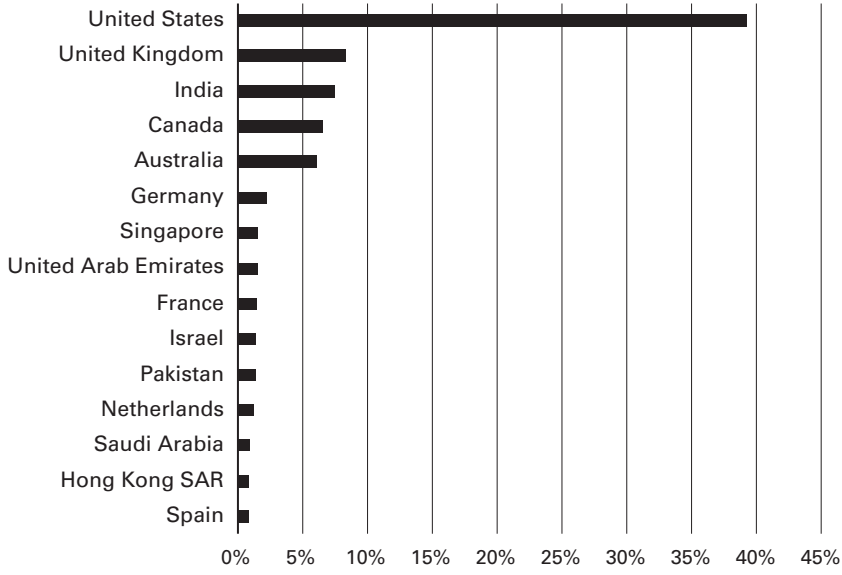
In another study, we found that platforms disproportionately benefited rural inhabitants in the United States as compared to their urban peers.[29] In absolute terms, urban workers used the online labor market more, simply because there are far more people in cities today. But relative to population, rural Americans made significantly more use of the online labor market. Moreover, they completed significantly more demanding projects than urban online contractors did; for instance, they often did programing instead of data entry. This makes sense because skilled specialists who live in urban areas can find suitable jobs locally and don't have to go online. In rural areas, jobs for people with highly specialized skills are scarce; usually they migrate to cities, but now many were using an online labor market to find work.

ODesk's success was mirrored by other online labor platforms. With names like Guru.com, PeoplePerHour, Prolance, and vWorker, most lacked oDesk's sophisticated monitoring and collaboration tools, but they had built up markets around specific types of contracts and clients. This initial proliferation was followed by consolidation. Many smaller sites were bought up by Freelancer.com, a venture capital–backed platform based in Sydney, Australia. ODesk merged with its major competitor, Elance, and in 2015 the combined platform was rebranded as Upwork. By 2016, most of this new global online labor market was underpinned by a handful of English-language platforms.[30]

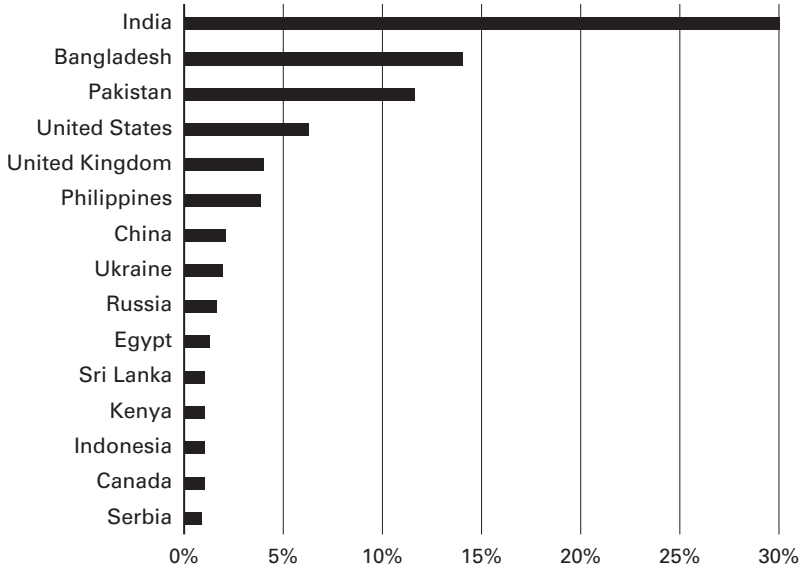
The largest occupational category in the new global online labor market was software development and technology, which accounted for over 40 percent of projects in the market (figure 5.1).[31] Most of the demand came from high-labor-cost countries. The United States alone accounted for almost 40 percent of the demand (figure 5.2), while European employers together accounted for just under 30 percent. Most of the labor supply



5.1 Online labor market share by occupation in 2020.



5.2 Online labor market share by employer country in 2020, top fifteen countries.



5.3 Online labor market share by worker country in 2020, top fifteen countries.

came from workers in lower-income countries; over 50 percent of the workers were in the Indian subcontinent (figure 5.3). Only in the professional services category did workers from the United States and United Kingdom hold the greatest market shares.

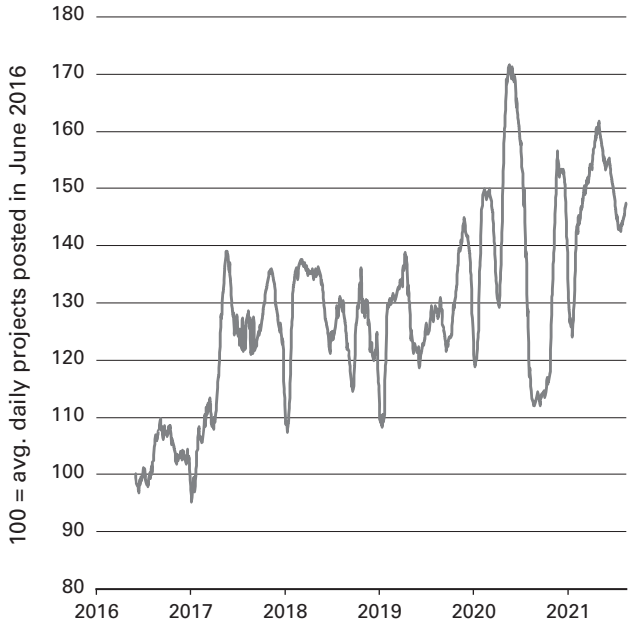
Most workers were located in countries that were already major destinations in conventional IT and business process outsourcing—countries like India and the Philippines, where multinational corporations had established back offices and call centers. Back-office employees found that platforms allowed them to do similar work as they were already doing but as independent contractors, trading job security for the potential of flexibility and higher earnings.[32] "The jobs that we are being asked to do on [a platform] are most probably the same as what we're doing in the office," said a data entry keyer in the Philippines.[33]

But many workers also lived in remoter regions where the outsourcing companies had never set foot. If they possessed valuable skills and knew how to market themselves, platforms were their gateway to the global economy. For both kinds of workers, the online labor market presented an electrifying opportunity to work directly for clients in distant, wealthy countries—countries that many desired to travel to but few ever could.

GLOBALIZATION IN CYBERSPACE

From 2016 to 2017, the global online labor market—as measured by the number of projects posted on platforms per day—grew by about 30 percent (figure 5.4). By the standards of national labor markets, which in most countries grew around zero percent in the same period, this was extremely impressive growth. But by the standards of digital platforms, it was slow. Over the next couple of years, the number of new projects ceased to grow altogether. Demand dipped during year-end holidays and northern summer months as clients went on holiday, and it recovered just as fast when clients returned. But the overall trend remained flat.

At this point, Upwork had 14 million registered workers based in 180 countries. The workers were earning over $1 billion per year through the platform, of which the platform took 10 percent as fees.[34] But as more and more workers entered, competition put increasing pressure on wages.



5.4 New projects posted daily to the online labor market relative to projects posted in June 2016 (28-day moving average).

Without the tyranny of distance, jobs on the platform flowed to wherever the costs were lowest. A Nigerian enterprise IT contractor lamented:

> I'm no longer competing with Nigerians. . . . I'm competing with people from all over the world. . . . Somebody will bring the same quality for a lower pricing. Now, we talk about that a lot, the cost of living in his country. He can afford to do it at that rock bottom price. . . . I can't go lower.[35]

A Kenyan contractor felt the same:

> The competition is tough. . . . in India, they offer very [high] quality work at a very cheap rate, extremely cheap. . . . Sometimes I want to take a job, but I can't, because there is someone who has bid a lower rate and will finish the work even faster.[36]

Commentators suggested that this virtual globalization would lead to a race to the bottom in wages. Indeed, some online labor platforms specialized in low-paid, deskilled work. E-commerce giant Amazon launched a platform called Mechanical Turk in 2005 as a way to source remote pieceworkers for the company's own needs.[37] A typical task was to label images to produce training data for an AI system. Pay rates—and thus Amazon's labor costs—were permanently depressed by unbridled competition between workers around the world.

But platforms like oDesk had rather different incentives. They earned all of their income from "payroll taxes" or fees paid by the workers and employers who populated the platform. A dirt-poor, low-wage labor market yielded less tax income per capita. It also scared away the most skilled knowledge workers and the lucrative clients who pursued them. Platform owners began to realize that the virtual globalization they had unleashed on their digital domains had its downsides.

Labor laws and regulations of the countries where the workers lived were of little use in moderating oDesk's virtual globalization, as they did not apply to independent contractors. Had they applied, rules such as minimum wages varied drastically between countries, and many countries had no statutory minimum wages at all. Administrators at oDesk realized that if they wanted to create a high-skill, high-wage economy, they would have to start regulating the market themselves.

In August 2014, the company announced a "policy update":

> Beginning November 15, 2014, we will introduce a minimum rate of $3.00 per hour (including the oDesk fee) for all new hourly contracts. . . . Our vision is to

be the world's largest, most trusted online workplace, known for top-notch talent and jobs. . . . we believe the new hourly minimum will benefit the entire community by setting an expectation of higher pay for higher quality work.[38]

Three dollars was a very low bar, and the company said that only about 3 percent of worker earnings fell below it at the time. But its significance was that it was a truly global minimum wage. For the first time in history, workers from New York to Nairobi and Mumbai to Manila were brought under the same mandatory minimum standard, enforced by the same authority. Policy implementation was swift and effective: if users tried to insert a rate below $3 into a contract, they received an error message from the platform: "Please enter a value between $3 and $899."

The downsides of the policy also became immediately apparent. "I'm a stay at home mom badly in need of job, but because of this decision, I'm unable to," wrote a worker in India on oDesk's community forum.[39] "How long will this test run? We are suffering from lack of job," wrote a virtual assistant in Bangladesh. Workers whose competitive advantage had been their extremely low hourly rate were now deprived of that edge. A data entry specialist in the Philippines argued that work that paid below $3 had still been "pretty good money, especially if it allows you to stay in your province, not have to move to the big city for a job and live in a boarding house."

Still, many other workers welcomed the new policy, as did many clients. An experienced contractor in India wrote as follows:

As a quality Freelancer, I myself have faced a lot of competition. . . . By setting minimum rates, oDesk has clearly sent a message to low-quality freelancers, and to the clients who think that they can take the existing competition for granted. Thank you, oDesk!

Economist John Horton measured the effects of oDesk's minimum wage policy.[40] He found that average hourly wages on the market increased by 10 to 15 percent, while the total number of hours worked diminished by about 6 percent. Employers dropped workers whom they had previously paid under $3 and switched instead to better-paid workers who appeared to be more productive in that they accomplished the same work in less time.

ODesk followed the minimum wage policy with many other policy measures, both soft and hard. As a soft measure, the platform started nudging workers into requesting higher wages when their skills and productivity

seemed to justify it. The administration collected data on projects and pay rates and used it to provide guidance to the workers as they submitted their bids.[41] Another policy measure was to advise workers on skill development. The administration started publishing a quarterly list of skills whose demand was growing in the online market, complete with links to relevant online courses—"Digital Media and Marketing Strategies" on Coursera, for instance, and "Deep Learning with Python" on edX.

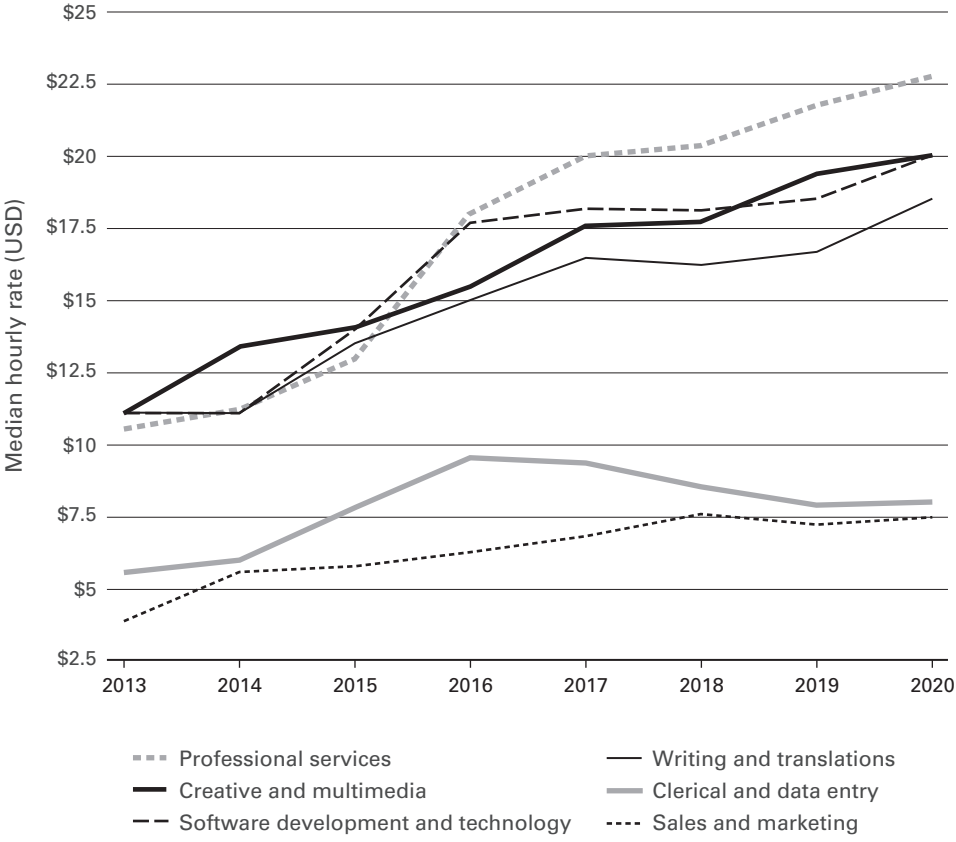
In segments where labor demand exceeded supply, the platform's administrators used online advertising to attract more workers. And for segments where labor supply already exceeded demand, the administration instituted a system of vetting new entrants. "Unfortunately, at this time there are already many freelancers with a similar skillset to yours and we cannot accept your application," said a message to those denied entry.

All the policy measures were supported by a system of classifying skills and specialties that was far more fine-grained and up-to-date than the occupation classification systems used by national statistical agencies and employment offices. For instance, while the United States Department of Labor's Occupational Information Network recognized only one type of computer programmer, oDesk's system distinguished between over a dozen specialisms, from firmware development to game development.

On the whole, oDesk's/Upwork's labor market policies seemed fairly successful in managing wages (figure 5.5).[42] In some segments of the market, competition remained more intense than in others, resulting in very low wages. But across the entire market, average wages did not fall over time; they increased from about $11 in 2013 to about $18 in 2020. It was nothing like a high-wage labor market comparable to Silicon Valley or London. But the race to the bottom—unleashed by oDesk's elimination of borders and distances—had been stopped, and thousands of people enjoyed higher wages on the Internet than they would have been able to obtain in their local labor markets.

THE EDGES OF CLOUDS

Territorial forms of social organization—like states—are good at underpinning territorially bounded markets. Transactions that cross territorial boundaries are almost by definition difficult for them to support. An



5.5 Median hourly pay rate on Upwork by occupation, 2013 to 2020.

independent knowledge worker in the Philippines cannot use national courts to recover fees left unpaid by a London-based client. Even when it is possible legally—which is by no means always the case—it is almost certainly unviable economically. So strong is the link between national territories and market boundaries that in international business jargon the word *market* is used to refer to countries.

Tsatalos and Karamanlakis wanted to liberate workers from the confines of their local labor markets—to "make remote work feel like, look like, be like, local work." With clever mechanisms, they successfully helped thousands of workers and employers to find each other over distance, cooperate across national boundaries, and to some extent even overcome discrimination based on nationality. With active policy making, their deterritorial

administration also mitigated many of the effects of the ensuing global competition for jobs.

Yet in the end, they achieved this not by eliminating the importance of location as such but by substituting a kind of virtual location for physical territory. Just as rural workers had to journey to the city to meet employers, knowledge workers had to turn up at Upwork to find a client. Upwork and a handful of other platforms became the new nexus where supply and demand met. "You use them because you have to. . . . no one has any other option," said a digital marketing contractor in Los Angeles.[43]

And if traditional references and degrees were most valuable in their national contexts, so knowledge workers' reputation ratings and other indicators of quality were tied to the platform. On the platform, the worker had a profile that the administration and previous clients vouched for. Outside the platform, they were a stranger scarcely worth trusting. "I was so close to deactivating. . . . then I realised, oh, no, all those good feedbacks are going to be deleted," said a programmer in Manila.[44]

And as countries had their courts and employment tribunals, Upwork had a dispute resolution center, in which administrators handled disputes taking place within their virtual jurisdiction. They could enforce payment of monies held in escrow but only for work conducted through the platform. Many workers had stories of having been lured to conduct work outside the platform to save on fees—only to be cheated of pay.

Indeed, so tough was it to make a living in the unincorporated Internet outside of this virtual hiring town that many more people wanted to enter it than its administrators were ultimately willing to let in. Like Canada or Australia, the platform began to admit only those deemed valuable to the economy and denied entry to the rest. Its initially open borders were replaced with the virtual equivalent of an immigration point system, with visa numbers tightly controlled. The most desperate turned to buying Upwork identities like fake passports from the black market to smuggle themselves in.

That Tsatalos and Karamanlakis ended up erecting virtual borders in place of physical ones illustrates how borders are not historical leftovers but consequences of modernity. Premodern boundaries could be vague, as cooperation and search rested on informal norms and personal networks. But formal institutions like courts, regulations, and standards entail sharp distinctions between those within and those without. A person cannot be

slightly subject or somewhat accredited. As platforms created digitalized versions of modern institutions, they ended up recreating borders as well.

European state borders were originally established along geographic features like rivers and mountain ranges that inhibited trade and offered natural protection. As communication and transport improved, geography became less significant in shaping interactions, and institutional boundaries more significant. More recent state borders, such as those drawn by European colonizers in Africa, are more virtual in that they are straight lines divorced from geographic and tribal realities, reflecting only institutional boundaries willed into being by the powers. The borders of platforms today are entirely virtual, encompassing identities and affordances instead of bodies and soil. But more and more hinges on where exactly they fall, while the unincorporated 'net between platforms' domains grows increasingly thin.

6

CENTRALLY PLANNED FREE MARKETS: PROGRAMMING A SOVIET UNION 2.0?

I like to think
(it has to be!)
of a cybernetic ecology
where we are free of our labors
and joined back to nature,
returned to our mammal
brothers and sisters,
and all watched over
by machines of loving grace.
—Richard Brautigan, "All Watched Over by Machines of Loving Grace" (1967)[1]

A man goes into a shop and asks, "You don't have any meat?" "No," replies the sales lady, "We don't have any fish. It's the store across the street that doesn't have any meat."[2] Citizens of the Soviet Union liked to joke about the constant shortages that afflicted their economy. At the same time, other goods could be in absurd oversupply. A retailer in the town of Kuybyshev received two hundred pairs of skis for the summer season of 1959.[3]

Economic planning in the Soviet Union hadn't always been so comically ineffective. In 1928, when Joseph Stalin imposed full central planning, the country was Europe's rural backwater: with a population of 150 million people, it had only about four thousand sizable enterprises.[4] In just a few decades, the economy transformed into an industrial powerhouse

capable of rivaling Western market economies in heavy industrial and arms production.

Socialist thinkers like Karl Marx posited that markets governed by individual whims were irrational and wasteful, something that humanity should replace with science and reason. "Socialism is calculation," explained Lenin. The Soviet government thus engaged hundreds of leading mathematicians and engineers to work as economic planners.

Market-led development in Russia had faced a chicken-and-egg problem: it was unprofitable to invest in coal mines until somebody built steel mills, but it was unprofitable to invest in steel mills until somebody mined coal. By deciding what was produced and what uses the products were put to, central planners were able to coordinate investments in a "big push" across sectors, resulting in rapid growth.[5] One of the leading planners, mathematician Leonid Kantorovich, was awarded both the Stalin Prize and the Nobel Prize in economics for his contributions to optimal resource allocation.

Yet from late 1950s onward, the growth began to stall. Shortages and misallocations perturbed the economy. Central planners suddenly turned into laughing stocks at home and abroad. What went wrong? To some extent, the Soviet economy had profited from the violent repression and outright slave labor of Stalin's prison camps, which were gradually dismantled after the dictator's death in 1952. Problems from corruption to excessive military spending also rankled the system. But according to an influential 1945 article by Austrian-British economist Friedrich Hayek, the fundamental problem was data:

> The "data" from which the economic calculus starts are never for the whole society "given" to a single mind which could work out the implications, and can never be so given.[6]

Hayek pointed out that there was little disagreement between market economists and Soviet economists that society's resources should be allocated to their most efficient uses. The real challenge was to know what those uses were. In the Soviet system, it was up to government planners to figure it out. In market economies, it was down to individuals to decide.

> Which of these systems is likely to be more efficient depends mainly on the question under which of them we can expect that fuller use will be made of the

existing knowledge. And this, in turn, depends on whether we are more likely to succeed in putting at the disposal of a single central authority all the knowledge which ought to be used but which is initially dispersed among many different individuals, or in conveying to the individuals such additional knowledge as they need . . . [7]

Hayek argued that lots of important economic information consisted of tiny details and "special knowledge of circumstances of the fleeting moment not known to others,"[8] which "cannot be conveyed to any central authority in statistical form."[9] Lacking these small but important details, central planners made mistakes when allocating resources, explained Hayek. Some of the mistakes cascaded into blunders, resulting in shops featuring skis in the summer season.

But when we allow individuals to make their own free choices, argued Hayek, they can put their special knowledge to use. Moreover, the market communicates the essence of their knowledge to others as well, since the competitive market price changes ever so slightly in response to each decision. When snow falls on a town, the prices of skis increase, and the higher prices attract more suppliers. When the snow melts, ski prices fall, and resources are redirected elsewhere. Thus, the problem of how to make the best use of all the knowledge dispersed across society "can be solved, and in fact is being solved, by the price system."[10]

Goods in the Soviet economy had prices, too, but they didn't change spontaneously in response to people's choices because they were fixed from above by the central planners. Central planners also decided which raw materials were allocated to which factory and where the outputs were shipped. Hayek argued that a market economy was ultimately going to prove more efficient than a planned economy because "only thus can we ensure that the knowledge of the particular circumstances of time and place will be promptly used."[11]

In 1962, less than two decades after Hayek's article was published, data was indeed starting to become a serious problem for Soviet central planners. Back when the Soviet economy consisted of only a few thousand enterprises, it had been possible for a team of mathematicians and engineers to collect data from each enterprise and use it to decide what should be produced where and to what end. But since then, the economy had grown vastly more complex. It now featured 46,587 industrial enterprises,

174,697 warehouses, 603,400 retailers, and 163,100 places of public eating, in addition to other establishments.[12] A prominent Soviet economist lamented:

> It becomes harder year after year to balance the economy, to construct its plan, and to manage it. Because of the growing interconnections of its sectors, the flow of information in the economy expands approximately as the square . . . of the volume of production.[13]

Collecting and processing the information necessary to manage the economy had by this point grown to require the annual labor of an astounding 3 million Soviet bureaucrats across the government and industry.[14] Through reports, meetings, and telephone calls, they compiled approximately five gigabytes of data every month.[15] Producing the data took so long that the information was often out of date by the time it reached the top planners. And analyzing the data was so laborious that by the time a plan was ready, the period being planned was often well on its way. Statistical aggregates that lumped together similar items were used to reduce the amount of data, but this caused ambiguities and inconsistencies once enterprises tried to act on the plans.

The director of the Central Institute of Mathematical Economics conceded that no more than 10 percent of the data that was being collected could in practice be used in planning and administration by this point.[16] Shortages and misallocations became endemic. People increasingly turned to the black market for what they needed, and in 1991, the Soviet system finally collapsed.

Hayek became a libertarian icon. His observation that the price system was "a mechanism for communicating information" became a cornerstone of mainstream economics. Of course, Western market economies were not quite perfect either. For one, they suffered from embarrassing booms and busts in which insiders profited and masses suffered. Hayek's and his followers' prescription was to reduce government regulation to allow prices to fluctuate more freely and thus convey information better. They also believed that advances in information and communication technologies would help perfect markets by conveying prices ever more rapidly and widely.

ELIMINATING HUMAN IMPERFECTIONS

Pierre Omidyar was one of the people who took up the challenge of using technology to perfect markets.[17] He was a staunch believer in individual choice, but he had seen firsthand in Silicon Valley how unequal access to information distorted prices. He thought that the Internet—the largest information system ever created—could be used to overcome such imperfections. In his parents' birth country, Iran, the government still set the prices for many goods. Omidyar's goal was to create the very opposite—a "perfect market, something economists had only imagined, where everything sold for its ideal price."[18]

When Omidyar launched eBay, he saw how startlingly unpredictable individual needs and circumstances could be. He would never have thought to price his broken laser pointer at $14.83, and yet that was what it sold for because someone in another country happened to need it for spare parts. His platform had allowed the buyer to express this odd piece of information in the form of a bid, entering it into the "economic calculus" and thus making the economy that tiny bit more efficient. Soon millions of people traded goods on his global marketplace at prices that were often much better than what they could have obtained elsewhere.

Yet imperfections continued to distort prices even on eBay. A rather banal problem was that people misspelled items' names—typing "Dell *commuter*" or "*base* guitar"—with the result that they failed to be found or failed to find what they were looking for. More than 15 percent of listings for Bakelite products on the German eBay misspelled the material's name.[19] People also frequently listed items in the wrong categories. These human errors resulted in numerous listings languishing in obscurity and selling below their "ideal price." An entire class of eBay arbitrageurs emerged to resell mispriced items for profit. The market worked, but it remained far from perfect.

Fortunately, eBay's engineers found that human imperfections such as these were not too difficult to correct via technical means. They added spelling suggestions to fix typos. They also added an algorithm that automatically selected default categories for listings based on their descriptions. Administrators also manually moved listings that appeared to be miscategorized. These interventions allowed things to be allocated more efficiently.

Another imperfection that troubled eBay's engineers was that auctions were vulnerable to "sniping"—buyers waiting until seconds before auctions closed to submit their bids. Snipers' aim was to leave competing bidders with too little time to react, resulting in items selling below their "ideal price." Economists Axel Ockenfels and Alvin Roth published a study in which they argued that some of eBay's design choices had made the platform particularly vulnerable to sniping.[20]

To combat sniping, eBay's engineers created a simple AI bot that would bid for items on buyers' behalf. A buyer would program the bot with the maximum price they were willing to pay for a given item. The bot would then automatically outbid anyone up to the buyer's maximum limit. Since the bot had millisecond reflexes, trying to outsnipe it was futile. Some buyers complained that automation took the fun out of auctions. It reduced the human element in eBay's economy and shifted a part of the responsibility to the platform's centrally controlled algorithms. But it did make prices on the platform correspond more closely with the theoretical ideal of a perfect market that Omidyar was pursuing.

A "SMARTER" MARKETPLACE

Tsatalos and Karamanlakis, founders of the online labor platform oDesk, did not set out to create a perfect market as Omidyar did. They simply wanted to enable independent contracting over distance. Their initial solution to matching remote contractors with clients looked more like a planned economy in that it involved a cadre of administrators allocating workers to jobs. But they soon found that this approach was hopelessly inefficient. Meanwhile, eBay's massively successful "marketplace model" was celebrated in Silicon Valley. Before long, Tsatalos and Karamanlakis pivoted their service into a "talent marketplace" that eventually found great success under the name Upwork.[21]

Once the initial market mechanisms were in place, Upwork's engineers did not stop there. As resources grew, more effort was invested into identifying places where the market could be made more efficient. The company hired data scientists and, like eBay, enlisted the help of academic economists specializing in market design, such as John Horton.[22]

One of the things that Upwork's team found was that contractors, left to their own devices, tended to charge less money than in theory they

should be charging. This put an apparent dent in the platform's revenues. A community manager wrote on the official forum:

> We often see freelancers who continue to propose low rates, even after successfully winning and delivering on projects. Based on their skills, experience and proven track record on these types of projects, they could be charging and earning more, but maybe they just don't know it.[23]

Inefficiencies were also identified in the allocation of contractors to jobs. In Tsatalos and Karamanlakis's original system, clients would search for contractors in the site's database and evaluate them on the basis of standardized job histories and reputation ratings. This was far easier than soliciting and evaluating unstructured resumes and reference letters, but it had its shortcomings. One issue was that clients often simply did not know what they were looking for. Was the right expert to give a face lift to a corporate blog a "Web developer," a "CMS developer," or perhaps a "Social media strategist"? After all, the reason clients were seeking to hire someone was that they lacked the expertise themselves.

Another issue was that the market allocated jobs unevenly. Contractors with great track records got more job offers than they could handle, as clients around the world all zeroed in on their profiles. Contractors with few or no previous jobs on the platform hardly got any offers at all, since their profiles lacked the evidence.[24] This resulted in a "Matthew effect," in which the rich kept getting richer while the poor mostly remained poor. This was a known problem in markets underpinned by digital reputation systems: a small head start could snowball into a vast lead in popularity that didn't necessarily reflect a real difference in quality.[25]

On Upwork, this inequality was starting to become institutionalized. Some of the rich contractors, who got more offers than they could handle, were covertly outsourcing projects to the unluckier ones.[26] These digital foremen often picked subcontractors who lived near to them to be able to monitor them outside the platform. The work was done by the subcontractors, but a cut of the revenues—and all of the reputation points that brought in the next jobs—were captured by the foremen. Knowledge work was falling back into the hands of geographic gatekeepers from whom Tsatalos and Karamanlakis had tried to liberate it.

As Upwork's resources grew, its engineers and data scientists made improvements to the platform that addressed all of these issues. The site began to highlight some new workers as "rising stars," prioritizing them

in search results over older profiles with much longer track records. And instead of just mechanically returning the same top-ranked candidates to any employer entering a similar search query, the site got smarter about whom it would recommend to whom. Candidates to jobs were listed in the order of "best match," which was determined by an algorithm that took into account all kinds of data points, including the candidate's skills and existing workload. As former Upwork CEO Gary Swart explained:

> Your feedback, your reputation, your test scores, your verifiable work history, your recency, your citizenship, your karma, your eagerness, your availability. . . . [We now] put them all together to really make an effective match between the best client and the best freelancer every time.[27]

And to help prevent seemingly ignorant workers from undercutting their own wages, the engineers built an algorithm that calculated what each contractor should really be charging for each job. This "rate tip" was displayed in big green letters above the box where the contractor entered their bid. "This rate was calculated specifically for you and this client. It is based on your skills and experience, and accepted rates for similar jobs," the algorithm explained.

This new "smart" marketplace still let people make choices over prices and matches, but it also told them what their choices should really be. It also influenced their choices by selecting which information to display to them and in what order. The instructions didn't always seem right to the workers; they complained that the rate tips, in particular, seemed unrealistically high a lot of the time. But with enough data, an algorithmic recommender system should according to economic theory know what's good for people even better than the people themselves. Horton explained:

> In many online product markets, the creating platform now goes beyond simply providing information but rather makes explicit, algorithmically generated recommendations about whom to trade with or what to buy. . . . Algorithmic recommender systems can try to infer preferences, determine the feasible choice set and then solve the would-be buyer's constrained optimization problem. At their best, algorithmic recommendations can incorporate information not available to any individual party.[28]

THE ALGORITHM BECOMES THE MARKET

Travis Kalanick and his friend Garrett Camp were struggling to get a cab one snowy night after a conference in Paris. They were flush with cash,

having both recently sold their startup companies. But the weather that night meant that a lot of people were trying to get a ride, and there weren't enough cars to go around. The number of taxis licensed to operate in the city was strictly controlled by the local government, and even though the resulting system was notorious for its bad service, license owners vigorously opposed changes.

According to one story, this is how the idea for Uber was born.[29] Like Upwork, Uber would match labor demand with supply but would do so in cities instead of on the Internet. Back in California, Camp quickly built a prototype of an app with his friends, and Kalanick became the company's CEO. The app was officially launched in San Francisco in 2011 and immediately attracted opposition from taxi license owners and regulators alike.

Kalanick was born in 1976 in Los Angeles, where his father worked as a civil engineer for the city government. He went on to study computer engineering and business economics at the University of California, Los Angeles. He was admitted into Theta Xi, a fraternity or single-sex social club distinctive of North American universities. In 1998, he dropped out of the university to join his first startup company, a peer-to-peer file-sharing service.

Kalanick was a fan of libertarian author Ayn Rand. Rand had escaped from the Soviet Union to the United States. Highly critical of government regulation, her novels depicted plucky entrepreneurs turning the tables on meddlesome bureaucrats. Kalanick's startup went bankrupt when copyright owners sued it. But he cofounded another file-sharing startup, stuck with it, and this time managed to sell it for $23 million.

In Paris, San Francisco, and most other large cities, local governments regulated taxi prices and the numbers of taxis licensed to work in the city. This ensured or at least was intended to ensure that drivers could earn a decent income and that cars were available also during periods of low demand. But it also meant that supply always fell short when demand peaked and that license holders did not feel particularly pressed to offer great service. As Uber defied regulators and taxi unions, Kalanick positioned the ride-hailing platform as a free-market alternative to a corrupt and bureaucratic establishment:

> We're in a political campaign, and the candidate is Uber, and the opponent is an asshole named Taxi. . . . Nobody likes him, he's not a nice character, but he's so woven into the political machinery and fabric that a lot of people owe him favors.[30]

Kalanick's cause quickly won support from major US conservative figures. It was the Obama era, and conservatives were badly in need of political wins. Consumers liked Uber, and the company was picking fights with left-leaning Californian bureaucrats and politicians. The Republican Party published a petition on its national website:

> Support Free Market Solutions and Entrepreneurial Innovation. . . . across the country, taxi unions and liberal government bureaucrats are setting up roadblocks, issuing strangling regulations and implementing unnecessary red tape to block Uber from doing business in their cities. We must stand up for our free market principles, entrepreneurial spirit and economic freedom. Show your support for Uber by signing the petition today.[31]

On one weekend in 2013, a snowstorm descended on New York. Uber's solution was about to be tested in the scenario that originally inspired it. Prices on the app immediately tripled. Just when New Yorkers desperately needed a ride, it became unaffordable to many. Angry users took to social media to complain. But the surging rates also attracted more drivers on the road.[32] In the end, fewer people were left stranded in the storm. People with money, like Kalanick and Camp, certainly got to their destinations. In Kalanick's assessment, Uber had performed extremely well:

> Surge pricing only kicks in in order to maximize the number of trips that happen and therefore reduce the number of people that are stranded. . . . We did more trips because of our approach, not fewer. . . . I guarantee that our strategy on surge pricing is the optimal way to get as many people home as possible.[33]

According to Kalanick, Uber's solution was based on "hardcore math." The company employed hundreds of mathematicians, engineers, and scientists to help develop its systems:

> We could put a thousand cars in San Francisco, and quickly go out of business. We need to actually predict what demand is going to be, then make sure there's the right number of cars out there—every hour of the day—[and] position those cars.[34]

Mobilizing and positioning the cars was done using economic incentives and nudges—including "surge pricing" that rewarded drivers for logging in and showing up in an area that was predicted to experience high demand. Once orders came through from customers, the platform matched them with nearby cars and sent directions to drivers' phones.

> You've got spikes, like rain, or shift changes, or things like this . . . so there's just a ton of math which basically makes sure that riders get a car in five minutes.[35]

By 2013, the company had invested tens of millions of dollars of venture capital funding into developing its technology and was about to raise hundreds of millions more. According to Kalanick, such massive investment was necessary scientifically but also justifiable business-wise, since it would result in a system that would dominate the market:

> Making that elegant experience is very, very difficult from a mathematical perspective, but once we do, once we have a huge network in a city, and huge efficiencies—the pick-up time is low, the efficiency is high, the utilization is high—it's very hard for somebody else to come in and break that.[36]

By 2018, Uber operated in more than seven hundred cities around the world. According to company figures, it matched 3.9 million drivers with 91 million consumers each month to produce 14 million trips every single day.[37]

But as Uber took over cities, questions began emerge over just how "free-market" its near-monopoly was. Instead of the local government licensing taxis and regulating prices, now it was Uber Technologies, Inc. doing the exact same thing. In mature markets, the company had stopped accepting new drivers into its system to maintain a balance between supply and demand. Drivers were not allowed to set their own prices, and now they couldn't even choose which areas they served, as Uber made them accept gigs without revealing where the customer was going. Just like the local government, Uber also levied a hefty "tax" on the drivers' earnings.

Kalanick argued that despite all this, Uber was still equivalent to a free-market solution:

> We are not setting the price. The market is setting the price. . . . We have algorithms to determine what that market is.[38]

THE PERFECT MARKET

As Silicon Valley technologists pursued ever greater levels of efficiency, they discovered that the perfect market for them was not really a market at all—at least not in the sense of a venue where people make free choices between competing alternatives. Instead, the perfect market was an algorithm that used data to make choices on people's behalf. EBay first began to use algorithms to correct apparent imperfections in people's choice making. Upwork went further by having algorithms tell people what their choices

should ideally be. Uber finally had the algorithm simply decide people's prices and matches for them, assuming the role of a central planner.

Hayek posited that central planning could never be as efficient as individual choice because all the data necessary to make good decisions could never be "given to a single mind which could work out the implications."[39] But what if he was wrong? Already back in 1950s, Soviet planners had tried to use new data collection and processing technologies to improve their planning.[40] The science of computerized central planning was quite established, and it was called *cybernetics*. The problem from the Soviet's point of view was simply that their technology wasn't up to the task yet.

The cutting edge of Soviet information technology at the start of 1960s was the URAL-4 digital computer.[41] It was a sprawling colossus that occupied 200 square meters of floor space and required a crew of eighteen engineers and technicians to operate. It was capable of performing five thousand to six thousand operations per second, but the Institute of Cybernetics in Moscow estimated that successful central planning would have required at least a million operations per second.[42] Moreover, using perforated tapes and punched cards, the URAL-4 could read only about 250 bytes of data per second into its memory. This meant that it would have taken over seven months to read in just one month's worth of data—while the machine could run for only about eight hours before one of its vacuum tubes or other components failed.

Under Stalin's repressive rule, Soviet computer science and mathematics had stagnated. But Stalin was succeeded in mid-1950s by Nikita Khrushchev, who was much more open to science and innovation. Khrushchev even visited Silicon Valley and toured an IBM research campus in San Jose, California. His premiership saw the inauguration of a new agency called the Chief Administration on the Introduction of Computer Technology into the National Economy.

In 1963, the new computerization agency recommended that the government construct a nationwide economic data processing system to facilitate central planning. Terminals installed at factories and other establishments would feed data into a network of computers connected via telephone lines and television cables. A central computing platform in Moscow would collect this data, calculate optimal resource allocations and prices, and transmit instructions back to the individual establishments. The project, later

dubbed the "Soviet Internet,"[43] enjoyed support from the very top levels of the Communist Party.[44] A new, vastly more powerful central computer, rumored to be based on Western-style semiconductor technology, was also in development.[45]

But the very next year, Khrushchev was deposed and replaced by arch-conservative Leonid Brezhnev. Reforms were put on hold. The Soviet Internet was canceled. The technological gap with the West widened into a gulf. The centrally planned economy fell into stagnation from which it never fully recovered.

Meanwhile, in 1966, the United States Department of Defense initiated ARPANET, a project that launched the Western Internet. Half a century later, Western factories, establishments, and even individual people carry Internet terminals that transmit not gigabytes but terabytes and petabytes of data to Silicon Valley's central computers. Google alone collects something in the order of 4 million times the Soviets' monthly data harvest every single day. To analyze the data, Silicon Valley employs tens of thousands of the most highly trained scientists, engineers, mathematicians, and economists in the world. They have at their disposal data centers capable of processing not thousands or millions but many trillions of operations per second. Almost all conceivable data not only could be but *is* now being "given to a single mind . . . [to] work out the implications."[46]

Kalanick claimed that Uber was equivalent to a free-market solution because his company's planning algorithms ostensibly produced the same outcomes that a free market would have produced. But as Hayek noted, the disagreement between central planners and market economists was never so much about the outcomes as it was about the means through which they would be achieved. Both sides wanted to allocate resources efficiently. Market economists pursued this through choice, while Soviets—followed by Silicon Valley—pursued it via calculation. Soviets called their computerized central planning *cybernetics*, while we call our networks *cyberspace*. Both derive from the ancient Greek word *kybérnēsis*, meaning "government."

eBay founder Pierre Omidyar told Tufts students in a 2002 keynote address:

> Whatever future you're building, don't try to program everything. Five-year plans never worked for the Soviet Union. . . . Chances are, central planning won't work any better for any of us.[47]

A few years later, eBay started imposing centrally planned performance targets on its ostensibly independent sellers:

> We assess your seller level . . . based on your sales history and the quality of service you provide to your buyers . . . falling below standard may result in . . . partial or even complete restriction of your sales activities.

BADGES AND NUDGES

If we accept that the Soviet Union and Silicon Valley both practiced forms of central planning, surely there was nevertheless a big difference in how their plans were executed? Even if a platform company picks someone's next job for them and sets the price, that person is not forced to take the job; they are free to decline. Platform workers are merely incentivized and nudged to follow the platform's suggestions, not coerced. Surely this sets platform planners decisively apart from their oppressive Soviet predecessors?

Incentivizing means that a platform promises people more money and other benefits if they comply with the plan. For instance, Uber drivers can earn a "signing bonus" if they complete twenty-five trips. And Uber offers drivers higher rates if they work during peak demand. Conversely, not complying with the plan can result in economic "disincentives" or punishments. If a driver declines a job, Uber may put them in a "time-out" and not offer them any jobs again for a while.[48]

Nudging means that a platform makes it easier and more gratifying for people to comply with its plan. Uber sends messages like "You're $10 away from making $330 in net earnings. Are you sure you want to go offline?" and "You're almost halfway there, congratulations!" Compliance with Uber's objectives is recognized with virtual badges, such as an "Excellent Service" badge depicting a sparkling diamond.

In contrast, the Soviet Union in the Stalin era operated a monstrous system of forced labor camps, known as the Gulag. Between 1930 and 1953, an estimated 18 million people were taken against their will to Siberia to toil in mines and construction sites. Many perished. Here the analogy between Soviet and Silicon Valley economics clearly fails.

But the vast majority of people even in the Soviet Union never worked at gunpoint. Forced labor had a very low productivity, so most people's

compliance was solicited instead through incentives and nudges. Managers were paid bonuses on the basis of how well their enterprises met production targets. Ordinary workers were paid on the basis of gig-work-style piece rates. For instance, a machinist in the city of Novo-Kramatorsk completed 1,424 distinct pieces of work one month and was paid a preset rate for each task.[49] The piece rate ranged from 3 to 50 kopeks, depending on the type of task. As many as 75 percent of wage workers in Soviet industry were paid this way, according to a 1963 CIA report.[50] At one point, even Gulag administrators created an incentive system in which prisoners' food rations depended on their output.

Soviet workers of all ranks were also recognized for exemplary behavior with badges. The Medal for Distinguished Labor was awarded to over 2 million factory workers, farmers, health-care workers, educators, and other laborers. The Veteran of Labor medal was awarded to almost 40 million workers; it depicted a sparkling hammer and sickle.

In other words, Soviet planners used incentives and badges to solicit people's compliance just as Silicon Valley planners do today. The main difference was that for Soviets this caused huge administrative overheads. To work out how much the Novo-Kramatorsk machinist had earned at the end of the month, the factory had to employ a team of bureaucrats to produce a pile of 2,885 documents weighing 8 kilograms.[51] In contrast, eBay, Uber, and Upwork can use automatic algorithms to implement complex rewarding and sanctioning schemes with negligible overheads. Gig work and gamification are not Silicon Valley's original inventions, but Silicon Valley has the technology to finally exploit them efficiently.

The fact that Silicon Valley uses automatic algorithms rather than bureaucrats to carry out central planning doesn't change the fundamental similarity. The word *algorithm* derives from the name of ninth-century Persian mathematician Muhammad al-Khwarizmi. It simply means any well-defined procedure that takes some values as inputs and produces other values as outputs[52]—like comparing someone's performance against some formal criteria to decide whether to reward or punish them. Until computers were invented, algorithms were carried out by humans. Indeed, at the turn of the twentieth century, German sociologist Max Weber described judicial bureaucracy as "a slot machine into which one just drops the

facts . . . in order to have it spew out the decision,"[53] because bureaucrats were expected to follow procedure and allow no personal feelings to affect decisions. Today, decisions are often made by actual machines instead of humans, but the principle remains the same. In this sense, algorithmic decision making is just another word for bureaucracy.

SLEEPWALKING INTO SOVIET UNION 2.0

It is ironic if, in pursuit of the perfect market, Rand-reading Silicon Valley libertarians end up enacting Soviet Union 2.0. But if computerized central planning really is more efficient now than individual choice—at least within the strictly circumscribed setting of a digital platform—then is there a problem with this? Would Hayek still object?

Online merchants and contractors could well be performing better, on average, as a result of being managed by platforms' all-knowing machines. Buyers might well be getting better deals as well. But economic performance—money—is not the only thing of value to people. We spend many of our waking hours at work. It's often a big part of our identities and of the ways we seek fulfillment in life, especially for independent merchants and contractors. Too much top-down planning and micromanagement reduces the scope for individual autonomy and fulfilment. A seller interviewed by Curchod and colleagues said that eBay had become "an enormous machine, where everything is impersonal, and we're just a number, a pseudonym":[54]

> If you have fewer than four out of five in one criterion and you fail to improve within a month, your account is closed. I call this "Siberia." It's like, you know, "You do as you're told or we'll beat you hard."[55]

Hayek maintained that markets were superior to central planning not only economically but also ethically. They were not just more efficient but also more free, in that they gave people more choice over how to apply their efforts. Today, it may be that central planning is more economically efficient than it used to be, but in other ways, it hasn't changed. Too much top-down direction is still dehumanizing. Just as people used to rail at inscrutable and inflexible bureaucrats, they now rail at algorithms.[56] The libertarian market designer's dilemma or Omidyar's dilemma is thus whether to watch people fail liberally or paternalistically to make them succeed.

Digital marketplace companies' intellectual backbone today is "market design," a thriving new subfield of academic economics that has developed in symbiosis with platforms like eBay and Upwork. The field was pioneered by Alvin Roth, now a professor at Stanford, who won the economics Nobel Prize in 2012 for his contributions. Roth and other practitioners such as Gary Bolton, John Horton, and Alex Ockenfels follow an "engineering approach to economics" characterized by the use of computers and data to develop solutions to market imperfections. They perform highly sophisticated experiments on things like what information to show or conceal from users to improve outcomes. But when it comes to nebulous concepts like freedom, which Hayek and his followers used to concern themselves with, today's market design economists are mostly silent.

Market designers probably intuitively side with individual choice and autonomy as most mainstream economists do today. Indeed, Roth asserts that "Markets differ from central planning because no one but the participants themselves determines who gets what."[57] But in his work, Roth presents alternative matching algorithms that result in different outcomes. By choosing which algorithm to implement, the designer does in part determine who gets what.[58] Roth moreover concedes that market designers must often take into account the priorities of those who are in charge of the market—by, for instance, preventing participants from engaging in transactions that the owners consider inappropriate.[59] Insofar then as market design boils down to a value-blind optimization exercise within constraints set by those in charge, it should not be surprising if some of the designs start resembling—for better or for worse—Soviet planners' visions of cybernetic society.

OPTIMAL TO WHOM?

Today, most social scientists accept that market economies and central planning are not quite the polar opposites that Hayek once portrayed them as. Postwar Western economies outlasted the Soviet Union on the back of varying degrees of government regulation and public-sector production that addressed markets' numerous failures. And great swathes of economic activity became centrally planned not by the government but by hierarchical corporations whose employees number in the hundreds

of thousands. It was thus inevitable that platform companies, too, would find imposing some degree of central coordination more efficient than presiding over a purely laissez-faire marketplace.

In many ways, a more important question than whether to do any central planning at all is who controls the planning and in whose interests it is done. People generally don't mind some central coordination if they feel that it helps them to attain shared goals, whether at the workplace or in society more generally. Coordination toward mutually accepted goals doesn't undermine our sense of autonomy in the same way.

In the Soviet Union, the planning process was firmly in the grip of the Communist Party. The Party used central planning to achieve laudable goals such as rapidly increasing literacy rates but also diverted immense resources to military build-up and leaders' vanity projects. Workers resented their falling piece rates and diminishing autonomy as the dictatorship invested into nuclear warheads and space launches.

Platform companies, too, have used their planning power for good. Upwork's algorithms try to prevent all gigs from going to a few elite contractors. Uber's centrally determined driver allocation has probably reduced location-based discrimination in which drivers refuse to take people to lower-income or ethnic minority neighborhoods—something that US taxis have long been criticized for.[60] Society as a whole might be better off as a result of the drivers' choices being curtailed in this way. But the company didn't give drivers any say in forming the policy, and understandably they resent it.

Platform planners also use their power for strictly selfish ends. Uber drivers have seen the proportion of their earnings taken by the platform increase over time and their take-home pay decrease as the company tries to generate profits for shareholders. Upwork and eBay have introduced even steeper "tax" hikes. Being for-profit companies, all the tech giants impose plans on their users that are ultimately designed to enhance the company's—or its leadership's—own power and wealth.

The promise and the peril of central planning since Marx and Lenin has been that it entails humans assuming conscious control over the economic calculus instead of leaving it up to our animal spirits to direct. It is a promise because such power could be used to liberate people, not in the sense of removing rules but in the sense of correcting inequities and

fostering greater prosperity for all. It is a peril because the plans could just as well end up being driven by the private interests and delusions of the planners themselves—unless some powerful governance mechanisms can be devised to prevent it. Either way, people tend to resent it when their lives are directed too much from above. Said Leonid Katovskii, a Moscow taxi driver in the final years of the Soviet Union:

> The plan is the plan. It's a pain in the arse. . . . [Central planners] have endless meetings but where they get their plan from, God only knows. They should switch places with us. Then they'd think twice.[61]

II

POLITICAL INSTITUTIONS

7

NETWORK EFFECT: FROM DIGITAL REVOLUTIONARY TO EVERYTHING EMPEROR

> And she bare him a son, and he called his name Gershom: for he said, I have been a stranger in a strange land.
>
> —Exodus 2:22

In 1959, Fidel Castro's revolutionaries toppled Cuba's corrupt regime and assumed control of the country. The new leadership began a program of nationalization by taking over land and businesses, first from American owners and then from middle-class Cubans. In contrast to the previous regime's self-serving graft, the new leadership justified its appropriations with appeals to the greater good. But the new leadership, too, was soon tainted by corruption, and those who lost their lands and businesses resented it all the same. Some tried to speak up, some resorted to arms; all were eventually subdued. Those who could became refugees: between 1959 and 1980, an estimated 500,000 Cubans—about 5 percent of the national population—fled to the United States.

Among the refugees was Miguel Bezos. His father and uncle had owned a lumber mill, and he had worked at the mill most mornings. But after they lost the mill to Castro's regime, Miguel's parents sent the teenager to the United States. Miguel arrived in Florida in 1962 and quickly learned English. He enrolled at a college in New Mexico and got a job at a local bank.[1]

At the bank, Miguel met Jacklyn Gise, a coworker, and the two eventually became a couple. Jacklyn had a baby from a previous relationship.

When the couple married, Miguel adopted the four-year-old boy—Jeffrey—as his own.

DASHED AMBITIONS

Jeffrey "Jeff" Bezos grew up in Houston, Texas. He was a bright kid, attracted to amateur radios, hovercrafts, and other complex gadgets. He read fantasy and science fiction novels like Robert Heinlein's *Stranger in a Strange Land*, a story in which humans have colonized the moon and are vying for Mars. He was also ferociously competitive: despite barely meeting the minimum weight requirement, his parents entered him into a youth league American football team and he was soon appointed a captain.

When Bezos was of high school age, the family moved to an upper-middle-class neighborhood in Miami, Florida. In high school, he won the school's Best Math Student award in his second and final years and Best Science Student award in his first, second, and final years. He also entered into competitions for prizes outside the school, and his achievements were featured in the local newspaper—the *Miami Herald*—three times. In the stories, he is pictured wearing a suit, a tie, and a confident smile.[2]

The sky was not the limit when it came to Bezos's ambitions. He thought that his future career might be as an astronaut or a physicist. One of the prizes that he competed for was NASA's Space Shuttle Student Involvement Project award. His paper, titled "The Effect of Zero Gravity on the Aging Rate of the Common Housefly," became a semifinalist, earning him a trip to Marshall Space Flight Center.[3]

Bezos announced to his high school class of 680 students that he was planning to graduate with the highest grade point average, and in 1982 he did just that. His farewell speech, traditionally given by the top-ranking graduate, was out of this world. According to the *Miami Herald*, he envisioned "space hotels, amusement parks, yachts, and colonies for two or three million orbiting around the earth." Bezos wanted to take humanity to space, literally: the ultimate objective was to "get all people off the earth and see it turned into a huge national park."[4]

Bezos's dreams of becoming an astronaut were probably dashed, though, when his parents informed him that he would need to wear glasses. "That made me cry," he later recounted.[5] Bezos went on to study physics

at Princeton, but that ambition, too, came to nothing. Although he was among the top twenty-five students in his physics program, he discovered that he did not have what a career in theoretical physics required:

> [I]t was clear to me that there were three people in the class who were much, much better at it than I was, and it was much, much easier for them.[6]

Bezos gave up on physics and switched to the more practical field of computer science. He was elected president of Tau Beta Pi fraternity and figured that he would probably become an entrepreneur.

But dreams of space conquest perhaps still lingered. Bezos read science fiction, watched *Star Trek*, and joined a club called Students for the Exploration and Development of Space.

LIFTOFF

Bezos graduated in 1986 with excellent grades. It was a good time to enter the job market. The economy was thriving. Stock markets were booming. Like many ambitious graduates of the time, Bezos took a job in the finance industry. Finance was becoming computerized, and Bezos used his skills to help build telecommunications networks and software that connected stock buyers, sellers, banks, and brokers around the world.

In 1990, Bezos joined a Wall Street hedge fund called D. E. Shaw & Co. founded by computer scientist David Shaw. The fund changed Bezos's life in more than one way. He got involved with MacKenzie Scott Tuttle, a fellow Princeton graduate who worked as a research associate on his team. The couple married in 1993. The next year, Shaw asked Bezos to look into a phenomenon called the Internet. Shaw was interested in what business opportunities it might present.

Bezos found that although the Internet had already existed for a couple of decades, its usage had only recently begun to skyrocket.[7] Such was the growth rate that if it persisted, the Internet would soon be ubiquitous. Bezos discussed several Internet business ideas with Shaw. According to journalist Brad Stone, one of the ideas was "the everything store"—"an Internet company that served as the intermediary between customers and manufacturers, and sold nearly every type of product, all over the world."[8] Bezos later explained:

With that huge diversity of products you could build a store online that simply could not exist in any other way. You could build a true superstore with exhaustive selection.[9]

A full-blown everything store would be difficult to get off the ground, Bezos concluded, but an online store focused on a single product category would be easier to launch. Bezos compiled a list of products that could be sold remotely via the Internet and ranked them. The list included things like office supplies, clothes, music, and books. Music's attractiveness as a business opportunity ranked low in Bezos's view because the industry was dominated by a handful of huge record companies that could suppress a digital upstart. Books were different. There were hundreds of book publishers in the United States—or thousands, if the tiniest operations were included—and even the largest represented less than 10 percent of the market. A new retailer could not be squeezed out easily. Moreover, the existing book retail landscape was fragmented: thousands of tiny independent bookstores dotted the continent, and the two biggest chains together accounted for less than a quarter of all books sold. Bezos thought that the book business was ripe for a digital revolution.

Yet according to some sources, D. E. Shaw & Co. rejected the idea.[10] To most people at the time, selling books over the Internet probably sounded like a quirky hobby project, not much different from offering singing lessons over amateur radio. According to other sources, Bezos realized that he wanted to pursue the idea as an independent entrepreneur, not as Shaw's employee.[11] Either way, MacKenzie supported him, and in 1994, the couple quit their jobs at D. E. Shaw & Co. and started an Internet bookselling company together.

To establish the business, the couple moved to the opposite side of the country: Seattle, Washington. Seattle was chosen partly for logistical reasons and partly as a way to minimize the company's tax burden: a state's sales tax was due only on Internet orders from the same state, and Washington had a relatively small population.[12]

Bezos raised seed funding and hired engineers. MacKenzie worked on office management, accounting, and logistics. At first, the plan was that customers would access the virtual bookstore via email. World Wide Web, the new but still much less popular Internet technology, was developed as a secondary option. A few months later, most people on the Internet

were on the Web, and the email interface was scrapped. On July 16, 1995, after almost a year of development, the website was finally launched. "Welcome to Amazon.com Books!"—"Earth's Biggest Bookstore."

Customers discovered the new website quickly. On portal sites such as Yahoo, Amazon appeared near the top of alphabetical listings. Internet users living in rural areas loved the new online store, as did US military members stationed abroad. In its first month, Amazon sold books to all fifty US states and to forty-four other countries.[13] By the end of the year, the site had sold $511,000 worth of books or about the same as a small independent bookstore.

In the next year, Amazon sold $15.7 million worth of books. In 1997, the sales were $147.8 million. The website was really taking off. The millionth unique customer came in October 1997, when someone in Japan ordered a book on Windows NT and a biography of Princess Diana.[14] Amazon was listed on the Nasdaq stock exchange, and by 1999, Jeff and MacKenzie Bezos were billionaires. Jeff Bezos hired dozens of new executives. MacKenzie withdrew from the company to focus on her children and on a novel she was working on.

A DIGITAL REVOLUTION

Both customers and book publishers loved Amazon. Customers kept returning to the site, and their enthusiastic word of mouth attracted more people. Publishers loved the new audiences they could reach. Amazon is "not just fulfilling demand, it's creating it," said the proprietor of a small New York publishing house.[15] Bezos and his team made many good decisions and some poor ones, too. But one fundamental driver of Amazon's value to its customers and publishers was the *network effects* that Bezos was able to unlock by combining old book industry practices with new digital tech.

The book industry had long followed a peculiar business model in which book stores could return unsold books back to publishers. Each time someone bought a book from a store, the store earned a slice of the revenue. But if the book failed to sell, the risk from unsold inventory was borne by the publisher. In 1994, publishers sent out 460 million books; 35 percent of them were returned.[16] From the perspective of risk, the publisher was the real seller; the store was more like an intermediary.

At the turn of the millennium, French economists Jean-Charles Rochet and Jean Tirole put forward a theory of "two-sided markets," also known as "two-sided platforms."[17] Buyers are on one side, sellers are on the other, and the platform sits in the middle as an intermediary. According to Rochet and Tirole's theory, the platform's value to each of its sides depends on the size of the opposing side—a characteristic known as a *cross-side network effect*.

Cross-side network effects mean that the more books a bookstore features, the more attractive it becomes to customers, and the more customers it attracts, the more value publishers get from featuring their books there. A positive feedback loop ensues, and the value of the store-cum-platform rapidly grows.

But brick-and-mortar bookstores could feature only so many titles before they ran out of shelf space. A typical store carried around ten thousand titles. The largest Barnes & Noble superstores of the mid-1990s—converted from bowling alleys and movie theatres—carried up to 175,000 titles. This physical limit prevented the cross-side network effects from unfolding very far, limiting the store's value to both buyers and sellers.

On Amazon.com, virtual shelf space was unlimited. The positive feedback loop, once started, could in theory keep compounding the platform's value indefinitely.

But Rochet and Tirole's theory also implied that the first problem that any aspiring two-sided platform would have to solve was how to get the feedback loop ignited in the first place. With no customers, how would Amazon convince publishers to list their titles? With no publishers, how would it attract customers?

To jump-start Amazon's engine, Bezos took advantage of existing intermediaries in the book industry. A few companies specialized in maintaining up-to-date lists of books in print across thousands of publishers. Bezos's team simply bought such a list on a CD-ROM disc and used it to populate the site's database. Orders placed on the website were fulfilled by another handful of companies—book distributors—that specialized in stocking books from major publishers.

Distributors normally had a minimum order size of ten books, but Bezos's team discovered a hack:

Turns out that . . . you just had to *order* ten books. If you ordered ten books, but nine of them were books they didn't have in stock, they would ship you the one book.[18]

Using existing intermediaries, Amazon was thus able to construct a massive supply side for its two-sided platform before having attracted a single customer. Afterward, once the demand side was teeming with millions of customers, network effects ensured that publishers—and soon other firms, too—were rushing to feature their products on the platform.

Another advantage that Amazon held over brick-and-mortar rivals was that its store enjoyed much better economies of scale. *Economy of scale* refers to the idea that the unit cost of doing something goes down as the quantity goes up. Ordinary bookstores had to pay rent on the space they occupied; as they grew bigger, they also became more expensive to maintain. Unit costs in normal bookstores thus stayed approximately constant. In contrast, Amazon's sophisticated website required a significant initial investment to set up, but once it was running, the cost of adding more customers and books to it was negligible. At launch time, the platform featured over a million book titles; a few years later, the number was over 3 million.[19] As Amazon grew, its unit costs plummeted, and it offered deep discounts that brick-and-mortar stores found difficult to match.

Amazon's unprecedented selection created a new problem: search costs.[20] In technical terms, the site's virtual bookshelves had no difficulty accommodating millions of books; the "shelves" consisted of two high-end computers situated in the company's offices. But how would customers find anything in such a heap? A simple keyword search helped only those who already knew exactly what they wanted. In brick-and-mortar stores, people discovered books by browsing shelves, looking at the covers, and noticing related books placed in clusters. Without some efficient way of matching readers with titles, Amazon's millions-strong inventory might as well have been locked away in a cellar.

Bezos's answer was data. From the very beginning, the site tracked each and every visitor, recording every click they made. On the basis of this data, Amazon's developers built systems that ranked search results and displayed recommendations based on each visitor's previous behavior and on the purchases of other people with similar profiles. "[W]e will not just let

readers find books, we will let books find readers," explained Bezos.[21] He argued that rather than being futuristic, the practice harkened back to the book trade's idyllic past:

> I want to transport online bookselling back to the days of the small bookseller, who got to know you very well and would say things like, "I know you like John Irving, and guess what, here's this new author, I think he's a lot like John Irving."[22]

An obvious difference was that Amazon was now collecting and analyzing data on an industrial scale.[23] This data began to generate increasing returns to scale for the company. Similar to the concept of economies of scale, *increasing returns to scale* refers to the idea that the more units a company processes, the more value it derives from each unit. Once Amazon had accumulated a massive cache of data on user behavior, just a single additional data point—for instance, that someone bought Scott Orson Card's *Ender's Game*—allowed the company to produce a host of potentially useful recommendations, from obvious ones such as Heinlein's *Starship Troopers* to more surprising ones such as the United States Constitution, which had appeared together with Card's novel on a US Marine Corps reading list.

Amazon also made it possible for customers to post their own reviews underneath each book's official description—including reviews that were negative. Publishers initially thought that this was crazy. Why would a store feature negative reviews about a product that it was trying to sell? Bezos countered that Amazon wasn't trying to sell any particular book but books in general. It was trying to generate an environment conducive to commerce. Additional information—whether positive or negative—was helpful to customers and thus ultimately helped the publishing trade, too.[24]

"EGALITARIAN IN THE BEST SENSE"

Amazon's unique value to its buyers and sellers—the fuel that boosted its ascent—was made from the positive network effects of a two-sided market, the economies of scale of an Internet-based operation, and the increasing returns to scale of customer data accumulation. All these elements had existed previously, but Amazon was the first company to combine them so effectively, and the combination became something of a blueprint for Internet ventures seeking to follow the pioneer's trajectory.

In one aspect, Amazon was not a typical Internet platform company. Most platform companies, from eBay to today's latest upstarts, relied on sellers to provide the logistics and the customer service, with uneven results. Bezos insisted on having Amazon take control of the customer experience. Instead of asking publishers and distributors to ship books to customers directly, Bezos had them send their books to Amazon's offices, where staff inspected them, repackaged them with Amazon branding, and shipped them to their final destinations. This way, Amazon could ensure that items would arrive in perfect condition by a given date—a promise that turned out to be crucial for gifts, school books, and many other purchases.

Early on, to keep up with the platform's rapid growth, the entire staff—including Jeff and MacKenzie Bezos—sometimes had to drop everything and ship books. But as the company grew, Bezos began to invest into an increasingly sophisticated distribution system. He poached logistics executives from Walmart and directed them to build a network of gigantic fulfillment centers, sortation centers, and delivery stations. He created a standing army of subcontracted and self-employed delivery workers. And he led the company to develop its own proprietary logistics information systems and warehouse automation technologies. Over time, Amazon expanded its physical footprint from the United States to South America, Europe, Asia, Australia, and South Africa, investing billions upon billions into logistics.

To help pay for its dizzying investments into data and logistics, Amazon began to share its infrastructure with other companies. Third-party merchants could pay Amazon to have the giant take care of storage and shipping for them. Like data, logistics began to generate increasing returns to scale: where it took a competitor at least three to five days to deliver a product in stock from its warehouse to a customer, Amazon could offer next-day or even same-day delivery from one of its hundreds of logistics hubs.

Small publishers in particular loved Bezos's digital revolution. Brick-and-mortar stores had acted as gatekeepers to the market, preferring to allocate costly shelf space to big publishers with large marketing budgets. In contrast, Amazon was happy to feature pretty much any book—even self-published works. If readers liked a book, Amazon's algorithms could surface it to more readers, sometimes resulting in micropublishers having

unexpected megahits. Tens of thousands of small publishers rallied behind Amazon. "It's very democratic and egalitarian in the best sense," gushed one author of a self-published bestseller.[25]

In what came to be called Amazon Marketplace, independent merchants of all kinds of products—from clothes and cosmetics to toys and electronics—were permitted to enter the platform. Hundreds of thousands of merchants joined. Self-employed merchants delighted at the opportunities the platform had opened up for them. Bezos was their hero. As one seller wrote on a forum for Amazon merchants:

> Amazon fell into my lap at a time when I was desperate and had very limited options. It enabled me to pay off massive levels of student loan debt and help out relatives who also desperately needed a helping hand. I have worked my backside to the bone but now have sizable savings and excellent credit, after having gone through a bankruptcy in my pre-Amazon days. So whatever happens, I owe Amazon and Jeff Bezos a hearty thank you.[26]

"AMAZON HAS CRUSHED ANOTHER LITTLE GUY"

By mid-2000s, people who navigated to Amazon.com encountered an astounding selection of products. The site featured 3.7 million book titles, 1.7 million compact discs, and millions of other products of every description, from baby products and musical instruments to jewelry and car parts.[27] In practical terms, the selection was limitless. Bezos's original idea of "the everything store" had more or less been realized.

In fact, in many ways Amazon was now more than a store. Most of the products were sold not by Amazon but by other companies under Amazon's auspices. Amazon provided the virtual crossroads in which merchants and customers met, the rules under which they traded, and the infrastructures through which they exchanged products and payments. Amazon was not so much a store as an entire market town on the Internet, with 50 million market goers. It provided an alternative to the brick-and-mortar gatekeepers of the old world, and Jeff Bezos—whose family still held 52 percent of Amazon's stock after the initial public offering—was its undisputed leader.[28]

From the merchants' point of view, Bezos had been an inspiring leader. He had put his own money as well as hundreds of millions of dollars of

investors' money into carrying out a digital revolution that overthrew the power of the brick-and-mortar gatekeepers. He had welcomed independent merchants into his virtual market town, charged them reasonable levies, and protected them against fraud, theft, and cyberattacks that troubled traders on the unincorporated 'net.[29]

But it was getting harder for Bezos to raise funds from investors. The so-called dot-com bubble burst in 2000. Stock market prices of overhyped Internet companies crashed. Venture capital flows diminished into a fraction of their precrash levels. Many dot-coms died. At one point, Amazon itself came close to bankruptcy; it was probably saved by a $672 million safety net loan that the company's new chief financial officer had negotiated only weeks before the stock market nosedived.[30]

In 2004, Bezos hired a new executive to Amazon's book department. He asked the executive to start negotiating better deals from book publishers. And he didn't mean just slightly better deals. According to journalist Brad Stone, Bezos suggested to the new executive that Amazon should start approaching smaller publishers "the way a cheetah would pursue a sickly gazelle."[31]

In what came to be known internally as the Gazelle Project, Amazon's managers began to rank publishers according to how dependent they were on its virtual market. The managers opened negotiations with the most vulnerable publishers and began to demand lower prices, longer payment times, and favorable shipping arrangements. Publishers were shocked. The company that many had once thought as "democratizing" had suddenly turned into a predator.

Larger publishers initially resisted Bezos's attempts at extracting favors. Amazon's managers beat them into submission. Whenever a publisher resisted, Amazon altered its algorithms to stop recommending that publisher's books to customers. The books were still listed on the site and could be found with the correct search query, but they would no longer show up in front-page recommendations, "customers who bought this item also bought," and other important places where people discovered books. According to Stone, the publishers' sales fell by as much as 40 percent.[32]

Amazon's head of vendor relations in Europe took "almost sadistic delight" in pursuing the resisters, claims Stone. "I did everything I could to screw with their performance," the manager is quoted as saying.[33] At

one point, Amazon simply removed the "add to cart" button from some publishers' books.

Independent merchants, too, became Bezos's prey. "Amazon literally STOLE my product idea and took over my listing," protested one merchant on an Amazon sellers' forum:

> I started selling on Amazon FBA in June. My first product has been wildly successful. . . . $40k+ per month in revenue within my first month. Well, I guess Amazon took notice.

The merchant explained how they had introduced a new product to Amazon's marketplace. Among other things, this involved creating a new listing, uploading product images, choosing categories and other settings for the product, and writing a product description that appealed to intended buyers. The merchant had sourced the product from an overseas supplier and furnished it with an original English-language manual. To ensure fast delivery to customers, the merchant paid Amazon for Fulfilment By Amazon (FBA), a service in which third-party sellers' products were stored and shipped by Amazon's logistics network. After a successful launch, the merchant noticed something odd: a new option had appeared on the listing, according to which an equivalent product was now available directly from Amazon. The "add to cart" button—known as the "buy box" in Amazon sellers' lingo—still defaulted to the seller's own product, so sales were not greatly affected. But then that, too, changed:

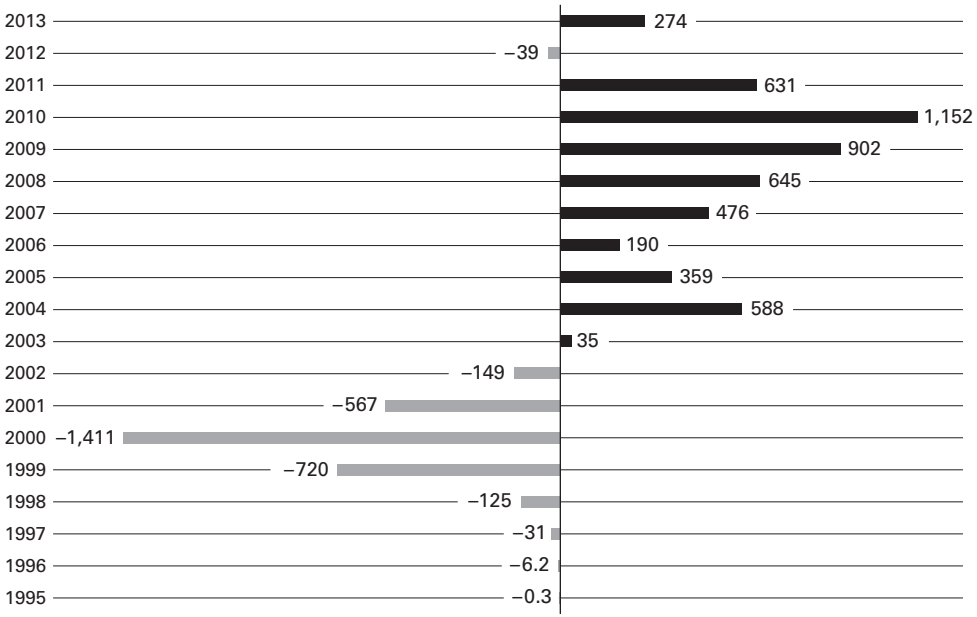
> Amazon has taken over the buy box from me. . . . On my personally created listing for my privately labeled product. . . . So, Amazon has crushed another little guy FBA seller it seems. . . . Saw me making a profit, and decided to take it from me and sell it themselves.

Other merchants on the forum shared similar experiences. Far from being an isolated incident, this was now Amazon's modus operandi in many product categories. Third-party sellers launched hundreds of thousands of new products on the platform in a year. Amazon showed no interest in the vast majority of them. But every now and then—in approximately 3 percent of cases, according to one study—Amazon stepped in and effectively took over the business from the original seller.[34] Amazon was more likely to take over a product if the product was selling well and getting good reviews from customers.

Amazon wasn't the only platform company to do this. For years, Spotify was the top music app in Apple's App Store; it appeared first in search results for "music." Then Apple introduced its own Apple Music app—and suddenly Spotify fell not just to second place but to twenty-third place in the search results. It appeared behind eight different Apple apps, some completely unrelated to music.[35]

Amazon also began to hike up the fees it levied on merchants. In some categories, the fees soon amounted to as much as 50 percent of gross sales. In a 2018 survey of Amazon sellers, 40 percent of the respondents said that their top concern was competition from Amazon itself; 33 percent said that their top concern was the high fees.[36] "Amazon is really predatory towards successful third-party sellers," one merchant summed up the situation.

Bezos's ruthless new policies—along with other changes and innovations—quickly began to pull money into the company's coffers. In just over a year, Amazon flipped from having annual losses of hundreds of millions of dollars to earning hundreds of millions in profit (figure 7.1). Bezos did not use the takings to lavish luxury on himself or on his employees or



7.1 Amazon net income (million USD), 1995 to 2013.

investors. Instead, he used the profits to fuel the expansion of his empire into ever new markets and technologies, from video streaming to grocery shopping and from digital payments to scientific supplies.

And the profits kept growing. From 2017 to 2018, Amazon's net income tripled from $3 billion to a staggering $10 billion. In 2020, it surpassed $20 billion.

In July 2020, Amazon announced that it was opening an aerospace research and development facility.[37] The company was going to start investing billions into satellite technology with the goal of launching 3,236 satellites into low earth orbit. Book publishers and merchants realized that Bezos had ultimately carried out his revolution not to democratize commerce but to further his own ambitions. "If you think this whole platform was set up for you to win . . . then that's your fault. The game's rigged . . . always will be," wrote a disillusioned merchant.

Amazon's second employee, Paul Barton-Davis, noted early on:

> Jeff is good at making it sound as if he's baring his soul, that he's telling you what's really going on. It may sound as if you're being told the honest truth, but this is still all part of the big plan.[38]

EL COMANDANTE

There is no shortage of revolutionaries in history who ultimately turned on their people. Bezos's own grandfather lost his lumber business to Fidel Castro's regime. Soviet rulers extracted wealth from their people to dominate the world and win a space race.

Of course, Jeff Bezos is not actually the ruler of a country. Amazon is a private company that works with partners to serve customers. According to libertarian political theorists, this is the crucial difference between states and private systems like Amazon: participation in a private system is voluntary.[39] If publishers and merchants are unhappy about the way Bezos treats them, then they are free to quit. The threat of partners voting with their feet and taking their business elsewhere should serve as an incentive for Amazon to treat them well.[40] Competition should keep corporate rulers in check.

Many merchants do leave Amazon. "I'm happy to say that I will be shutting down my seller accounts and leaving Amazon for good," wrote

one merchant. "The past few years have been challenging to say the least . . . the rising FBA fees have become untenable." But leaving a platform like Amazon comes at a cost. It entails leaving behind everything that the person has built on the platform—built not from bricks and mortar but from things like verified customer reviews, repeat buyer relationships, painstakingly devised inbound links, and reams of data arranged into the platforms' systems. Wrote one seller of secondhand books:

> My problem is that I have close to 9,000 books and have spent so much time on them to list with Amazon, that I do not know what to do anymore. . . . Everything goes up but my income.

Little of what an independent merchant has built on Amazon can be easily taken with them. Nor does Amazon try to make it easy. The platform withholds buyers' email addresses, preventing merchants from taking their customers with them. Many other platforms, including eBay, do the same. Leaving a platform can therefore entail leaving behind one's livelihood and having to start over from scratch. In principle, sellers are free to leave at any time, but in practice, the cost is often too great. Most remain, keep their heads down, and endure the predations. "Best not to be too successful," concluded one merchant on the forum.

In principle, people can quit countries, too, if they are unhappy with the rulers. Miguel Bezos did. He left Cuba to escape a regime that oppressed his family. Yet the human cost of doing so was great. He left behind his family and social networks, his language and culture, and what property his family still had. Those who stayed behind did not all stay because they endorsed Castro's regime but because they could not afford to leave it. The difference between states and private platforms is thus not as fundamental as libertarian political theorists would suggest. Competition—people becoming refugees and voting with their feet—did not keep Castro's regime in check, nor was it sufficient to prevent Bezos's predations.

Moreover, when Miguel Bezos left Cuba, he at least had an attractive alternative: the United States. For all that he lost, he also gained tremendous opportunity. Amazon's publishers and sellers have no such alternative. A 2020 joint statement by the Association of American Publishers, the Authors Guild, and the American Booksellers Association lays it out plainly:

> Amazon's scale of operation and share of the market for book distribution has reached the point that no publisher can afford to be absent from its online store.[41]

In early 2000s, Amazon and eBay were still competing neck to neck. By 2019, Amazon had won the race. Of every dollar Americans spent buying goods online, approximately half now went through Amazon. Amazon's US market share was twice the share of the next top ten e-commerce sites put together.[42] It was also the biggest e-commerce site in Canada, Mexico, Brazil, India, Japan, most European Union countries, and elsewhere. In some product categories, it commanded more than 90 percent of the online market.

Amazon's dominance is partly explained by a troubling corollary of the theory of positive network effects. If the most valuable platform to a buyer is the one that connects them with the greatest number of sellers and vice versa, then competition between similar platforms will tend to produce a single overwhelming winner that dominates the market. To see why, suppose that there are two competing platforms that are otherwise identical except one has a slightly better selection and slightly more customers. A new customer or merchant choosing which platform to go to will probably pick the slightly larger one. That tilts the size advantage just a little more in the larger one's favor, so that the next person is even likelier to pick it, and so on, until the advantage is overwhelming. In other words, the same positive network effects that generate value to people also tend to generate monopolistic marketplace owners.[43]

Territorial sovereigns, too, enjoy some scale advantages, but their growth is limited among other things by geography. People and resources stretch out across lands that seas and mountain ranges apportion into defensible domains; a patchwork of countries covers the earth. Yet on the Internet, everyone and everything can in theory fit into a single spaceless city. Only the most alluring one need remain.

There are some countervailing forces as well. A smaller platform focusing on a niche, such as a special product category or a specific region, can build a thicker network in that particular niche and thus defend its turf against a larger but less specialized rival. For instance, in the food delivery market, there is no global monopolist; the leading app varies by city. And to the extent that it's not too inconvenient, sellers can try to use multiple platforms in parallel, as some Uber and Lyft drivers do. But in the purely Internet-based general e-commerce market, Amazon gets a significant boost from positive network effects that help it dominate the market.

Amazon's earthly presence, too, is formidable. The company is building airport hubs around the world and recently launched Amazon Air, a seventy-aircraft-strong cargo airline for its own exclusive use. At this point, competing head-on with Amazon would probably require hundreds of billions of dollars in investment and working capital—roughly the same magnitude of resources that the United States marshaled over a decade and a half to take humans to the moon. "If there is a new platform to replace Amazon, I will leave Amazon with no hesitation," declares one merchant. They probably won't get to say good-bye any time soon.

While merchants remain stuck, Bezos himself—boosted by Amazon's record profits in the pandemic years—is taking off to new adventures. In February 2021, he announced that he was stepping down as CEO of Amazon to focus on other projects. One is Blue Horizon, a space technology company that he founded. Blue Horizon aims to build a suborbital space port in Texas and take Bezos himself to space.

El Comandante Fidel Castro died in 2016. A few years later, Cubans adopted a new constitution that gave more protections to private property and enterprise. In Amazon's everything empire, entrepreneurs still live in constant fear of having their businesses taken away.

8

CRYPTOCRACY: THE QUEST TO REPLACE POLITICS WITH TECHNOLOGY

> When the dao prevails in the world, the common people do not discuss governance.
> —*The Analects of Confucius* 16.2[1]

"The whole country was in the hands of a few persons, and if the tenants failed to pay their rent they were liable to be haled into slavery, and their children with them."[2] Aristotle in his *Athenian Constitution* describes how the ancient city state was once ruled by ruthless oligarchs. Government administrators were perceived as corrupt and untrustworthy, offering no recourse to the oppressed. The situation became untenable:

> Since . . . the many were in slavery to the few, the people rose against the upper class. The strife was keen, and for a long time the two parties were ranged in hostile camps against one another. . . .

A surprising resolution to the conflict was found in the appointment of a poet to devise a new system of government for the country:

> at last, by common consent, they appointed Solon to be mediator and Archon, and committed the whole constitution to his hands.[3]

Solon was a poet but also a competent statesman. He sang a poem and then set about designing a better system. Instead of trying to make government administrators more trustworthy, he took a different approach: he

wanted to make trustworthiness matter less. Achieving this involved a machine, called the *kleroterion*, or "allotment machine."[4]

The kleroterion was about the height of a man and built around a rectangular slab of stone. Carved into the face of the slab was a matrix of slots, about ten columns across and fifty rows down. Inserted into the slots were bronze plates bearing the names of the people who had shown up to the machine that day. Things clicked into action when white and black balls were dropped into a funnel attached to the side of the slab. The balls tumbled and mixed inside the machine, until a mechanism released them, row by row. A black ball meant that the people whose names were on that row were sent home. A white ball meant that they were appointed as government administrators.

Using the kleroterion, random people were selected to serve as government administrators in ancient Athens.[5] Magistrates were appointed in this fashion annually. Judges were reselected every morning. Each legal case in Athens was heard by several of these randomly selected judges, who acted as checks on each other. As long as the majority were honest, a few corrupt officials could not abuse their power. Individual trustworthiness would not matter. To incentivize participation, each appointee received a reward from the public purse.

Having designed his revolutionary system of government and seen it off to a start, Solon set off on a journey to Egypt. He disappeared from public life and let others carry on the project.

PROBLEM OF TRUST

Satoshi Nakamoto was a skilled if somewhat old-fashioned programmer.[6] On his online profile he claimed to be born in 1975 and live in Japan, but this was probably just an online persona that he, she, or they had created for themselves. "Nakamoto" wrote messages in precise British English, cited the London-based *Times* newspaper, and was active mostly during British daytime hours.

Whoever he was, Nakamoto's messages suggested that he was disappointed with how the digital revolution had turned out. Cybervisionaries like John Barlow had imagined that the Internet would give rise to social order beyond the reach of governments and powerful corporations.[7] Yet

by the late 2000s, it was clear that government was not going anywhere and that the Internet was giving rise to corporations that, if anything, were even more powerful than before. In particular, Nakamoto was bothered by how people still had to rely on powerful and opaque financial institutions to manage their finances:

> The root problem with conventional currency is all the trust that's required to make it work. The central bank must be trusted not to debase the currency. . . . Banks must be trusted to hold our money and transfer it electronically. . . . [8]

> Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments.[9]

Many people at the time had similar sentiments. In 2008, the world was reeling from the effects of the great financial crisis. Due to inept government and selfish corporations that had misled and defrauded their customers, many people had lost their jobs, their savings, and even their homes. Thousands protested on Wall Street, demanding a greater say in how these institutions were being run.

But Nakamoto was not interested in making the institutions more democratic. Instead, he wanted to resuscitate the Barlowian dream of a digital social order that wouldn't need such institutions in the first place—no bureaucrats, no politicians who inevitably betrayed their electorates' trust, no elections rigged by corporations, no corporate overlords. Nakamoto still thought that such a social order could be created with technology—and in particular, with cryptographic technology.

Nakamoto was not the first to believe in the power of cryptography to achieve such goals. A whole subculture of programmers calling themselves "cypherpunks" and "crypto-anarchists" had been pursuing political liberation through cryptography for almost two decades.[10] Derived from the ancient Greek words *kryptós* (hidden, secret) and *gráphein* (to write), cryptography is the millennia-old craft of creating and deciphering secret messages. The advent of personal computing gave the discipline a huge boost, and the cypherpunks' mailing list at one point reached thousands of subscribers.[11]

Cypherpunks' goal was to create infrastructures that could not be controlled by authorities, whether state or corporate. So far, they had successfully built anonymous communication platforms that allowed messages

to be exchanged beyond authorities' oversight. But after years of work, they still had not succeeded in building viable payment platforms. As a result, their enclaves remained all talk and no business. "We must come together and create systems which allow anonymous transactions to take place," "A Cypherpunk's Manifesto" had urged already back in 1988.[12] Twenty years later, the goal seemed as elusive as ever, and the movement was losing steam.

To understand what the movement was trying to achieve, consider for instance the functions of a conventional bank. A bank ensures that whenever someone wants to make a payment, that person actually has enough credit on their account. If the account balance is insufficient, the bank stops the transaction from happening. The bank's oversight ensures that the same money cannot be spent twice and that account holders cannot create money out of thin air. In this and other ways, the financial system creates order and makes economic exchange possible between people who entrust their funds to it. But financial institutions can also abuse that trust—refuse valid transactions, hold monies hostage, or rig rules to favor insiders, for instance. Trust means belief in someone's good intentions despite an absence of guarantees, so risk of abuse is inherent to it. It boils down to the age-old problem of political science that troubled ancient Athenians, too: the authorities protect us, but who will protect us from the authorities? How can we hold power to account? Cypherpunks and crypto-anarchists called it the "Problem of Trust," and they wanted to solve it with technology.[13]

In 1990s, entrepreneurs launched new digital payment platforms that challenged banks' monopoly on mediating payments. Peter Thiel, Elon Musk, and their cofounders started what eventually became PayPal, the most successful of these ventures. But PayPal's administrators imposed fees and policies that many users felt were arbitrary and opaque. There was nowhere to appeal if the platform froze a merchant's account and put them out of business. PayPal broke new ground in facilitating transactions over the Internet, but it solved nothing when it came to the problem of trust.

Some digital payment platforms tried to adopt more liberal approaches. A platform called E-gold asked few questions of its users and rarely policed transactions. It quickly attracted criminal money, and the US government shut it down and arrested its owners.

Nakamoto surmised that the problem with these platforms was that they still placed power in the hands of a central authority whom users had to trust:

> A lot of people automatically dismiss e-currency as a lost cause because of all the companies that failed since the 1990s. I hope it's obvious it was only the centrally controlled nature of those systems that doomed them.[14]

A trusted central party could abuse its power, as platform companies often did. At the same time it was also vulnerable to government take-down. To avoid these pitfalls, Nakamoto wanted to create a "trustless" platform—one in which the trusted authority was replaced with technological certainty:

> What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party.[15]

Instead of having a central entity like PayPal mediate people's payments, Nakamoto wanted people to be able to send payments directly to each other. To make this happen, every participant in Nakamoto's scheme would run special peer-to-peer "banking software" on their computers, which communicated directly with other participants' computers. Nakamoto took inspiration from peer-to-peer (P2P) file sharing:

> Governments are good at cutting off the heads of a centrally controlled networks like Napster, but pure P2P networks like Gnutella and Tor seem to be holding their own.[16]

The ledgers of this peer-to-peer payment platform would not be held in any central database but as parallel copies on every user's computer. Nakamoto called it a "decentralized" platform.

THWARTING THE SYBIL ATTACK

How would such a decentralized platform ensure that people spent only their own monies? PayPal authenticated users by asking them to log in with their usernames and passwords. But in a peer-to-peer system, broadcasting your username and password to every other user was hardly a good idea.

Ancient Athenians sometimes used pieces of ceramic to authenticate themselves. A flat piece of ceramic with a name or sign was broken in half, leaving an irregular edge on both halves. One half of the ceramic

was given to an administrator, and the other half taken by a person who later needed to authenticate themselves. That person could then later prove who they were by demonstrating that they and only they held a piece of ceramic that perfectly matched with the fragment held by the administration. Unlike a password, the fragment could not be copied, not even by someone who possessed the other half.

Crypto-anarchists before Nakamoto had figured out that a similar technique, called *digital signing*, could be used to authenticate users in a peer-to-peer system. Instead of ceramics, the technique relied on specially devised pairs of numbers, known as *keys*. One of the keys was taken and held privately by the account holder, and the other key was used as the account number and broadcast to everyone else. Like two halves of a ceramic, the two keys formed a perfect mathematical fit; they could be used by the account holder to prove their ownership of the account to other people, without giving away anything that would allow others to imitate them.[17]

However, digital signing had not allowed crypto-anarchists to create truly trustless payment platforms, because a trusted authority was still needed for another reason—to keep track of account balances and check that monies had not already been spent. Thus, by late 2000s, digital signatures were widely used, but they were used by banks, payment companies, and other trusted digital platforms.

Nakamoto had a new idea: the responsibility for checking balances could circulate randomly between users, a little like how administrator posts circulated randomly between citizens in ancient Athens. Where Athenians used the kleroterion to rotate administrators every twenty-four hours, Nakamoto's scheme used an algorithm to rotate the administrator approximately every ten minutes.

The job of the administrator in Nakamoto's system was to go through recently issued payment instructions, check that they were valid, and collate them into a record known as a *block*—an official record of transactions that could be used to determine who owned what in the system. Of course, the administrator would not have to check transactions by hand: all the work would be done automatically by the peer-to-peer "banking software" running on their computer.

After approximately ten minutes, the next randomly appointed administrator would take over, double check the previous block of records, and

append their own block to it, forming a chain of blocks. Just like in ancient Athens, this constant circulation of responsibility meant that the administration would be extremely difficult to corrupt. Together the users would be as powerful as a bank, but individually none would wield power sufficient to coerce another. As long as a majority of the peers remained honest, the platform could maintain orderly records without any single trusted authority. Belief in good intentions was replaced with technological certainty. The problem of trust appeared to be solved:

> With e-currency based on cryptographic proof, without the need to trust a third party middleman, money can be secure and transactions effortless.[18]

However, a significant problem remained. What if an attacker created puppet accounts until their numbers overwhelmed the legitimate users? It was not difficult to create lots of new digital personas for oneself, especially among crypto-anarchists who swore by privacy and anonymity. The randomly chosen administrator would then in reality end up being the same person again and again, undermining the system's supposed lack of reliance on any single party. This so-called Sybil attack—named after the Greek pseudonym of a woman who supposedly possessed sixteen different personalities—had stumped earlier crypto-anarchists.

Poet Solon had faced a somewhat analogous design problem. In Athens, a randomly selected administration could in theory have been taken over by people from a rival city state. Rivals could have suddenly shown up in the morning in great numbers and stuffed the kleroterion with their own nameplates. Once appointed to a majority of the city's administrative posts, they could have wreaked havoc.

Solon prevented such attacks by limiting eligibility to men who could prove that they owned property in Athens. Candidates' plates were sorted into the machine's columns in accordance with their wealth, so that each row represented a spectrum of men from the richest to less well off. For those with no property, the machine simply had no column (nor did it have columns for women or for slaves).

Nakamoto's defense against a Sybil attack was somewhat similar: his scheme required would-be administrators to prove that they owned a CPU. A CPU or central processing unit is the part of a computer that makes calculations. Anyone wishing to have a shot at being selected as the next

administrator in Nakamoto's scheme had to make their computer's CPU try to guess a number that would solve an otherwise meaningless cryptographic puzzle. The first participant whose CPU guessed the correct number became the administrator for the next ten-minute block. Although anyone could create as many online personas as they liked, if the personas shared the same computer, their combined likelihood of being appointed would still be no greater than the individual's alone, so they would gain nothing from it. Sybil was thwarted.

Nakamoto didn't invent the technique of requiring users to spend CPU cycles on guessing numbers. It was known among crypto-anarchists as *proof-of-work*, work being the cycles expended and proof being the correct guess. But Nakamoto's idea of using the technique to select a randomly rotating recordkeeper appeared to be a breakthrough. After years of frustration, the crypto-anarchists' dream of a reliable payment platform without a trusted authority suddenly seemed within reach. "Everything is based on crypto proof instead of trust," Nakamoto summarized his invention.[19]

THE MOST DANGEROUS PROJECT

On October 31, 2008, Nakamoto announced his invention to the world:

> From: <satoshi@vistomail.com>
> To: The Cryptography Mailing List <cryptography@metzdowd.com>
> Subject: Bitcoin P2P e-cash paper
>
> I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.
>
> The paper is available at: http://www.bitcoin.org/bitcoin.pdf . . .
>
> —Satoshi Nakamoto

Two months later, Nakamoto released version 0.1 of his software. It was the peer-to-peer "banking program" that people would run on their computers to join the network, issue transactions, and—if they so wished—spend CPU cycles to compete for a spot as the administrator. He set up the network's first node and recorded the first transactions. Into the first transaction record block, he encoded a message—a newspaper reference that dated the record but also mocked the institutions that his system was set to challenge:

```
The Times 03/Jan/2009 Chancellor on brink of second
bailout for banks
```

Nakamoto received a lukewarm response at first. After decades of failure, many crypto-anarchists had grown pessimistic about the prospects of a truly trustless digital payment system. But a handful joined their computers to his network and began to play around with the platform. Unlike PayPal, the platform couldn't be used to issue payments in US dollars or any other national currency. Instead, the numbers recorded into the chain of blocks represented a new currency unit—*bitcoin*. The virtual coins weren't worth anything as such. They were just tokens. Users sent them back and forth just to test the system. Nakamoto released updates to the software, fixing bugs and adding features. He also set up a mailing list and an online discussion forum for people interested in the project.

> I keep a list of all unresolved bugs I've seen on the forum. . . . This isn't the kind of software where we can leave so many unresolved bugs that we need a tracker for them.[20]

After enthusiasts had been testing and tinkering with the platform for over a year, Bitcoin still hadn't seen any real use as a payment system. Like any platform, it faced a chicken-and-egg problem: How to attract consumers when no businesses accepted bitcoin? How to attract businesses when no consumers used it?[21]

Thanks to the financial crisis, trust in established institutions was at a low point. Many people were eager for change. Some small businesses began to experiment with the new digital currency, which was said to offer independence from the old regime. A vegan café near where I lived advertised a soy-based cheeseburger meal for one bitcoin. An online merchant began to sell alpaca socks in bitcoin. The Electronic Frontier Foundation began to accept donations in the currency.

But cafés, merchants, and foundations still had to pay their suppliers and employees in local currency. Perhaps in the future, they might be able to pay suppliers in bitcoin, if it grew into a widely accepted currency. That was what Nakamoto was hoping for. But for now, it was still necessary to convert the virtual coins into a national currency. This was fortunately possible on *exchanges*—emerging online trading sites on which people began to buy and sell bitcoins for dollars, euros, pounds, and yen.

As word of the new anti-authority payment platform spread, more people became interested. Bloggers took notice. American tech investor Jason Calacanis wrote that Bitcoin was "the most dangerous open-source project ever created . . . unstoppable without end-user prosecution."[22] Swedish libertarian activist Rick Falkvinge explained that "you can transfer any amount anywhere instantly without any authority knowing or interfering" and announced he was "putting all my savings into Bitcoin."[23] Then media outlets picked up the story. *Wired* magazine called Bitcoin "math-based money" that was immune to human politics.[24] A *New York Times Magazine* cover depicted a dollar bill dissolving into pixels, overlaid by the words "In Code We Trust."[25] Bitcoin's exchange rate soared.

With his system successfully inaugurated, Satoshi Nakamoto began to step back from the project. His forum posts became less and less frequent until they stopped completely. Like the poet Solon, the pseudonymous programmer disappeared from the public stage and entered into legend.

A BUG IN THE MACHINE

Bitcoin's success inspired others to initiate similar projects. Some simply copied Nakamoto's source code, changed a few variables, and launched a competing platform with a new name and currency unit. These platforms and their tokens came to be known collectively as *cryptocurrencies*.

Others sought to go further. Brilliant Russian Canadian programmer Vitalik Buterin and his collaborators created a system called *Ethereum*. Like Bitcoin, it used a proof-of-work algorithm to randomly appoint computational recordkeepers who strung blocks of transactions together into an official record. The name of its currency unit was *ether*. But instead of mere payment transactions, its record could also contain *smart contracts*—programs specifying that a payment should be carried out only when certain conditions were met, for instance. Where legal contracts are written in English and executed by lawyers and courts, smart contracts were written in computer code and executed by the Ethereum peer-to-peer network.

Of course, automated programs were already performing conditional transactions everywhere from financial markets and company payrolls to Google Ads and the Amazon Marketplace. The difference was that the Ethereum platform promised to run such code "trustlessly": if parties

submitted a contract to it, it would execute that contract exactly as written *and nothing else*. It would be guaranteed not to overstep its authority and abuse its power. There would not be "any possibility of downtime, censorship, fraud, or third-party interference," according to the platform's website; contracts would be "unstoppable."[26] Users would not have to take Buterin's word for it: certainty would be built into the technology itself, using the techniques that Nakamoto had pioneered. It would solve the problem of trust not just for payments but for all kinds of economic interactions.

This promise carried awesome political ramifications. Throughout history, the state and other formal institutions had played an indispensable role in economic growth by enforcing contracts and property rights. If the Internet had recently diminished the state's role, it was only by replacing it with private state-like authorities.[27] Our reliance on authorities for order continued to leave us vulnerable should they turn against us. Millennia of political science had not delivered any definite answer to this fundamental problem. Now Ethereum promised to solve it and deliver formal institutions' benefits without their risks. "Can't be evil > don't be evil," summarized blockchain visionary Chris Dixon.[28] Peter Thiel paid Buterin $100,000 to drop out of college and focus on Ethereum full-time.

One year from the network's launch, the reality was somewhat less awe-inspiring: most of the popular smart contracts on Ethereum were gambling machines, Ponzi schemes, and other unimpressive undertakings. But one shining example of the platform's potential was The Distributed Autonomous Organization (DAO), a complex set of smart contracts initiated in April 2016. According to its website, it was a "new breed of human organization never before attempted . . . borne from immutable, unstoppable, and irrefutable computer code."[29]

Participants could deposit money into The DAO in exchange for voting rights that determined how the code would invest its funds. Any profits would be credited to the participants' virtual accounts. The DAO thus resembled an investor-directed venture capital fund, except that it was not incorporated under the laws of any state: its by-laws were expressed in computer code and administered only by the peer-to-peer network whose nodes now dotted the world. It was, according to its German creators, "existing simultaneously nowhere and everywhere and operating solely with the steadfast iron will of unstoppable code."[30] There were

human-readable explanations of how The DAO worked, but its creators stressed that the real rules were those expressed in its code:

> Any and all explanatory terms or descriptions are merely offered for educational purposes and do not supersede or modify the express terms of The DAO's code set forth on the blockchain.[31]

Crypto-anarchists and tech journalists were enthralled. A TechCrunch story described The DAO as "a paradigm shift in the very idea of economic organization."[32] In its first month, the fund attracted over $150 million worth of investment from over eleven thousand people.[33]

It is a well-established tenet in software engineering that software is never perfect: despite programmers' best efforts, defects or "bugs" are guaranteed to remain in almost any code. A metric used to measure software quality is defects per thousand lines of code (or KLOC). According to one industry estimate, freshly written code typically contains around ten to fifty defects per KLOC, while fully tested code usually contains up to 0.5 defects per KLOC.[34] A study of popular open source software packages reported an average of 0.69 defects per KLOC.[35] Sometimes critical bugs are not discovered until years or even decades later.

At just over two thousand lines of code, The DAO was small by software project standards. It was also carefully vetted before release. But statistically speaking, it was still likely to contain bugs. And indeed, several were discovered within weeks. On June 17, someone began to exploit them. "I think TheDAO is getting drained right now," wrote a pseudonymous user on Ethereum's discussion forum.[36] Vitalik Buterin and many others showed up. But they could only watch as cryptocurrency gradually disappeared from the fund, moved out in tranches. In the end, the hacker managed to siphon out around a third of the fund's treasury—about $50 million worth of ether.

SOFTWARE UPDATE

As news of the hack spread, The DAO's investors were shocked. Many took to the forum to demand recourse. But from the Ethereum platform's point of view, no rules had actually been broken. The alleged hacker had simply made use of features present in The DAO's code to withdraw funds for themselves. Whether The DAO's creators had put those features there on purpose or not was not something that the automated platform was

in a position to judge. The platform's job was simply to execute the code as written; any bugs were in the eye of the beholder. An anonymous message purporting to be from the hacker emphasized this point:

> I have carefully examined the code of The DAO and decided to participate after finding the feature where splitting is rewarded with additional ether. I have made use of this feature and have rightfully claimed 3,641,694 ether, and would like to thank the DAO for this reward. . . . I am disappointed by those who are characterizing the use of this intentional feature as "theft." I am making use of this explicitly coded feature as per the smart contract terms. . . . Yours truly, "The Attacker"[37]

The situation was a catastrophe for The DAO and its investors but also for the entire Ethereum platform. The Distributed Autonomous Organization was the platform's model application and leading media case study. Around 15 percent of all ether in circulation was by this time invested in The DAO. If investors simply lost their funds, faith in the entire platform could collapse. The ether's exchange rate was in freefall. Buterin undoubtedly felt that something had to be done.

Yet it wasn't obvious that anything could be done. After all, The DAO was built from Ethereum's "immutable, unstoppable, and irrefutable computer code." The entire point of the platform was that there wasn't any admin panel that someone could call up to cancel transactions that they didn't like. Contracts were executed as written. Those were the rules. And it was next to impossible for even Buterin to break Ethereum's rules.

However, changing the rules was a different matter. Small changes to the rules were being made almost routinely as part of software updates that Buterin and his team issued to users. It was possible to imagine a more complex rule change that would in effect reverse the effects of the hack by forcing the misappropriated funds to return to the original investors—like a special law that said, "The contract signed on this date between these parties shall be deemed null and void, and any funds transferred thereunder shall be returned to their original owners." It would be a complex software update, but the process of implementing it would be the same as with earlier updates: Buterin's team releases an update, users download and install it on their computers, and the new rules take effect. From that point on, the decentralized platform would enforce the new rules with the same "steadfast iron will" with which it had enforced the previous rules up to that point. Problem solved.

Of course, the slight issue was that this update would reveal the whole idea of immutable records and unstoppable code as an illusion. For what good were rules administered without any possibility of human intervention if humans could change those rules at will?

The update was thus likely to cause some contention. And to Buterin's team's credit, they did not attempt to simply impose it on Ethereum's users. Instead, they began to publicize the problem and their proposed solution via discussion forums and blog posts. Thanks to a safeguard built into The DAO's code, the hacker wouldn't be able to spend their crypto-takings for another four weeks, so there was still time to deliberate.

Many users agreed with the proposed rule change. Others opposed it on the grounds that changing the rules retroactively seemed to run counter to the platform's whole idea. In the end, Buterin organized an ad-hoc online referendum. Users' voting power was proportional to how much of the ether cryptocurrency they owned. Votes representing only about 6 percent of all ether in circulation were cast. Despite the publicity, it is likely that less active ether owners didn't hear about the hastily organized vote. In any case, the yeas beat the nays almost seven to one, and the update was carried out. The DAO's funds were returned to their original owners.

The crisis revealed how a peer-to-peer blockchain system in the end was never really "trustless." The network may have enforced its rules with robotic impartiality, but people were still in charge of making and amending the rules. In this instance, people decided to amend the rules to confiscate a person's holdings and return them to their previous owners. The point here is not whether this decision was justifiable or carried out in a democratic fashion. The point is that it was possible in the first place. Funds placed in the system were still ultimately entrusted to the care of people, not cryptography. The problem of trust remained unsolved.

Ethereum did survive but with a bruised reputation. Much soul-searching ensued. The word "unstoppable" was removed from the platform's home page. "It turns out we have a lot in common with central banks," commented a former Ethereum project manager. "Maybe not at the technical or legal level, but at a political level, people in our community expect us to be able to make things better for them."[38]

Similar incidents showed how Bitcoin likewise still ultimately depended on human rulemaking. When Nakamoto withdrew from the project, he

handed it over to Australian American programmer Gavin Andresen. Andresen appointed a team of software developers to help him. This core team issued software updates that added new features and fixed bugs. Andresen downplayed the team's role, suggesting that they merely took care of the "plumbing."[39] But one bug was so severe that it would have allowed an attacker to generate new bitcoins at will.[40] In cases like this, the team didn't necessarily tell the users the full story of the update's purpose beforehand. Users were in effect asked to trust the team. Bitcoin, too, was ultimately not "math-based money" but people-based money, not fundamentally dissimilar from the pounds and dollars that Nakamoto had sought to replace.

COMPETING INTERESTS

Around the same time, it was starting to become apparent that even blockchain's revolutionary rule-enforcement system wasn't quite as trustless as Nakamoto had thought.

The idea of using a proof-of-work scheme to select the administrator in charge of recordkeeping seemed like a brilliant bit of engineering. It meant that selection was random but eligibility was tied to something tangible—CPU power. As in ancient Athens, participation was incentivized with rewards: fresh bitcoins were awarded to the successful appointee each time the selection was performed. Nakamoto called this process *mining*:

> The steady addition of a constant amount of new coins is analogous to gold miners expending resources to add gold to circulation. In our case, it is CPU time and electricity that is expended.[41]

Miners' rewards could be substantial. In 2015, the reward per block was twenty-five bitcoins, worth over $6,000 on the trading sites. Since a new block was mined once every ten minutes, the total payouts added up to over $6 million per week. Mining quickly began to attract professional interest. Data center–style industrial cryptomining outfits emerged, kitted with custom-built hardware and bulk electricity access.

However brilliant a cryptographer Nakamoto was, he clearly was not an economist, for he did not realize that just like gold mining, bitcoin mining would entail economies of scale.[42] Industrial mining operations incurred much lower unit costs than individual users with ordinary PCs

did. The industrialists thus quickly outcompeted the ordinary users whom Nakamoto had expected to shoulder the system's administration. Instead of circulating randomly between thousands of cryptocitizens, Bitcoin's official recordkeeping duties began to cycle between a handful of large corporations.

At the end of 2015, just three companies were responsible for mining 60 percent of Bitcoin's record blocks. In principle, anyone controlling over half of the mining power would have been able to stop any and all transactions they didn't like, holding the network hostage.[43] Managers who represented approximately 90 percent of the network's mining power appeared on a stage together at a Bitcoin conference in Hong Kong in December 2015. The managers sought to assure the citizens that they had the network's best interests in mind. "Trustless" recordkeeping had turned into "trust us."

Bitcoin's lead developer Andresen argued that the concentration of mining power into the hands of a few large corporations was not a big deal because it would not make economic sense for a mining company to undermine the system from which its profits derived.[44] Still, it meant that if something should ever emerge to threaten the companies' profits, they would not be powerless. And it turned out that Andresen himself was about to trigger such a scenario and end up feeling the mining corporations' power.

In 2015, Andresen proposed increasing the size of the Bitcoin blocks on which transactions were recorded. The rationale was simple. At that time, each block could accommodate at most about two thousand transactions. Given that the system was designed to add a new block to the chain once every ten minutes or so, this meant that the Bitcoin network was able to confirm only about 3.5 transactions per second. This had been more than enough at first, but now the network's increasing popularity had led to congestion. People sometimes had to wait hours for their payments to be confirmed, making the system practically unusable.

Andresen proposed increasing the maximum block size twentyfold, resulting in a capacity of about seventy transactions per second. This would still be a Lilliputian capacity compared to a mainstream payment system like Visa, which processed two thousand transactions per second on average and had a maximum capacity of 56,000 transactions per second. But

it would be a simple update to implement and would at least alleviate the problem for the time being, Andresen argued.

It turned out that a powerful interest group among Bitcoin's stakeholders was against such a change. Thanks to the availability of cheap government-subsidized electricity, the mining industry had become heavily concentrated in China. At the end of 2015, about three-quarters of all the mining power in the Bitcoin network originated from China.[45] The country's Great Firewall restricted Internet bandwidth between Chinese mining companies and the rest of the world. This meant that Andresen's proposed larger blocks would have been difficult for Chinese miners to handle. "An increase in block size to 20 megabytes would increase operating costs for miners," explained one Chinese mining executive.[46]

Moreover, mining companies everywhere actually profited from the network's congestion, at least in the short term. Miners had the power to choose which transactions from the queue of pending transactions they included in the blocks that they produced. Ordinary users, desperate to get their transactions picked up ahead of the queue, furnished their payment instructions with "tips" that miners could collect when they processed the payment. The worse the congestion became, the bigger the tips users were willing to offer to bypass it. Major mining corporations quickly sided against Andresen's proposal. Andresen arranged talks with them but to no avail.

A variety of other commercial and ideological interests also hinged on the block size question. Some interest groups publicly expressed support for Andresen's proposal. Others opposed it. But Bitcoin had no formal decision-making processes—that is, formal political institutions—that all sides would have considered legitimate and thus no way of reconciling the conflict. Divisions intensified. Rhetoric hardened. Debate broke down into tribalism, trolling, and social media bot campaigning. A climax of a sort was eventually reached when another developer betrayed Andresen's trust by canceling his write access to Bitcoin's official code repository, effectively throwing him out of the core team.

A Chinese mining company executive lamented:

> A decentralized system . . . needs a democratic mechanism to operate and to avoid that disputes are thrown into the Bitcoin community directly and rudely.[47]

A BROKEN MARKET FOR RULES

Decision making in open-source software development projects is often a mix of two contrasting elements. One element is strong technocratic direction by a skilled and charismatic lead programmer, sometimes referred to as a *benevolent dictator*.[48] For instance, Vitalik Buterin is widely recognized as Ethereum's benevolent dictator.[49] The dictator and their team usually control the project's infrastructure, such as its official communication channels and code repository. This concentration of power can provide efficient decision making toward a consistent vision.

The other decision-making element is so-called *rough consensus*—an informal norm that any significant changes to the software should enjoy near-unanimous support from the "community". The community is never clearly defined, but it can mean software developers actively working on the project, companies using the software, and sometimes even individual users, depending on whom you ask. This popular assembly of a sort acts as a check on the executive power and helps to ensure that decisions are informed by a broad range of perspectives.

In practice, the popular assembly usually takes the form of deliberation via a mailing list or an online forum. The goal of the deliberation is to reach a rough consensus on any major issues at hand, on which basis the dictator may then act. Rough consensus means that little or no disagreement remains among those participating in the debate. Majoritarian decision making of the sort used in modern democracies—where a vote is held and the minority must accept the view of the majority—is not as frequently used, partly because it is unclear who should be eligible to vote. The following motto, coined by influential Internet engineer David D. Clark—and repeated by many blockchain developers—expresses this ideal:

> We reject: kings, presidents, and voting. We believe in: rough consensus and running code.[50]

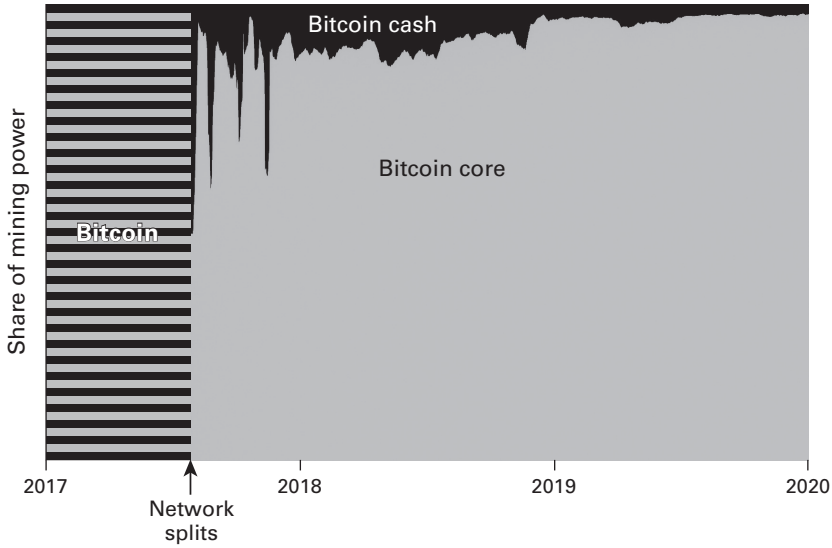
This combination of two contrasting elements—or in social science terms, contrasting *political institutions*—has evolved through decades of open-source software development and clearly it presents some advantages. But it remains poor at reconciling conflicts. No matter how frustrated people get with benevolent dictators, there is no process for replacing them. This has allowed some "benevolent" open-source dictators

to bully community members for years (fortunately this is not alleged in Bitcoin's case or in Ethereum's case). And insofar as community decision making relies on consensus and rejects voting, in contentious issues it easily becomes deadlocked.

However, open-source software projects carry a third political institution in their back pocket, which can be pulled out in case of irreconcilable conflict: the *fork*. Since all source code is freely available, developers who are not happy with the leadership or direction of the venture can simply copy the code and launch their own version. The two parallel projects diverge from their common haft, like tines on an eating implement. Because of the possibility of forking, open-source software projects are sometimes thought of as anarchic or even democratic even as they are being overseen by dictators.

In the same way, blockchain proponents sometimes maintain that their projects are "trustless," even as they rely on powerful lead developers and mining corporations, because anyone unhappy with the arrangement could in principle launch their own fork. Indeed, this is what Gavin Andresen's allies did when they lost the fight over Bitcoin's block size: they created their own parallel version of the Bitcoin software with different rules and set up a parallel peer-to-peer network with that software. Similarly, people who disagreed with Vitalik Buterin on changing Ethereum's rules to countermand The DAO contract set up their own Ethereum network where the update never happened. People could then choose which of the two parallel Bitcoins or Ethereums they preferred—and thus which set of rules they were subject to. In line with anarcho-capitalist thinking, "the market" would choose the rules; there was no need for formal political institutions like voting.[51]

The market for rules was not very liquid, however. One problem was that the platforms' value was based on network effects.[52] The most useful payment platform for consumers was the one that businesses used and vice versa. In other words, individuals couldn't simply choose the systems that they personally preferred but had to take others' choices into account also. When the two Bitcoin networks split from each other, miners and users at first wavered between the two alternatives (figure 8.1).[53] But as it started to become clear which side was going to emerge as the de facto standard, the overwhelming majority quickly gravitated to that one, and the



8.1 Bitcoin cash versus Bitcoin core share of total mining power, 2017 to 2019.

competing "coin" lost almost all of its support and value. The same happened in the Ethereum split. Individuals could not freely choose which rule set to follow; in the end they had to follow the majority if they were to continue transacting. Choice between institutions is not an individual choice but a collective one.

But must a choice be made? Couldn't people simply use multiple systems in parallel? This is called *multihoming* in platform theory. In some contexts, multihoming is viable, and it helps to limit the winner-takes-all dynamics that result from positive network effects. Using multiple payment systems in parallel is clunky but not impossible.

But when a blockchain system is supposed to record ownership stakes in assets like land titles, stocks, or nonfungible tokens (NFTs), multihoming after a fork becomes untenable. Suppose that The DAO had already bought some stocks before the hack happened and the Ethereum network split into two. Now there are two duplicate versions of the Ethereum blockchain, both purporting to contain records attesting to ownership of the same stocks. Suppose further that people multihome and both chains remain in operation. On one chain, the owners of a stock sell it. On the other chain, they don't sell it. The same stock now has different owners

in the two different blockchains. Which record is correct? The technology provides no answer. People must somehow choose one chain to be the authoritative one and discard the other.

Still, even if we accept that a choice must be made and that the choice between institutions is a collective one, then blockchain network splits could be seen as referenda of a sort on which rules the collective would like to adopt. The only eligible voters in such referenda are the miners, though, and indeed the only thing that Nakamoto's original Bitcoin paper said about the system's governance was that miners would "vote with their CPU power."[54] Ordinary users can influence the referendum result only through informal and indirect means, such as by buying a particular token to try to push up its value to incentivize miners to mine it.

Moreover, nothing in the technology guarantees that users get to make an informed choice. When Buterin's team at the Ethereum Foundation created a new version of the software that changed the rules of the game, the foundation's trademark ensured that only this new software would be called Ethereum. The version that remained unchanged had to adopt a new name, even though it was the one that represented continuity. In the case of Bitcoin, some community moderators attempted to prevent users from knowing that there was any choice to be made at all by banning all discussion of Andresen's allies' version.

In both conflicts, the eventual winner was the group in control of the things that could not be split, such as the official code repository, the official communication channels, and—crucially—the system's official name and branding. The trading sites also played a kingmaker role by deciding which version gets to keep the established ticker symbol and which one must adopt a new one. For all these reasons, forking does not make blockchain networks "trustless," nor is it an effective substitute to formal political institutions. The Bitcoin split, in particular, played out more like a civil war than a referendum; naked power was deployed at least as much as argument.

TRUSTED CENTRAL PARTIES

Bitcoin's capacity to handle transactions remains extremely limited to this day. It was never widely adopted as a payment system. Many shops and

restaurants that once experimented with the currency stopped accepting it.[55] Staff at the vegan café near where I lived told me that it was mostly the journalists writing stories about Bitcoin who paid with it in the first place. Instead of being used for payments, Bitcoin and other cryptocurrencies turned into speculative investment assets. People buy bitcoins in the hopes that someone else would later buy the coins from them for an even higher price.

The great majority of cryptocurrency investors today don't actually hold the keys to the coins that they buy. Like stuffing cash in a mattress, holding cryptocurrency is risky and inconvenient. Instead, they entrust their coins to a handful of companies that run the largest trading sites and access the funds by logging into the equivalent of online banking. The vast majority of cryptocurrency transactions happen inside the proprietary systems of these new financial institutions. The Bitcoin network functions not as a payment system for ordinary people but as a sort of interbank settlement network between these institutions.

The leading trading sites and mining companies—many of them owned by the same people—now measure their profits in billions of dollars. The crypto-elite who run these organizations are, if anything, less accountable to the people than conventional financial and regulatory elites. They are caught lying to their customers, defrauding them, manipulating the market, and peddling assets they know are not backed by sufficient collateral, and yet the show goes on.[56] In the eventual crisis, millions of people will again lose some or all of their savings, while insiders' profits will have been long since off-shored. The Electronic Frontier Foundation, true to its cyberlibertarian form, lobbies against government intervention.[57] The only saving grace is that for now cryptomarkets remain small compared to mainstream financial markets, limiting the damage.

None of this to suggest that Bitcoin's or Ethereum's creators themselves were untrustworthy or insincere people. Compared to platform company barons like Amazon's Jeff Bezos or PayPal's Peter Thiel, they were remarkably open about their plans, gave many users a voice in decision making, and solicited user consent for many important decisions. The point is simply that like previous cypherpunks and crypto-anarchists, they ultimately failed to eliminate trust as something that underpins economic activity, with unfortunate consequences.

Meanwhile, another unintended consequence of Nakamoto's proof-of-work scheme has become impossible to ignore. Mining corporations' total electricity consumption now rivals the electricity needs of medium-sized countries.[58] The proof-of-work algorithm causes a network's energy consumption to be proportional to its coin's exchange rate. As long as crypto-investors keep paying fabulous sums for the coins that miners mint, mining corporations will keep burning energy like there's no tomorrow. More efficient mining hardware simply results in larger amounts of hardware being used to burn the same amount of energy. "Proof-of-work" should really be called "proof-of-waste." China eventually banned cryptomining, but the industry moved into other countries, led by the United States.[59] Ethereum's developers have been trying to implement a less damaging scheme for years. Bitcoin's developers have not announced any such plans. Prominent Bitcoin proponents focus on downplaying and denying the system's climate implications.

RISE OF CRYPTOCRACY

Satoshi Nakamoto wanted to solve the problem of trust by delegating power to an incorruptible machine—a peer-to-peer blockchain network. Like the kleroterion of ancient Athens, the machine would distribute administrative responsibilities to so many people that none individually would wield power sufficient to coerce another, creating order without risk of abuse. This decentralization of administration didn't quite succeed, in that economies of scale concentrated power into the hands of a few large companies. But even if it had succeeded, it still would not have eliminated trusted authorities from the system, because Nakamoto did not design anything comparable to the other crucial aspect of Athenian democracy: decentralization of legislation.

Legislation and administration are two sides of a coin. Legislation creates rules, while administration applies them. Solon designed institutions for both. Nakamoto was so concerned with creating an incorruptible administration that he paid no attention to legislation. While administration can to some extent be automated, legislation cannot. "You will not find a solution to political problems in cryptography," somebody on the mailing list warned Nakamoto when he first announced his project.[60] But

Nakamoto missed the point and proceeded as if politics in his system didn't exist.

For many years, then, blockchain developers believed—or at least pretended—that they were mere plumbers. To acknowledge that they were in fact politicians—on whose decisions so many fortunes now hung—ran counter to their crypto-anarchist creed. Thus, they tried to keep everything informal and resisted creating formal political institutions that could have distributed legislative power more widely but would have also revealed their own de facto power.

Crises like The DAO attack and the block-size conflict finally forced developers to confront their blockchains' politics. They tried to govern their software as a traditional open-source project, but into the mix now entered investors, trading sites, billion-dollar mining corporations, shady Bahamian banks, and other stakeholders with financial interests and resources to spend. Open-source dissidents' traditional weapon—the fork—was dulled in the presence of network effects, and it was completely off the table for any blockchain intended to maintain a definitive record of who owned what in the real world. In the absence of formal processes, many important decisions turned into backroom politics and social media warfare. Most ordinary users had no idea who the systems' power blocs were, what goals they pursued, or whose social media accounts they funded. Most journalists continued to write stories of math-based money that somehow ran itself.

In his quest to eliminate trusted authorities, Nakamoto succeeded mainly in obscuring who the authorities were. His complicated attempt at substituting technological certainty for human fallibility resulted in such a convoluted system that power holders became difficult even to recognize, let alone call to account. His pseudonym and Solon-like vanishing act conjured a legend over his creation, which further obscured its workings. In attempting to forgo the need for popular rule as in the Athenian *dēmokratía*, he instead ended up enabling a regime of secretive rule—a *kryptókratía*.

9

COLLECTIVE ACTION I: WORKERS OF THE INTERNET, UNITE?

Just as hands and other limbs
Are thought of as the members of a body,
Can we likewise not consider others
As the limbs and members of a living whole?
—*The Way of the Bodhisattva* 8:114[1]

Kristy Milland was born in 1979 in Toronto, Canada.[2] It was a prosperous city with a diverse immigrant population. Even as car makers shuttered plants across the border in Detroit, they opened new ones here. Her parents were professionals, and the family lived in a leafy suburb.

Milland went to a special school—a program for gifted children—but she didn't enjoy school very much. She didn't like most of the classes and didn't get along with the program's forty other kids. She wasn't into things like hanging out at malls and, as a result, didn't have many friends.

But Milland had something else that few of her generation had: Internet access. Her mother was an early computer enthusiast, and her father was a computer engineer. Throughout her childhood, she was surrounded by screens and punch cards. "I was twelve or thirteen when my dad first gave me a modem and put me on CompuServe," an early commercial online service.

Milland was especially drawn to CompuServe's real-time instant messaging groups, which were probably the first public instant messaging

groups in the world. The concept of instant messaging didn't exist yet, so CompuServe marketed the system as a sort of text-based version of amateur radio, referring to the groups as "channels." The people on the channels were interesting, smart, and quirky. Milland made many friends, and sometimes her father drove her to physical meetups in Toronto's tech district. She started wearing purple hair, black clothes, and piercings. It was a different world from mall-based youth culture:

> It made me very different, but also . . . I got to live through the adventure of the early Internet and the idealism of it.

But before Milland could finish high school, tragedy visited the family: her mother died, and the family fell into crisis. "I didn't go to school for a long time." The very next year her life took another big turn: she gave birth to her own daughter.

Milland moved in with her partner, and he put his schooling on hold to support the new family. But Toronto's economy was still reeling from a recent recession. Jobs were not easy to come by, especially without any qualifications. While her new husband looked for work, Milland stretched a welfare check by collecting coupons and making spreadsheets to determine the best place to purchase each necessity.

Her husband eventually found work through a temp agency, but it paid only $11 per hour.[3] Milland realized that she had to figure out a way to earn income while also caring for her daughter. She knew a little bit of HTML and taught herself more. Her father put her in touch with clients who needed websites, and it turned into a small business.

Then she learned about eBay.[4] With her web design skills and digital camera, she could produce attractive listings. She started combing through local garage sales for toys and collectibles to sell. "My grandmother and I would get up at the crack of dawn. . . . everything that you could possibly sell on eBay, we'd buy it all and put it online by the end of the day."

Milland also started building websites of her own, especially independent fan community sites for popular toys and television shows. She made some money from some of the sites by selling advertising space and subscriptions. None of the sites became big businesses, but they nevertheless made Milland one of the Internet's earlier entrepreneurs.

In 1996, Milland's husband's temp agency job at a Nestlé beverage factory turned into a regular job, and his hourly wage nearly doubled. Milland

finished high school through one of Canada's first online education programs, earning excellent grades. The family was finally able to live in relative security and comfort for a while.

ARTIFICIAL ARTIFICIAL INTELLIGENCE

In 2007, a financial crisis began in the United States and soon spread to banks around the world, which reduced their lending to firms and consumers. Businesses suffered. Nestlé acquired another beverage company and consolidated production to another city. Milland and her husband didn't want to move—they had just bought a house in Toronto, and their daughter was entering high school. He lost his job.

Finding a new job that would support a family was hard, especially as Milland's husband hadn't finished high school. He went back to school to get the diploma, but the family desperately needed income in the meanwhile. Besides his job, the family had also lost his medical insurance, which meant that they now had to pay about $250 more every month for vital prescription drugs.

At the same time, Milland's old Internet businesses were all starting to dry up. Fan communities were migrating from independent websites to social media platforms. EBay was increasing its fees while customers tried to cheat and extort her. As for her web development business, the financial crisis had destroyed that. "My clients had all been American, and so 2008, 2009, that was the end of that."

Just one online revenue stream was holding up: Milland's activity on a website called Amazon Mechanical Turk. On this site, Jeff Bezos's e-commerce giant was posting little onscreen tasks like "What color is the garment in this picture? Select the right answer." Whenever someone completed such a task, Amazon paid them a small reward. Milland had originally started using the site in 2005, the year it was launched. At the time, it was just a curious way for her to earn some extra spending money in her spare time. But now she decided to try to turn it into her family's main source of income.

The reason that Amazon was paying people to answer simple questions was that the company's engineers wanted to collect more data on the products that the company was selling, among other things. With more

data, they could build new systems, such as a search box that allowed shoppers to search for products by color. In the future, *artificial intelligence* or machine learning systems might be able to do the job automatically, especially if they were first trained with data produced by humans. But at least for now, AI was incapable of such feats, and Amazon's engineers created the website as a substitute to it. The site's peculiar name—Mechanical Turk—was a reference to a celebrated eighteenth-century "robot" that in reality was controlled by a hidden human. The site's tagline was "artificial artificial intelligence."[5]

In 2006, Amazon opened up the website to other companies that wanted to post tasks on it. Mechanical Turk thus turned into a platform that connected buyers and sellers of online piecework. Thousands of companies joined over time, posting hundreds of thousands of tasks. One company asked users to look at scanned business cards and type the details into a database. A financial technology startup asked users to transcribe receipts. Another startup asked users to look at photos of meals and identify the dishes; the photos came from users of a mobile dieting app. Internet giants besides Amazon also began to use the platform, either directly or through their contractors. They asked users to do things like detect profanities in YouTube videos, categorize apps submitted to Google's app store, and moderate messages posted on Twitter.

But the rewards paid for the tasks were very small. An image categorization task might pay only $0.01 per image. A bigger task that involved writing a piece of text or responding to a survey might yield a dollar or two. Time spent searching for suitable tasks was unpaid. According to one study, the median effective hourly wage on Mechanical Turk was thus a pitiful $2 per hour—nowhere near enough to support a three-person family in Canada.[6] And since the workers were not considered employees but independent contractors, they were not given any medical insurance or other benefits.

Still, since the work was paid by piece and not by hour, in theory it would be possible for Milland to increase her hourly rate if she could become more efficient at the work. Indeed, about 4 percent of Mechanical Turk workers were able to earn $7.25 per hour or more, according to the study.[7] If Milland could become incredibly fast at completing tasks and if she could identify tasks that paid well relative to how long it took

her to find and complete them, then she might stand a chance of earning enough to make ends meet.

TURKER NATION

Fortunately, Milland knew exactly where to find support for becoming a superefficient online pieceworker. She was a member of an online forum called Turker Nation, in which many of Mechanical Turk's worker-users congregated. The workers called themselves turkers, and in the forum they shared their joys and hardships, discussed techniques for selecting and completing tasks, and shared links to well-paying tasks that they had discovered. One turker explained: "The work itself is not hard. Everything else surrounding [it] is what is hard to manage."[8]

However, the relationship between fellow turkers was a complicated one. Like other independent professionals, turkers were at once peers and competitors. On Mechanical Turk, competition was intense. The platform allocated available tasks on a first-come, first-served basis, and at some point tasks from a given buyer would run out for the day. One turker explained:

> MTurk is incredibly competitive. When people use . . . alarms and things, they don't talk about it publicly. . . . If everyone uses all the same bells and whistles, the [tasks] will go even faster.[9]

Some of the most powerful techniques—and most lucrative tasks—were shared only within a close inner circle of members:

> Most of the boards are hidden so you can only see them once you . . . have been participating in the community and have had the privilege granted to you. . . . Some of the things we kind of protect behind our wall of silence.[10]

The wall of silence did not stop Milland. As an experienced online community manager, she quickly rose up the forum's ranks to become one of its administrators. By the time of her bid to become a full-time turker, she was Turker Nation's lead administrator. She had access to all the most powerful secrets of the trade.

The most important thing that Milland learned from Turker Nation was that it was possible to use browser scripts—small pieces of software—to automate parts of the work. For instance, an Amazon task that involved indicating the color of a garment normally required two mouse clicks: one

click to choose the correct color from a list and another to submit the answer. With a suitable script in place, Milland needed to make only one keypress, such as Y for yellow, after which the script automatically submitted the answer.[11] In this way, a task that normally took maybe seven or eight seconds could be completed in perhaps four or five.

Yet probably the most treasured script that turkers possessed was one that automatically monitored the platform for new tasks. Milland set up the script so that when it detected a new task that fit her criteria, it alerted her with a sound. If the task paid up to $0.05 a piece, the sound would be a simple ping; if the payment was more than $0.25, it would be a siren.[12] Whenever the siren sounded, Milland immediately rushed to her computer. Other turkers explained:

> That alert goes off and I stop whatever I am doing and work until that work is gone. . . . I have gotten out of the shower, mid shower, to work.
>
> You are chained to the computer to search for [tasks] endlessly without it.[13]

With these and other scripts and techniques in place, and with a lot of experience in how to choose and complete tasks, and with resolve, Milland succeeded. In 2011, she earned over $40,000 before taxes from completing tasks on Mechanical Turk. In addition, since she was a leading turker and knew how to do web design, some employers hired her as a consultant to help them design better user interfaces for their tasks. Her income still fell under Canada's median family income of around $65,000 (USD) after tax.[14] But it was a lot more than the average Mechanical Turk worker's income. And—most important—it was enough to support her family.

ADULT CONTENT

The global financial crisis was over, but jobs returned only slowly. Milland's husband finished high school but didn't find work. Milland spent another year on Mechanical Turk, once more bringing home over $40,000. But even with all the tricks, the work was demanding. She slept in her office so that she could respond to task alerts without waking up her husband. And she developed pain in her right wrist and arm—repetitive strain injury and carpal tunnel syndrome. Her doctor recommended rest, but as an independent contractor she would have had to cover the income loss

from her own pocket. Her family could not afford that, so instead she put on a wrist brace and an elbow brace and kept working. "It's just the same movements over and over again, for hours on end . . . the pain was severe."

Then there was the psychological strain. Many tasks involved sifting through unmoderated photos, social media posts, and YouTube videos. Most of the time the content was banal, but occasionally a turker would encounter the worst that humanity posted online. Once Milland was asked to tag still shots from ISIS execution videos, complete with human heads in a basket. Another set of photos depicted animal abuse so horrid that years later Milland still had trouble taking her dogs to the vet without crying.[15] "Things you can't unsee."

As per Mechanical Turk's rules, employers did flag such tasks with a bold warning: "This HIT may contain adult content. Worker discretion is advised." A worker who did not wish to expose themselves to secondary trauma could choose to skip such tasks. But in practice, even tasks that were quite safe were often marked as "adult." Employers marked all tasks containing user-submitted content as "adult" just to be sure. For someone like Milland, who was trying to support a family on Mechanical Turk income, skipping all such tasks was not really viable. She simply accepted psychological risks as part of the job. "They were some of the most lucrative [tasks]. . . . And at the same time not lucrative enough that I could say that I was compensated for the damage."[16]

Some of the worst tasks were posted by academic researchers and students. An infamous task that particularly bothered Milland was created by a team of experimental economists. They wanted to study how "increasing job disamenities" affected workers' likelihood of persisting on a task.[17] Workers were asked to process a set of images by tagging them with suitable descriptors. Every now and then, the researchers popped in a "disagreeable" image. According to one worker, the resulting experience was "90% pretty cute kittens, rays of sunshine, cupcakes and brownies," interspersed with "dismembered children in the streets, burn victims, amputations, [and] decaying corpses."[18]

Another issue that bothered Milland and many other turkers was that employers often failed to pay for the work. This was possible because the platform allowed employers to unilaterally "reject" workers' responses to tasks. Rejection was meant to be used when the responses were clearly

spurious or against the employer's instructions. But sometimes the instructions were poorly written. And sometimes employers simply mass-rejected hundreds of responses seemingly without even checking them. The employer still got to keep the results, but the workers did not get paid. "You couldn't really go to a small claims court against [an employer] who ripped you off, because you didn't know who they were." Neither did Amazon's administrators step in to resolve disputes.

Adding to the workers' sense of powerlessness was the fact that they were almost completely invisible on Mechanical Turk. They had no official discussion forums, profile pages, or other ways of making themselves heard on the platform.[19] At any time Amazon could make changes to the platform's rules that broke the scripts and routines that they had been depending on.

Milland had managed to support her family via the piecework platform, but the income was coming at the expense of her long-term physical and mental well-being. When her husband finally found a job, she told him that she never wanted to depend on Mechanical Turk again.[20] "I had struggled for so long for us to survive." Her daughter had grown up, and she was free to navigate to a new page in her life. She applied and was admitted to study psychology at Ryerson University, a well-regarded research university in Toronto.

But even as Milland began her studies at Ryerson, she kept in touch with her old colleagues via Turker Nation. She also did the occasional task on Mechanical Turk. She wasn't dependent on the platform anymore, but she saw that others were. Others continued to suffer in the ways that she had suffered, and she felt that she should somehow help them.

"NOT ENOUGH FOR ANYONE IN GOVERNMENT TO CARE"

For years, Milland and other workers had been reaching out to Mechanical Turk's employers, one by one, outside the platform, to try to persuade them to treat workers better:

> We also had social media campaigns, where we would call out [employers] on social media and say, "Hey, you're paying $2 an hour for this thing."

Some employers responded positively, while others ignored the feedback. New employers continued to be mostly clueless. Reaching out to employers ultimately just wasn't effective, Milland eventually concluded:

The problem is it's individual. You're changing the actions of individual [employers]. You're not changing the system.

At the root of the problem, to Milland, was the way in which Amazon framed and marketed the platform. Workers were marketed as "artificial artificial intelligence"—as substitutes for software systems that didn't yet exist. The companies that hired them were not called employers or clients but *requesters* in Amazon's language. "You've heard of software-as-a-service. Well this is humans-as-a-service," said Jeff Bezos when he introduced Mechanical Turk to journalists and potential clients.[21]

In line with Bezos's software-as-a-service framing, the platform's rules and mechanisms were all designed so as to make human labor resemble software. All interactions between employers and workers were designed to be as mechanical and codified as possible. Employers adopted the same approach in their dealings with workers. One employer explained:

You cannot spend time exchanging email [with workers]. The time you spent looking at the email costs more than what you paid them. This has to function on autopilot as an algorithmic system . . . and integrated with your business processes.[22]

Another consequence of the framing was that it invited employers to disregard workers' well-being. Employers who exposed workers to disturbing imagery would normally be expected to provide appropriate training, monitoring, and support. Academics would at minimum be expected to inform their experimental participants about potential risks, proceed only after obtaining participants' informed consent, and provide appropriate support afterwards. But on Mechanical Turk there were no such norms. The platform packaged workers into a faceless, interchangeable "crowd" that was accessed through an application programming interface (API) as if they were a software library. Just as programmers did not worry too much about causing trauma to a software library, so employers did not seem to worry much about causing trauma to turkers. Researchers Lilly Irani and Six Silberman explained:

[B]y hiding workers behind web forms and APIs, [Mechanical Turk] helps employers see themselves as builders of innovative technologies, rather than employers unconcerned with working conditions.[23]

How could Milland achieve change? One obvious way would have been to appeal to the Canadian government. The country's existing employment

regulations offered no recourse, Milland had concluded. "If you are an international worker, especially in a format that looks like an independent contractor, you've got nothing, absolutely nothing." But Milland could try to get the government to introduce new regulations. By herself, she could hardly command the government's attention. But if other turkers joined her, perhaps they could achieve change together.

Social scientists use the term *collective action* to refer to any action that a group of people take together to pursue a shared interest. Canadian workers today are safer from injury, death, and psychosocial risks at work than they used to be, and their pay is more secure, thanks in large part to the many collective actions that they have undertaken over the past century and a half to demand change. Their actions have evolved from early riots and sabotage to strikes, rallies, petitions, and demonstrations; and to pooling of resources to hire lobbyists and support candidates in elections. In response to such actions, the Canadian government has introduced new schemes and regulations over the years that address some of the workers' demands. In the same way, other interest groups—from farmers and miners to veterans and pet owners—have taken collective action to influence government regulation. Could turkers not follow the same approach?

Turkers were not a very large interest group in Canada, however. In total, there were over 500,000 registered workers on Mechanical Turk, but they were spread across 190 countries.[24] Perhaps only a few thousand registered workers lived in Canada, and only a fraction were actively working. In the context of Canadian politics, the turkers' plight was thus a rather marginal issue. Even if all the active turkers had managed to come together, it was doubtful that their actions would have been enough to influence the national government. "There were about three hundred active Canadian turkers at any given time," estimated Milland. "That's not enough for anyone in government to care." The same applied to unions. "Canadian unions could have been another avenue to pursue, and I did . . . but they ignored me. Literally ghosted me."

Moreover, even if turkers had somehow managed to get the Canadian establishment to take up their cause, Milland wasn't convinced that it would have helped very much. Canada was one of many countries starting to grapple with the question of how to deal with Internet giants. Like many of its peers, Canada was struggling even with such basic things as how to

get the giants to pay taxes. Meanwhile, even Canada's existing employment regulations were in Milland's view ineffectual, as the government was failing to enforce them. "The people who are getting screwed over . . . they can't afford the lawyer. . . . So the people you see enforcing employment standards claims are executives."

To improve working conditions on Mechanical Turk, Milland concluded that the most effective way was to try to change the platform itself. The platform's user interfaces, back-end systems, and customer service policies in effect formed a body of rules that regulated the conduct of employers and workers on the platform. At present, the rules were failing to protect workers, but there was no technical reason why they couldn't be changed. "You can't change the requesters. You have to change the platform."

DIGITAL WORKERS OF THE WORLD

Instead of trying to achieve change indirectly through the Canadian government, Milland thought that turkers should appeal directly to the platform's decision makers. In any particular territorial state, turkers represented at best a marginal interest group. But on the Mechanical Turk platform, turkers were the preeminent interest group—rivaled only by the employers. Their views should carry some weight there.

Of course, the platform was not a democracy. Workers could not change things by simply voting for their preferred candidates. But if they acted in unison, their views should carry some weight even against an autocrat. With actions like general strikes, a disgruntled working class had brought autocrats to the negotiating table many times before in history. Digital pieceworkers could in principle bring an online labor platform's economy to a halt through a massive strike or through collective sabotage, like submitting false responses to tasks. Even if they never made such threats explicitly, workers acting in unison were therefore a force that any platform ruler had better take seriously.

However, the digital nature of the work organization posed a problem for collective action. Karl Marx observed that nineteenth-century factory workers were "disciplined, united, organized by the very mechanism of the process of capitalist production."[25] Working shoulder to shoulder and living in the same tenement houses, factory workers could communicate and

coordinate protest actions easily. In contrast, Mechanical Turk's workers were dispersed across cities and time zones, from Toronto to Thiruvananthapuram. They worked long hours on the same tasks but never saw or heard any trace of each other. Even when two lived in the same city, they wouldn't recognize each other if they met on the street. To Marx, such workers would probably have appeared unorganizable.

Yet even as they were geographically dispersed, many were virtually united.[26] New workers surfing the web in search of advice and camaraderie often found their ways into forums like Turker Nation. Almost 60 percent of Mechanical Turk workers surveyed in one study said that they used at least one forum.[27] Many also hung out in smaller groups on Internet Relay Chat and Skype, chatting as they completed tasks, working virtually shoulder to shoulder. Milland felt at home in these virtual communities and knew that they could spread word of a collective action just as well if not better than flyers at a factory gate.

In April 2014, an annual academic event called the Conference on Human Factors in Computing Systems was held at the Toronto Metro Convention Centre, not too far from where Milland lived. Some of the academics wanted to meet Milland, who by now had obtained some renown as Turker Nation's lead administrator. Over dinner they discussed practical ways of allowing turkers to express themselves collectively toward the platform company. Later that year, in collaboration with some of the academics, Milland launched an action.

It was a campaign to write letters directly to Amazon's top decision maker, CEO Jeff Bezos. A journalist had recently written that Bezos was "very accessible to his customers with an easy-to-find email address, jeff@amazon.com . . . when his customers aren't pleased, Bezos isn't either."[28] Milland figured that turkers who weren't pleased could use the same channel. The campaign's message to the Amazon autocrat was three-pronged:

1. Turkers are human beings, not algorithms, and should be marketed accordingly.
2. Turkers should not be sold as cheap labor but instead as skilled, flexible labor that needs to be respected.
3. Turkers need to have a method of representing themselves to employers and the world via Amazon.

Milland wasn't naive: she knew that Bezos most likely wasn't reading the email himself. But she thought that if many turkers collectively descended on the inbox, Bezos would realize that he should start listening to them:

> I think that Jeff's team will read our letters, but I'm not sure if they'll make it to the top. . . . But once we have more Turkers writing, he'll have to get involved as the word spreads that we're organising.[29]

To participate in the action, workers simply needed to send an email to Bezos's address. The campaign's web page contained instructions on what to write, and organizers offered editing help for anyone unsure of their writing. Participants were also asked to cc the campaign's email address to have their messages appear on the campaign's web page.

The campaign wasn't trying to change everything overnight. Its goals included simply getting a response from Bezos and opening up a two-way conversation with the company. That, the campaigners hoped, would eventually allow them to influence the platform's rules to effect change for the better.

THE FREE-RIDER PROBLEM

In some ways the campaign got off to a great start. Thanks in part to the academics' connections, the campaign was quickly featured in a dozen different blogs and technology news sites. *The Guardian* wrote that the campaign aimed to "beam hundreds of letters into Jeff Bezos's inbox."[30] The *Wall Street Journal* published a story titled "On-Demand Workers: 'We Are Not Robots.'" Milland was encouraged by the media coverage:

> Here was a real group effort, online, in a new way, that fit this new online world . . . saying, "Look, we exist, and we're going to be heard."

But the actual group effort was not going as well as the media outreach. Milland encouraged everyone on Turker Nation to write letters. She wrote at least two letters herself. Yet weeks into the campaign, there were very few letters on the website. Milland came up with increasingly creative ways of mobilizing participants. Her academic collaborator even logged into Mechanical Turk as a requester and hired workers to read about the campaign. More letters trickled in, thoughtful appeals as well as curt one-liners.

A few months later, the trickle dried up. The campaign had generated a grand total of thirty-one letters, plus an unknown number that had been sent without cc'ing the campaign. Such numbers would hardly make an autocrat tremble. Some of the emails received boilerplate responses from Amazon's customer relations team. But Jeff Bezos didn't respond, nor did the campaign result in any real two-way conversation with the company. If anything, it had the opposite effect: Milland says that the company cut even its existing communications with workers.

Why didn't more workers participate? Thousands of active workers were suffering from the problems that the campaign highlighted. Academic studies attested to this. The campaign was clearly aimed at improving the workers' situation. Nobody disputed that. And many of the workers certainly heard about the campaign. Common sense suggests that the campaign therefore should have attracted far more than just a few dozen participants. Why didn't it?

An influential theory by American economist and political scientist Mançur Olson suggests that it's harder to get people to participate in collective action than it first appears.[31] Consider the choice that a member of a group faces when they learn about a campaign that will benefit everyone in the group if it succeeds. Regardless of whether they participate or not, they will gain the campaign's benefits if it succeeds—for instance, better working conditions. But if they choose to participate, they will also have to pay a cost—not necessarily money but things like extra effort, time that could have been spent on paid work or leisure, and the risk that opponents of the campaign will retaliate.

Olson argued that in a large group, individual members will probably choose not to participate because they know that their participation probably wouldn't change the outcome either way but they would still have to pay the costs and bear the risks. If enough people think this way—or think that others might think this way—then the campaign is doomed. Olson called this the *free-rider problem*, in reference to nonparticipants who are essentially hoping to ride for free on backs of those who do participate, causing the entire effort to collapse.

Olson concluded that because of the free-rider problem, large groups could succeed in collective action only by somehow making participation mandatory. For instance, Canadian workers who went on strike often placed

pickets around their factories to prevent any among them from breaking the strike and going to work. But in a virtual workplace like Mechanical Turk, it was extremely difficult for workers to coerce each other to participate. Per Olson's theory, collective action by a large remote workforce therefore seemed destined to fail, as happened to Milland's campaign.

It is easy to think that turkers who chose not to participate were shortsighted. But we should not underestimate the cost of participating in even such a seemingly simple action for someone struggling to make ends meet, unused to political activism, and unsure of the risks involved in emailing critique to the autocrat of their sole source of income. Milland reflected afterward:

> Turking inherently is such a precarious job. At any moment, they can block you, suspend your account, and take all your money. And we all know that because we see people suspended all the time. . . . I've had my account suspended in the past for no good reason. . . . So we know how precarious it is, and that prevents activism.

"HOW DARE YOU TAKE FROM THE LITTLE GUYS?"

Yet many scholars believe that Olson's theory is too pessimistic.[32] It leaves out important factors that can allow a seemingly hopeless action to succeed. The most important factor is that people are not necessarily considering only their own rational self-interest when deciding whether to participate. Sometimes people participate in an action out of a sense of solidarity for others. Sometimes they are moved to act out of a sense of outrage over a perceived injustice. When such factors come into play, an action that would fail on purely self-interested grounds can attract a groundswell of participation.

A little over a year after Milland's Mechanical Turk campaign, the online freelancing marketplace Upwork[33] announced that it was changing its fees. Up until then, the platform had levied a flat 10 percent fee on all freelancer earnings. But from June 2016 onward, it was switching to a tiered fee structure. The first $500 that a worker earned from a client would now be charged at 20 percent. Any further earnings from the same client up to $10,000 would be charged at the original 10 percent. Earnings exceeding $10,000 would be charged at only 5 percent.

From Upwork's perspective, the new fee structure was more rational. Much of the value that the platform provided—and much of the cost of operating it—was in making the initial match between an employer and a worker and enforcing good conduct while the two still didn't know each other very well. Once someone had performed over $10,000 worth of work for the same client, the value they got from keeping the relationship on the platform was diminishing, and the new fee structure reflected that.

But from the workers' perspective, platform fees were a bit like taxes: nobody liked paying them, but they were generally understood to be necessary for the maintenance of the marketplace. For most freelancers, the new fee structure was like a sudden tax hike because the majority of clients never paid enough to qualify the worker for the new low-tax bracket. Moreover, the tax hike was a regressive one: workers who struggled the most were going to be taxed the most. Workers who had no long-term clients—who took whatever short, poorly paid gigs they could get hold of—had their taxes doubled.

Workers were outraged. "I didn't think it was right. I thought they were abusing their [position]," explained Nick, a video editing freelancer based in London.[34] Somebody launched an online petition against the change. The petition was quickly signed by over five hundred people, despite not being covered by any media outlet. Over two hundred signers left messages comparable to the letters that Milland's Amazon Mechanical Turk campaign had tried to elicit. In addition, almost a thousand freelancers wrote messages of protest on Upwork's official forum.

The brief campaign failed to convince Upwork's leadership. The fee change was implemented as planned. But considering that the campaign was spontaneous, unplanned, and underresourced, it succeeded in mobilizing a surprisingly large number of workers in a short amount of time. How?

> "You guys are making so much money, like, how dare you guys take from the little guys?" That's how I felt. . . . It doesn't affect me all that much, but I was really frustrated for all the other freelancers whom I knew . . . that's their main income.

This was how Casey—a user experience design freelancer based in Los Angeles—explained her reasons for participating.[35] Like her, most freelancers who participated in the forum protest were based in the United States and Europe. American and European freelancers were least likely to be hurt

by the new fee structure: on average, they earned a lot more on Upwork than freelancers from lower-income countries, and they had other income sources as well. They had the least selfishly rational reasons to protest. But the sudden, regressive tax hike had outraged many of them. They went online and protested out of solidarity for others whom they knew would be hurt.

In contrast, workers from South and Southeast Asia—who on average were likely to face the biggest tax hikes—were relatively absent from the protest. They were less able to risk being delisted from the platform if an administrator deemed the protest against the platform's rules. And many probably simply couldn't afford to take time off from paid work for politics.

Milland finished her degree in psychology. She went on to do a master's degree in labor studies and considered starting on a PhD program to explore the topic of a worker-run cooperative alternative to Mechanical Turk. But she no longer believed in the power of virtual labor organizing as she once had. She also didn't want to be poor forever. Her husband wouldn't be able to keep doing physical labor through old age. They had to start saving for retirement.

Milland decided to apply to law school. As a lawyer, she could make money and perhaps advocate for workers also. In the law school admissions test, her old turking injuries shot pain up through her arm, and she struggled to hold the pencil. But she completed the test anyway and was admitted.

ADVENT OF PLATFORM POLITICS

Kristy Milland thought that many people together could win change from an Internet giant against whom individuals were helpless. After all, that was how people had prevailed over powerful rulers in the past. Through collective action, she sought to obtain not just momentary relief but an ongoing discussion—a voice in the platform's decision making, a seat at the table.

Unlike ordinary factory workers, Milland's peers were scattered around the world. Even when two lived in the same city, they would not recognize each other on the street. But on the Internet they rubbed shoulders in virtual communities and groups. The communities had emerged to provide

advice and camaraderie, but Milland knew that they could just as well spread word of a political campaign.

But few workers joined Milland's campaign—not because only a few were distressed but because many were so distressed and so deprived that all their energies were spent on scraping together an income for the day. Politics is work, too, and as such can be too much for those already overworked. The underpaid can also ill afford to risk losing their income. Another campaign that targeted a different platform mobilized more people because it was sparked by an acute sense of injustice, but also because many of the workers were more affluent and could better afford to take political action. Milland herself took action not when she suffered the most but when she observed from safety how others suffered. "I didn't have the privilege to push back until I was financially independent of it," she reflected later.

In the end, neither campaign achieved its goals. But the efforts of Milland and her peers were notable for a more basic reason. They didn't try to appeal to their territorial governments, to whom they were at best a marginal interest group. Instead, they imagined the platform itself as a polity—a political community—and as constituent members claimed a moral right to participate in its governance.

The word *politics* comes from the ancient Greek word *politiká*, meaning "affairs of the cities" (*polis*). Many people tend to associate the word with political parties and elections. But social scientists use it to refer to decision making over common affairs more generally, whether democratic or otherwise. There didn't use to be any politics over Mechanical Turk's rules because it was not a common affair. It was purely Amazon's internal corporate matter. But then Milland and her fellow turkers *politicized* the issue: they claimed that they, too, had a stake in the platform's rules and demanded a say in how the rules were being made. In the end, Amazon gave them no such thing, and yet on a certain level, something had already changed: a platform politics had emerged that was distinct from the politics of territorial government, even if it remained a purely autocratic politics for now.

10

COLLECTIVE ACTION II: RISE OF A DIGITAL MIDDLE CLASS

> A feast is made for laughter, and wine maketh merry: but money answereth all things.
>
> —Ecclesiastes 10:19

Andrew Gazdecki was born in 1989 in Detroit.[1] Times were tough. Car manufacturing plants that once provided work for hundreds of thousands were now closed. The family moved across the country to Orange County, a prosperous part of California. Then disaster struck: "My dad died when I was six."[2]

Gazdecki's mother cleaned houses to try to support her two sons. "We were on food stamps. Life was hard." All around him people were much wealthier. "Spring break comes around, and everyone else is going to Hawaii, and you're wondering, why am I not going."[3]

As an elementary school kid, Gazdecki found joy in skateboarding. He thought he might become a professional skateboarder when he grew up. But as he moved up to middle school, he discovered that the school had banned skateboards. "I was bummed."[4]

With support from his mother, Gazdecki decided to push back against the rule:

> Me and my mum came up with the idea of a petition. So we just went on the Internet and looked through sites and we found a petition to work with.[5]

He rallied his classmates, collected almost 150 signatures on his "Petition to allow skateboard transportation to school," and presented it to the school's principal. Alas the campaign failed. Citing safety concerns, the principal stuck with the rule. Gazdecki did win praise for his initiative, though, including a laudatory segment on the local television news.[6]

Gazdecki then got into Pokémon, a collectable card game. Pokémon cards weren't banned at school, but unlike skateboarding, they were a constant money sink. To make money, Gazdecki sold rare cards on eBay. A few years later, as a teenager in mid-2000s, he got into *World of Warcraft*, a massively multiplayer online game. He set up a website that offered deals on the game's in-game currency for real money.[7] "Entrepreneurship was for me like a survival mechanism," he reflected later. "It saved my life."[8]

Gazdecki went on to study business at California State University, Chico. Located a few hours away from Silicon Valley, it was not as prestigious as some of the state's other institutions of higher education, but it was long-established and much more affordable. If he stuck with his courses, he could expect to find a decent job that would eventually allow him to pay off his student debts and maybe make a trip to Hawaii if he wished.

But after years of deprivation, Gazdecki was hungry to achieve something more than just a decent living:

> I knew that just a job wasn't going to work for me. . . . I had like $30,000 in student loans, I didn't have a place to really go after school, so I needed to build a company. . . . it was out of fear [that] getting . . . a job [was] not going to lead to a life that I want to achieve.[9]

CUSTOMERS IN OVER TWENTY COUNTRIES

In 2007, Apple CEO Steve Jobs got on a stage in San Francisco and announced the iPhone. Soon everyone was excited about iPhone apps, but no one knew how to build them. Gazdecki decided to set up a business in his dorm room: an online marketplace for freelancers specializing in mobile application development.

Gazdecki wasn't a programmer, so to set up his marketplace, he bought "an Upwork script," a software package that replicated some of the most important features of the leading online freelancing platform.[10] He installed

it on a web server, named it PhoneFreelancer.com, and began to promote it. "I spent like a whole winter commenting on literally a thousand different blogs."[11]

After a while, clients started to show up and post projects. Freelancers skilled in mobile app development bid on the projects. Contracts were soon signed for thousands of dollars. Gazdecki earned a 5-percent cut on each contract. It looked as if the site was turning into at least a minor success. Then Gazdecki noticed something:

> I started seeing people posting the same job over and over again: they kept requesting a mobile app for their small- or medium-sized business, same functionality.[12]

Restaurants, gyms, hairdressers and other local businesses had very similar needs. They all needed simple apps that would allow them to interact with their customers. Gazdecki felt that this was an even bigger opportunity than the freelancer marketplace. "Luxury restaurants . . . were paying $40,000 to $50,000 for some really basic functionality."[13]

But time was starting to run out for Gazdecki to experiment with different business models. It was 2010, and he was entering his final year of college. He had nothing to fall back on once he graduated.

He decided to take the risk. He sold off PhoneFreelancer—"not for a lot, but for a lot for someone in college"—and used the proceeds to start another company: Bizness Apps.

Gazdecki's idea for Bizness Apps was to turn app development from a pricey bespoke service to a "do-it-yourself mobile app builder."[14] Gazdecki hired software developers through Upwork, and his team created a website where users could pick features from a list of options, upload their own text and images to the template, and have the system generate a fully functioning app—no programming required!

After the initial investment, building apps in this semi-automated manner was much cheaper than developing apps from scratch. Gazdecki charged only $39 per month for a package that included generating the app, submitting it to Apple's App Store on the client's behalf, and keeping the code up-to-date so that it kept working on newer iPhones. This way, he was hoping to address a huge market of small businesses that wanted to offer an app to their customers but couldn't afford to build and maintain one themselves.

Bizness Apps's first client was his university's gym. The gym purchased an app that informed users about things like class schedules and instructors. "And if a class is cancelled, we can send a push notification and users will immediately see it," explained the gym's marketing assistant.[15] "It's pretty cool; it works pretty well." Since every app was generated from standard components, the apps were quite robust and less likely to have bugs and glitches than apps programmed from scratch.

Gazdecki initially hired two college friends to help him hawk apps to local businesses. After a while he also started enlisting resellers—freelance designers and advertising agencies, for instance, who could combine Gazdecki's app builder with their own graphic design and copywriting skills to provide their small business clients with cost-efficient yet professional-looking apps.

Sales got off to a great start: nine months later, Bizness Apps had created a thousand apps for customers in over twenty countries.[16] The biggest customer group, representing about a third of the company's sales, were restaurants, cafés, and bars.[17] Many restaurants wanted an app that regular customers could use to place take-out orders without having to go through a take-out platform and pay its exorbitant fees. Hairdressers wanted an app that their customers could use to book appointments. Artists wanted apps for keeping in touch with fans. Even lawyers and accountants wanted apps with forms for clients to fill in.

Gazdecki got Bizness Apps some great media coverage, and the growth continued. By January 2012, the company had created three thousand apps and reached $1 million in projected annual subscription revenues.[18] Gazdecki's dorm-room venture was turning into a serious business. He went on a hiring spree, and the startup moved to a fancy office in San Francisco, complete with a game room and a snack bar.[19]

> Where else cultivates tech startups better than Silicon Valley, the world-famous stomping grounds of Apple, Facebook, and Google? For years, I'd dreamed of joining this elite club of entrepreneurs.[20]

Over the next few years, the company continued to do well but never quite reached the frantic, hockey-stick-shaped growth of a unicorn like Facebook. "[W]e hit the law of diminishing returns. We'd exhausted our usual sales channels and had to pay more to get the same results."[21] Gazdecki spoke to venture capitalists, but taking outside investment would

have meant giving up control over the company, which he wasn't willing to do. Growth had to be financed from the company's own profits, but competing app builders like AppMakr and ChowNow had appeared on the market, limiting the profits.

In 2016, after four exciting years in San Francisco, Gazdecki relocated Bizness Apps 800 kilometers south to San Diego, where rents and salaries were more reasonable. Gazdecki wrote:

> Silicon Valley will probably always be the best place to start the next Facebook. For the other 99 percent of us—those with practical, executable ideas—there are better places out there. If you want to build a profitable, mid-sized company, explore elsewhere.[22]

DAVID VERSUS GOLIATH

When Gazdecki promoted Bizness Apps's services to potential clients, he liked to use a "David versus Goliath story" in which his company was the metaphorical sling that empowered the small-business David to survive against giant brands:

> Starbucks builds a fantastic mobile app but they spend two million dollars on it. . . . we allow the small mom-and-pop shop to build a mobile app for the price of a newspaper ad and compete with these big public megabrands down the street.[23]

Gazdecki's own business was a sort of David as well. In the Nokia and BlackBerry era of mobile phones, only the phone giants and their favored contractors could develop mobile apps; phone operating systems were closed to everyone else. Even as the giants gradually opened up their operating systems to independent developers, there was still no practical way for independent developers to distribute apps to consumers, so the business remained in the hands of the telecom giants. Apple's App Store changed this. It introduced an open central marketplace through which any developer could make apps available to all iPhone users, everywhere. It was the sling that empowered underdogs like Gazdecki to suddenly battle with telecom giants for a piece of the mobile revolution.

And Gazdecki wasn't alone. By 2017, there were almost half a million active developers on App Store.[24] Many were students and hobbyists. But tens of thousands were midsized businesses like Gazdecki's. Roughly half

of their income came from developing apps for clients, like Bizness Apps did.[25] The other half came from selling apps directly to consumers and from in-app advertising. In June 2017, Apple announced that it had paid out a cumulative total of $70 billion in App Store earnings to developers.[26] Google's Play Store for Android phones, launched months after Apple's store, published similar statistics.

Gazdecki's Bizness Apps didn't become the next Facebook, but neither did it die a defenseless David. It became a solid midsized firm bringing in millions of dollars in annual revenues. Alongside thousands of others, it prospered in this new transnational market that was created and upheld by Apple and Google. Cities like San Francisco and London but also Hyderabad and Hanoi saw the rise of entire app development industries on the basis of this new market.[27] Industry publications, networking events, and providers of ancillary services created internal structure for the industry. Media coverage enhanced the industry's public status. In 2016, a local newspaper named Gazdecki as one of "top 100 influential leaders in San Diego."

After spending most of his adult life running Bizness Apps, Gazdecki started thinking about moving on. "As proud as I was, I was ready for something new."[28] He wasn't going to be able to list Bizness Apps on a stock exchange, but the company was now substantial enough that it should be possible to sell it off to a larger company or to a private equity fund. It was profitable and still growing, so finding a buyer should not be too difficult. Gazdecki hired an investment bank to spread the word that he was entertaining offers.

Gazdecki soon got a multimillion-dollar offer for his company, and then another one. In deals like this, the founder would typically remain with the company for a while to ensure a successful transition, but after the transition, he would be free and financially independent. He could visit Hawaii if and when he liked. His own children "wouldn't grow up worrying whether the paycheck would stretch to new school shoes."[29]

However, negotiating and closing the sale of an entire company takes time. Among other things, it involves a period known as *due diligence* during which the buyer's lawyers and accountants scrutinize every aspect of the target company, poring over its papers and books, looking for any hidden problems or liabilities. The deal can easily fall apart at this stage. It's a nerve-wracking time for a hopeful seller.

Before Gazdecki could close a deal, Apple's new CEO Tim Cook got on a stage in San Jose, California. It was June 2017, time for Apple's annual Worldwide Developers Conference. First held in 1983, the WWDC was a week-long spectacle of keynote speeches, technology tutorials, and parties for people who made software for Apple devices—the highlight of the developers' annual calendar. In 2017, physical attendance was capped at 5,300 people. Hundreds of thousands watched online.

Even developers who did not care about parties and tech tutorials usually paid close attention to the WWDC, often with a mixture of excitement and trepidation—excitement because Apple used the event to announce new products and features (which could open up new business opportunities for developers) and trepidation because Apple also used the event to announce changes to existing services (which could impact developers' current business). In particular, Apple liked to use the event to announce changes to the rules of the App Store.

The rules that regulate business in Apple's digital marketplace are presented in a document called the "App Store Review Guidelines." The Guidelines amount to about forty pages of text, divided and subdivided like the sections and paragraphs of a legal code. They have provisions for things like child protection, disallowed content (such as porn and misleading quotations from religious texts), and restricted business models (such as gambling and cryptocurrency mining). To enforce the rules, Apple employs a mix of bots and human administrators who review all apps submitted to the store. The Guidelines are essentially the laws of the marketplace.

During the 2017 Worldwide Developers Conference, Apple announced that it had added a new rule to these laws:

> 4.2.6 Apps created from a commercialized template or app generation service will be rejected.[30]

With that single line, Apple had just outlawed Bizness Apps and its competitors. "They've wiped out pretty much an entire industry," exclaimed the CEO of AppMakr.[31]

"I'M GOING TO LOSE MY COMPANY"

At first, many didn't quite believe Apple's announcement. "There was no way in June that we would have said, 'that's going to target our apps,'"

explained the CEO of ChowNow.[32] After all, there was a more rational explanation. Over the preceding months Apple had prosecuted a campaign against spam in the App Store. Hit applications tended to be followed by hundreds of crude imitations, most amounting to little more than an attempt to trick a few dollars from hapless buyers. Much of this spam was generated from templates. Many observers interpreted the new rule as simply a continuation of Apple's antispam campaign.[33]

Although an app that Bizness Apps created for a gym could be very similar in appearance and functionality to an app that the company created for another gym, the two apps had different end users, so unlike spam, they were not superfluous at all. Nor were they crude: many of Gazdecki's apps were recognized for their good quality, and ChowNow had even been highlighted as a design best-practice example by Apple itself.[34]

Besides, Apple had an ongoing partnership with IBM, in which IBM provided its clients with "starter kits . . . that let you build and deploy an app in minutes."[35] Surely Apple wasn't about to shut down its partner's template business. Wordings in the "App Store Review Guidelines" were known to be occasionally weird. Ultimately, what mattered was how they would be applied by the administrators, and developers believed that they wouldn't be applied to legitimate businesses.

Such hopes turned out to be futile. Over the following months, Apple's administrators told Bizness Apps and other leading app builders that any apps they would submit after January 1, 2018, would be rejected on the basis of the new rule.[36] Many of their existing apps were taken down immediately.[37] Smaller app development studios that used templates to produce apps for clients simply started receiving rejection messages. Apple wasn't just going after spam; it was going after legitimate developers who used templates. "A lot of businesses that do work for clients can no longer do the work," explained an exasperated developer in Oxfordshire, UK.[38] "They've been making my life hell. They really have."

Yet not everyone was affected. IBM's clients continued to churn out apps from ready-made components as before. Apps for individual branches of megafranchises like Holiday Inn remained online, despite being cookie-cutter copies of each other. This outraged many independent developers. "They are all the same but none of them get removed. This is a clear violation of Apple's . . . policy and obviously it is unfair to other developers," said

a lawyer for a group of Chinese app developers.[39] "All of a sudden we have that Gestapo, you know, whatever it is, where it's not the free and open platform that we hoped it would be," complained another developer.[40]

This was not the first time that Apple had instituted policies that cost some developers dearly. Nor was it the first time that the company applied its policies selectively. Apple was constantly tweaking the rules of its marketplace. Some changes were made in response to shifting circumstances on the marketplace, such as the rise of spam. Other changes were linked to shifting interests and alliances in the grand strategy games that Apple played with other giants and with territorial governments. Every now and then, little people and companies that relied on its platforms got caught in the gears of those changes and had their livelihoods ground to pieces.

App builders and developers from San Diego to Shanghai now found themselves caught in the gears and desperately sought a way out. A few talked about abandoning Apple and moving to Google's Android platform. But that was not a viable path for companies like Bizness Apps. Close to half of all smartphone owners in the United States and several other rich countries had an iPhone.[41] Apple's App Store had a 100 percent monopoly on distributing apps to people with iPhones. Developers could produce apps for multiple platforms at the same time, and indeed Bizness Apps already generated apps for both iPhones and Androids. But there was no way that the company could stop serving iPhones and still continue doing business as it did. "Who wouldn't want their business on the world's number one app marketplace, servicing the world's number one smartphone?" Gazdecki explained.[42] As long as end users had iPhones, Bizness Apps had to serve iPhones. The Oxfordshire developer explained:

> The ideal would be that everyone just gives up their Apple device. They just get rid of their iPhones and all move on to Android. But that's not gonna happen.[43]

The situation seemed hopeless. "I was going to lose my company," Gazdecki thought. "Revenue was in freefall. Clients were asking for their money back. I dreaded resignation letters . . . as employees fled the sinking ship."[44] One of Bizness Apps's competitors gave up and announced that it was shutting down. The company had been trying to attract enterprise clients—that is, the larger firms that IBM also targeted. Apple's unpredictability made continued investment in the area untenable, said the CEO.[45]

But Gazdecki wasn't ready to give up yet. He had a lot at stake. He had spent almost seven years building the company and was finally at the cusp of financial freedom, and yet his work could come to nothing if Apple's administrators had their way. "I'd invested so much of my time and effort into Bizness Apps that I believed I'd never recover if it failed."[46] He thought that there had to be a way to make the platform giant reverse its decision.

Apple was by now close to becoming the first trillion-dollar company in the world. It was fabulously rich and profitable. Its CEO Tim Cook was by many measures a more powerful authority than most of the world's heads of state. One person, no matter how determined, would hardly be noticed by the giant. Yet if developers protested in unison, might their combined voices be powerful enough?

"TEAM UP TO MAKE OUR VOICES LOUDER"

Gazdecki went on the Internet once again and set up an online petition. He addressed it to Apple headquarters in Cupertino, California:

Apple: Please Allow Small Businesses to Publish Apps in the App Store
Our hope with this petition is to open a constructive dialogue with Apple to reconsider their new App Store approval guidelines by giving small businesses a fighting chance against large corporations who can afford custom iOS development. . . .[47]

He reached out to his competitors and collaborators in the app development industry to join the campaign. After all, he was well known in the industry and had extensive networks:

We are now looking to partner with companies which create iOS applications for small businesses or organizations alike that support small businesses, to form an alliance, as together we are stronger. . . . If you are a member of a company or organization that would like to team up with us to make our voices louder—please feel free to contact me directly.[48]

Many developers probably thought that Gazdecki's campaign was futile. But many didn't. Some of Gazdecki's fiercest competitors endorsed the campaign. Gazdecki attached statements from their CEOs to his campaign web page. Other developers blogged about the campaign and spoke about it on YouTube. The petition got off to a great start. Names started pouring in. In less than a week, it attracted over a thousand signatures. Developers from all over the world left messages:

We're a boutique company that uses templates to develop apps for small and medium businesses in the Philippines. Enforcement of Rule 4.2.6 will make app development unaffordable except for the biggest brands.[49]

Behind the scenes, Gazdecki and his competitors worked their contacts in the media. Sympathetic tech journalists ran stories about the app builders' plight. Sarah Perez wrote on TechCrunch:

[W]hat Apple's doing with its expanded ban of templated apps is the equivalent of preventing small businesses from being able to compete in the same ecosystem as the bigger brands. It's the gatekeeper . . . that impacts the little guy by interfering with their ability to do business. . . . [50]

Somebody hired a lobby firm to recruit allies from Congress. California's Democratic congressman Ted Lieu wrote an open letter to Tim Cook:

The Apple App Store has helped small businesses expand their economic horizons. . . . I am concerned, however, that . . . Apple may be casting too wide of a net and invalidating apps from longstanding and legitimate developers . . . [51]

Despite all this, Apple remained silent. It didn't offer any public response to the congressman's letter. Nor did it respond to questions from journalists. Meanwhile the January 1, 2018, deadline was drawing near. Bizness Apps was about to lose its core business in a matter of days. Signatures were still pouring in. Messages expressed growing desperation and anger toward App Store's autocrats:

You place the full weight of your knee on the chest of everyone else who is trying to feed their children and make a living because . . . you can.

Please reconsider this decision asap. Business will fail and people will lose their livelihoods from this.[52]

Then Gazdecki received a call from an Apple executive: "Hi, Andrew. . . . There's going to be a change to the 4.2.6 guideline."[53]

On December 21, 2017, Gazdecki posted an update on the petition's website: "Victory! Apple revises its guidelines on template-based apps!" He explained in a blog post:

At the insistence of small business advocates, Apple amended the new guideline that banned templated apps from the App Store. . . . [A]ll small businesses will once again be able to publish affordable apps in the Apple App Store through app generation services like Bizness Apps. A huge thank you to our partners and supporters who fought alongside us for this outcome.[54]

Apple didn't completely rescind the new rule, but it amended it in a way that made it possible for Bizness Apps and its competitors to continue operating. Their clients would have to register with Apple and start paying membership fees, but after that they could continue to build apps from templates.

The giant offered no public explanation for its U-turn. We don't know if its decision makers were swayed by the 3,261 signatures that Gazdecki's petition had by this point attracted, the hundreds of messages that its supporters had posted, the letter from Representative Lieu, the growing media attention, private appeals from app business CEOs, or perhaps even internal dissent from within the company. But it's clear that all these activities supported each other. And together they amounted to a formidable campaign that forced Apple to change its rules.

RISE OF A DIGITAL MIDDLE CLASS

Why did Gazdecki's campaign succeed when so many other campaigns against platform autocrats had failed—failed not just in the sense of failing to achieve change but in failing to even rally other platform users behind the cause? Kristy Milland was an extremely clever and resourceful campaigner for the rights of digital pieceworkers on Amazon's Mechanical Turk platform.[55] She had years of experience on the platform, the support of activist academics, and the sympathy of major media outlets. Yet despite sustained efforts, her campaign failed to mobilize even three dozen out of tens of thousands of fellow workers. Gazdecki's campaign managed to mobilize thousands of signatories and several CEOs in a very short amount of time. Why?

Many factors contribute to the success or failure of a collective action.[56] Milland's campaign sought to address long-standing structural problems, while Gazdecki's campaign was a response to a sudden change that presented an immediate threat. That acute sense of outrage probably helped to mobilize people behind the campaign. But Gazdecki's campaign also did substantially better than a campaign against Upwork, which was likewise sparked by an acute sense out outrage over a sudden and deleterious change.[57]

In many ways, the most pivotal factor that set Gazdecki's campaign apart from others was *capital*—wealth and other resources that app developers

possessed and most freelancers and pieceworkers didn't. Gazdecki's firm didn't become the next Facebook, but it also wasn't a struggling microbusiness. It was part of a prosperous "middle class" of platform users—individuals and companies that grew wealthy in the markets that the platforms enabled.

Unlike poverty-stricken pieceworkers, members of this middle class could afford to take time off from work for politics. They could afford to learn about an issue that affected them, discuss it with their peers, sign a petition, and perhaps even blog about it or contact a local journalist or politician. Business owners like Gazdecki might even be able to assign a full-time staffer to promote the cause. The members of this class were also more likely to have the confidence, education, and cultural adroitness to speak in ways that might persuade a platform company's rulemakers. And perhaps most important, they had accumulated safety nets, savings, and marketable skills to fall back on should platform powers penalize them for speaking up, which meant that they were not afraid.

It is possible to make an analogy here to the actual middle classes of Europe, which first emerged in medieval market towns. As trade and crafts flourished, the growing number of merchants and artisans coalesced into a new social layer between impoverished peasants and powerful lords, known as the burghers. Peasants' attempts to resist their lords usually ended badly. But burghers, with their increasing wealth, learning, and social status, were able to collectively start pushing back against their lords' power. Through petitions, protests, and bribery, they won rights for themselves—promises from the local lord not to interfere in their business or seize their property or person. To help them in their struggles, they sometimes recruited powerful allies, such as bishops, monarchs, and mercenaries.[58]

Just as Apple had itself enabled the prosperity that Gazdecki and his peers now used against it, the burgher class that began to dismantle the feudal lords' monopoly on power was in many ways the lords' own creation. Medieval lords installed hardware such as scales and mints in their towns that reduced business costs. They also began to enforce contracts and protect traders against bandits. They did this to attract a rich supply of goods and generate new tax revenues for themselves. But the expanding market opportunities also multiplied the numbers of traders and craftspeople and compounded these burghers' wealth. By the High Middle Ages, the burghers had organized into guilds and associations that defended their

political interests jealously. Gradually, they obtained a larger and larger voice in the market towns' governance and administration.[59]

Gazdecki's campaign remains one of the few successful collective actions to influence the rules of a platform marketplace. But professional users' grievances against platforms have not diminished. Mobile app developers continue to resent many App Store rules and impositions. In particular, developers have become increasingly vocal about their anger toward the 30 percent "Apple tax" and "Google tax" that they must pay to the duopolists from their app store income. Epic Games, makers of hit game *Fortnite*, took Apple to court over the tax. Music streaming service Spotify complained to EU competition authorities about it. Both solicited support for their campaigns with social media outreach and industry networking. The platform rulers seem to be feeling the heat: both Apple and Google quickly announced a new 15 percent low-tax bracket for developers earning less than $1 million a year.

On May 31, 2018, Gazdecki posted on his company's website: "Today, we have an exciting announcement to make: Bizness Apps has been acquired by Think3!"[60] After the Apple fight, Gazdecki had received a call from an associate of a ten-billion-dollar private equity fund that specialized in buying software businesses. They already had several software-as-a-service businesses in their portfolio, and they offered Gazdecki a great deal on his company.

> I'd probably have sold the company for half as much. . . . They let me leave quickly . . . with an amount that meant never worrying about money again.[61]

Think3 paid in cash. "When that wire transfer hits your account, it's a moment you never forget."[62] The fund sent new executives to run Bizness Apps. The newly minted millionaire bought a new house and splurged on a Mercedes sports car. A few months later the twenty-nine-year-old founder departed his company.

The successful exit did not quell Gazdecki's entrepreneurial ambitions. He was already working on a new venture. This time it would be based on the Ethereum smart contract platform. Gazdecki had prevailed against a powerful platform ruler once, but it had been an ordeal. Ethereum, on the other hand, was reputed to be a "trustless" platform where participants' fortunes could not be swayed by rulers and politics.[63]

III

SOCIAL INSTITUTIONS

11

THE DIGITAL SAFETY NET: SOCIAL PROTECTION AND EDUCATION IN A PLATFORM ECONOMY

> Alms shall be used only . . . for distribution among the poor, the destitute, the wayfarers, [and] those that are employed in collecting alms. . . . That is a duty enjoined by God.
>
> —Quran 9:60

In late nineteenth century, the great powers of Europe were locked in competition against each other for territory, wealth, and prestige. Britain, France, Germany, Austria-Hungary, and Russia formed shifting alliances as their leaders attempted to outmaneuver each other. Between outright warfare, the five powers competed in economic prowess as they tried to outdo their rivals.

One of the most fearsome leaders in this contest was Otto von Bismarck, who would come to be known as the Iron Chancellor of the German Empire. As minister president of Prussia, he conquered territory and wealth from Denmark, Austria, and France. He then merged rivaling German principalities into a single empire in which Prussia held a controlling stake.[1]

The contest for supremacy intensified. Russia annexed more territories. Britain invested into additional warships for its already terrifying navy. Bismarck did something quite unexpected: he spent all of his political capital to push through sweeping social legislation.

The Sickness Insurance Law of 1883 ensured that workers who fell ill would be covered for medical treatment and receive financial support

equivalent to 75 percent of the average wage. The Accident Insurance Law of 1884 covered workers in case of workplace accidents, regardless of who was at fault. Permanently disabled workers could receive a pension equivalent to two-thirds of their earnings; if they died, the widow and orphans were paid compensation. The Old Age and Disability Insurance Law of 1889 created a state-administered pension system.[2]

The three laws together constituted an unprecedented safety net that German workers could fall back on in times of hardship. The safety net was funded mainly by employers and the state; workers and their families were the system's net beneficiaries, especially the poorest who paid no taxes. The system still had many gaps and was much expanded in later years, but it earned Bismarck a place in history as an inventor of the modern welfare state.

TECHNOLOGICAL UNEMPLOYMENT

As a self-employed gig worker in California in 2014, Sofia didn't have any medical insurance. Nor was she eligible for government Medicaid. The medical bill she was facing was over $100,000. Thoughts of self-harm crossed her mind.

Sofia was born in 1987 in Santa Barbara County in southern California.[3] The long and pleasant beaches of the county were lined with tourist resorts. Its mountainous interior was dotted with luxurious ranches, including the ranch of sitting President Ronald Reagan. Sofia's parents worked in the hospitality sector that served the ranches and the beaches.

Sofia enjoyed reading, and one of her favorite authors was Japanese novelist Natsume Sōseki. The novels had been translated to English by a professor at her local university, the University of California at Santa Barbara. She wanted to study there after high school.

UC Santa Barbara was an old and prestigious research university. In 1969, its Mathematics Center had been the third site in the world to be connected to the Internet, or its precursor, ARPANET. Student admissions were very selective. But Sofia easily gained admission into the university's Japanese language undergraduate program. She even obtained a scholarship that made the studies financially possible. "I wanted to be a Japanese translator or interpreter," Sofia later reminisced.

But when she graduated in 2010, the job market did not look good. Unemployment in California was still spiking in the wake of the financial crisis. Demand for low-end translation services was being demolished by Google Translate, an automatic machine learning translation system trained with the works of United Nations and European Union translators. At the same time, mid-market Japanese translation was being outsourced over the Internet to the Philippines and elsewhere, where local Japanologists could do it for less pay. Without years of relevant work experience, high-end translation and interpretation was still beyond Sophia's capabilities.

Sofia continued to live with her parents as she looked for suitable jobs. But her parents weren't rich, and she felt that she should contribute to the household budget at least a little. She started looking for ways to earn money in between crafting job applications. She found a website called Fiverr, where people sold simple services to others over the Internet. She came up with a service titled "I will write your name in Japanese" and offered it for $5 per name. But dozens of others were already offering an identical service. Sales were slow. Then she found a site called Amazon Mechanical Turk.[4] It was an online piecework platform where she could get paid for completing surveys and doing simple data labeling tasks. The pay was extremely low, but at least she could bring home a few dollars each day.

Weeks turned into months and then into a year, but the full-time job that she was looking for eluded her. She started realizing that she might not become a Japanese language professional after all. "After all that time, my Japanese skills were getting pretty rusty." But she didn't want to follow her parents into the hospitality sector, where pay was low and benefits meager. She started looking for ways to reskill herself.

CERTIFIED BY GOOGLE

Sofia didn't want to go back to college and probably couldn't have afforded it anyway. Instead, she started playing with free and low-cost learning materials posted on the Internet. Tech companies like Amazon, Google, and Microsoft were offering online courses, tutorials, and self-study materials on the web. Most of these materials aimed at teaching people how to

use the companies' own products; some were aimed at teaching general tech skills, like how to stay safe online. Google introduced one of its several learning platforms as follows:

> Skillshop gives you practical and conceptual product knowledge and skills, plus industry-recognized Google certifications that add value and credibility to your professional profile.[5]

Sofia began to study the use of Google's AdWords platform for advertisers. Internet advertising was a $37 billion market in the United States alone, and almost half of that money was spent via Google's platform;[6] there were bound to be jobs in the advertising world for people who knew how to use the platform effectively.

But advertising and technology were both completely new worlds for Sofia. She found the tutorials hard, but she persisted, and after a few weeks she felt ready to take an online test. The test was time-limited; a clock was ticking on the screen as she worked through the questions. After about two hours, she was done. The result came immediately: it was a pass. Google awarded her a virtual "Google AdWords Certification" badge, which she could display on her LinkedIn profile.

Three months after obtaining the certification and almost two years after graduating from UC Santa Barbara, Sofia finally landed her first full-time job. It wasn't in advertising. It was a "regular office job" in another part of southern California. Perhaps the update to Sofia's LinkedIn profile had caused the platform's algorithms to surface her profile to recruiters; perhaps she herself had become less picky. She wasn't sure. But the job came with benefits and paid well enough for her to be able to move out from her parents' place, something that she had longed to do as a twenty-five-year-old single. She might not become a Japanese language professional, but she was well on her way toward leading an average middle-class life in one of the quieter parts of beautiful California.

Less than a year later, Sofia was laid off from her new job. She was devastated. She didn't want to go back to her parents. She just stayed by herself. "I'm kind of ashamed of myself."

To scrape together money for the rent, Sofia logged into Fiverr and Amazon Mechanical Turk again. It wasn't nearly enough. She created an account on oDesk, an online labor marketplace where some clients paid good rates for remote writing and translation work.[7] "It's much more work

and much more of an uphill climb to establish yourself there." Desperate, she got into her old sedan and started driving for Uber during peak commuting times. It stabilized her budget.

Sofia worked long hours. "Pretty much any time I'm in front of the computer, which is most of the time I'm awake, I'm signed on to Mechanical Turk." Her parents were worried. They didn't understand what she was doing to support herself. "I talk about it very little to them. . . . they don't really know all the lingo." She felt lonely, but she found camaraderie online. "The Turker Nation forum gives you a real sense of being part of a group."

Over time, Sofia's earnings from her remote online gigs improved slightly. She developed her skills with online tutorials and advice from other workers. She took tests and earned virtual "qualifications" on Mechanical Turk and oDesk that gave her access to projects previously unavailable to her:

> I have many qualifications. . . . The most important ones I have are the e-commerce writing and e-commerce editing qualifications from Crowdsource. If you have those, you absolutely have it made.

All this didn't leave Sofia with much time or energy for trying to find another regular job. She was disillusioned with the regular job market anyway:

> I haven't looked for more jobs since I was laid off because I got so frustrated with it during the years I was trying to get that office job, and I'm just kind of fed up. And because I had Mechanical Turk and all this other stuff, I just didn't have much motivation.

This way Sofia kept going until the spring of 2014, when she noticed a lump in her breast.

FRAYING WELFARE STATE

Sofia was diagnosed with a stage II breast cancer. It is rare in young women, but nevertheless thousands get it every year. Sofia was terrified—of what the illness would cost her financially. The diagnosis alone had cost her $1,600, which was close to her entire earnings for the month.

Sofia was told that she would have to undergo surgery, which could cost as much as $100,000. She would also have to buy medications, receive radiation therapy, and possibly also undergo an unpredictable number of

chemotherapy rounds at a cost of $5,000 to $25,000 each. During this time, she would most likely be unable to work.

As a self-employed gig worker, Sofia had no medical insurance through her work that would cover the treatments and income loss. Without children or disabilities, she also wasn't eligible for government medical insurance scheme Medicaid. Her credit rating was still good, so she should be able to borrow money to access the treatment. But it was possible that she could never pay off the resulting debt and interest. The treatment could save her life but destroy her finances.

Millions of people in the United States had no formal safety nets in case illness or other misfortune struck. The US health-care system was unique among rich countries in that it did not have a universal public program. The Affordable Care Act pushed through by President Barack Obama's administration in 2010 decreased the number of uninsured people significantly. But as of 2018, approximately 12 percent of US adults aged nineteen to sixty-four remained uninsured, including many working poor like Sofia.[8] As many as 45 percent were underinsured, meaning that although they had an insurance, its coverage wasn't necessarily sufficient to get them through serious illness.

In other rich countries, the state typically operated a mandatory national insurance scheme. Governments also granted various benefits to those who were sick or otherwise unable to work. In Europe, public health care and benefits together with free public education were understood as key pillars of a so-called welfare state that took care of its people.

But in Europe, too, the pillars of the welfare state had somewhat eroded, partly as a result of austerity policies pursued in the wake of the global financial crisis. And in Europe as well as in the United States, tech giants such as Amazon and Uber were further contributing to their erosion. The tech giants promoted uninsured gig work and lobbied governments and fought court cases to ensure that they didn't have to insure the workers. They also starved governments of tax revenue: they bankrupted brick-and-mortar stores that used to pay local taxes in every county and generated new tax income and employment only in select locations, in which they built their logistics hubs and data centers. Governments competed for the privilege of hosting their facilities by offering tax breaks and investment subsidies.

Broke and with no insurance or government support, Sofia gave up on her apartment and moved back to her parents' place. Her parents had saved some money for retirement, but it wasn't much. They soon started putting Sofia's medical costs on their credit cards. She was worried that she might end up taking her parents down with her. Thoughts of self-harm crossed her mind.

ENTER THE DIGITAL SAFETY NET

A girlfriend from Sofia's college years heard about her illness. The friend and her husband set up a fundraising campaign for Sofia on a website called GoFundMe:

Sofia breast cancer surgery
Sofia is an incredible woman who is passing through a very difficult situation. A couple of months ago, she was diagnosed with cancer. . . . She has been out of work, and her job doesn't include any kind of insurance or short-term disability. She is scheduled for an operation on May 16th. She is currently an Uber driver to make ends meet, but she will not be able to drive for quite some time because of the recuperation time and the following chemo therapy. Please help Sofia survive this tragedy. Everything helps. We are praying for her survival. Thank you.

Next to the appeal there were buttons to "Donate now" and "Share" the campaign via email or social media. There was also a progress bar that depicted the funds raised so far as a proportion of the campaign's target sum. The target was set at $100,000.

Sofia's friend shared the campaign on Facebook. She also posted the link to a WhatsApp instant messaging group that had many of Sofia's old college friends in it. Donations started trickling in right away. The first donation was from an old college friend who gave $20. Another two friends gave $25. Another friend donated $50 and then $500. The couple who had set up the campaign donated $1,000. In a few days, the progress bar reached $10,000. The donors left messages of support: "Love you sis! You got this!"

Silicon Valley–based GoFundMe, Inc. operated a so-called charity crowdfunding platform. People like Sofia had received more than $5 billion in donations through the platform since it was launched in 2010. Approximately a third of all the funds raised through the platform had been for medical costs. About 250,000 medical crowdfunding campaigns were

initiated on the platform every year, raising a total of about $650 million.[9] According to a 2019 survey, 20 percent of American adults had donated money to a medical crowdfunding campaign.[10] GoFundMe was especially popular in the United States, but it also had many users in Europe, including in France, Germany, Italy, Portugal, and Spain. Chinese Internet giant Tencent operated a similar platform in China; other charity crowdfunding platforms were available in Brasil, India, Japan, and elsewhere.

GoFundMe's chief executive Rob Solomon suggested that crowdfunding had emerged as a way to plug the holes in societies' formal safety nets. "We're the digital safety net," Solomon explained.[11] As health-care costs had risen and state welfare institutions weakened, GoFundMe had become "an indispensable institution," he argued.[12] Indeed, in a study of a thousand medical crowdfunding campaigns in the United States, we found that significantly more campaigns were initiated in counties that offered few government benefits and were home to many uninsured people—that is, in counties where formal safety nets were weak.[13] Even some hospital case workers now referred patients straight to crowdfunding platforms.[14] Crowdfunding was also increasingly used to raise funds for disaster victims, bereaved families, and young people unable to afford an education. Silicon Valley helped to erode the formal safety nets that people used to rely on. Had it made good by inventing a substitute?

One possibility was that crowdfunding was merely old charity in a new bottle. Family, friends, and neighbors had always been important sources of care and financial aid. Well before formal government safety nets were even invented, these informal safety nets provided relief to people in distress. Yet where they fall short is that they are very patchy, especially in a postindustrial society where most people no longer live in tightly knit rural communities.[15] Sofia's family was not rich; she could rely on their finances only so far, and in doing so she risked plunging them into poverty, too. She had few other relatives. She was fortunate in that she had some friends from college who were wealthier and could afford to donate $500 or even $1,000 at a moment's notice. But did she have enough friends like this to survive cancer?

National insurance schemes and tax-funded benefits spread risks across broader populations, so their protection does not hinge on whom you know or how wealthy your parents are. For instance, if Sofia had lived in

England, then her treatment would have been funded by the mandatory National Insurance and by taxpayers and provided by the National Health Service. If crowdfunding was just the same old "friend funding" that had always been people's last resort—if all that it did was to replicate traditional informal safety nets in a digital medium—then it could not begin to offer a substitute to universal safety nets such as England's NHS.

Indeed, in our study of US medical crowdfunding campaigns, we found that in counties where people were wealthier, there were greater numbers of successful crowdfunding campaigns.[16] In poverty-stricken counties, where the need for relief was greatest, there were fewer successful campaigns. This suggests that crowdfunding campaigns were funded by local friends, family members, and neighbors—that is, the traditional informal safety nets that were simply too patchy to protect everyone. If so, then crowdfunding was just friend funding with some Silicon Valley yarn about saving the world spun on top of it.

ENGAGING THE AUDIENCE

A couple of days after the launch of her crowdfunding campaign, Sofia noticed a donation from a name that she didn't recognize. Then came another one and another. A dozen or so strangers donated sums of up to $100 each. Somebody donated $1,000 anonymously, without leaving a name on the campaign's web page. Another anonymous donor gave $1,500. "I wish I could donate more, but I'll share this on Facebook, and maybe some of the kidney community will come through," one of Sofia's friends wrote to her. More strangers came in and donated.

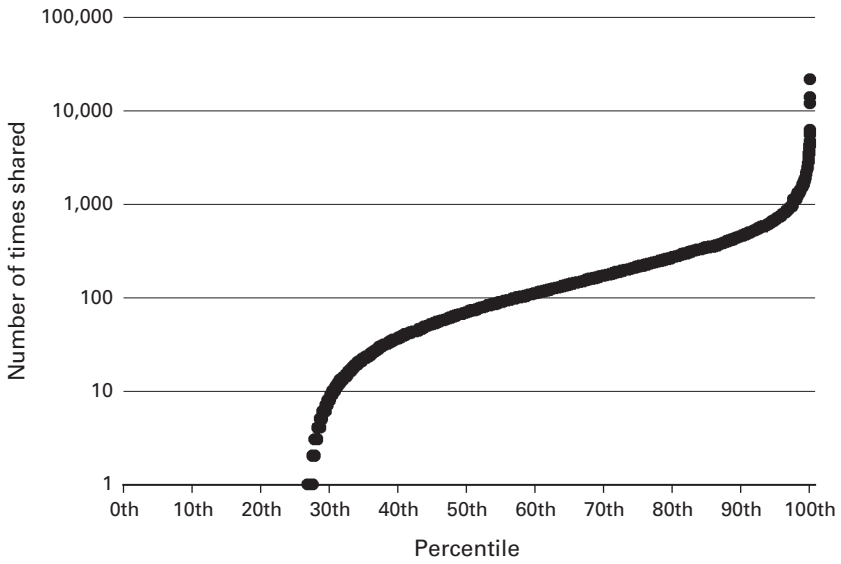
A difference between traditional informal safety nets and crowdfunding was that crowdfunding campaigns were often shared via social media. That way they could reach people beyond the beneficiary's immediate circle of friends, family members, and neighbors and attract donations from a broader range of people. According to a survey, over a third of Americans who donated to medical crowdfunding made a donation to someone they didn't personally know.[17] GoFundMe claimed that sharing an appeal via Facebook increased donations by "350%."

In our study of US crowdfunding campaigns, we indeed found that there was a significant correlation between the number of times a campaign was

shared and the amount of money it raised, even when many other factors were held constant. Our estimates implied that a 10 percent increase in the number of times a campaign was shared was associated with an almost 2 percent increase in the funds it raised.[18]

Yet as with any social media content, crowdfunding campaigns' popularity varied greatly. Some campaigns went viral and were shared and retweeted thousands of times. Others received much less attention. In a random sample of 12,126 US medical crowdfunding campaigns on GoFundMe collected by my doctoral student Sumin Lee, the most successful campaign was shared 21,400 times (figure 11.1). But 90 percent of the campaigns were shared fewer than five hundred times, and over a quarter were not shared at all. The median number of times a campaign was shared was sixty-eight.

Success in being shared and retweeted was in part determined by how well the campaign's initiators and beneficiaries were able to engage with their online audiences.[19] Sofia's friend posted updates throughout the early stages of the campaign: "The surgery went well, she is now at home starting the long recovery journey." After a while Sofia started posting updates herself: "Thank you so much everyone. . . . Feeling low energy but all of



11.1 Number of times GoFundMe medical crowdfunding campaigns were shared on social media.

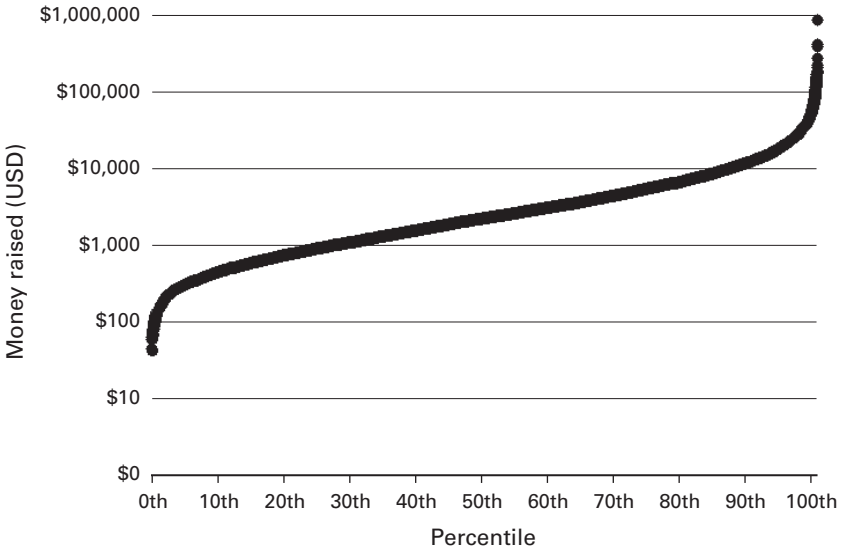
the love I have been receiving helps so much." She posted photos of herself: "Started losing my hair a few days ago so decided to get it shaved off." Others commented on the photos: "You look great, Sofia. Hope you are feeling as well as you look." All the activity helped to keep the campaign alive, reach more people, and convince them to donate.

The digital safety net is thus not merely friend funding with a digital gloss. It can pull in support from people well beyond a beneficiary's immediate circle of friends and family. People in need increasingly resort to it as other safety nets fail them. But it doesn't afford protection universally or on the basis of need. It's a market for welfare in which protection depends in part on how well you are able to appeal to audiences and outcompete rivaling needfuls. Unfortunately, it is exactly in our unappealing and noncompetitive moments when we most need protection in a market society. Silicon Valley firms have eroded our safety nets by promoting uninsured gig work and starving governments of tax revenue, but they have not provided a viable substitute in crowdfunding.

In the end, Sofia's campaign raised a total of $31,480 from 160 different donors. The funds raised fell short of the campaign's $100,000 goal, but the platform nevertheless allowed Sofia to keep the money. It wasn't enough to cover all her bills, but it staved off financial crisis for a little while longer and gave her some hope for the future. She clicked "Withdraw" and entered her bank account details, and the sum appeared on her account a few days later—minus a 3 percent fee that the platform kept for itself. And Sofia was one of the lucky ones. According to Lee's data, 98 percent of campaigns raised less money than Sofia did; the median amount raised was just $2,235 (figure 11.2).

CARE BY AMAZON

Was it futile to imagine that Silicon Valley tech firms might create something comparable to the universal safety nets of a European welfare state? After all, these are for-profit companies competing against each other for market share and profit. Their chief concerns are expanding their operations and outcompeting rivals. Sometimes they serve as vehicles for their founders' prestige projects—but their founders tend to espouse conservative views when it comes to money and personal responsibility. Socialists



11.2 Money raised by GoFundMe medical crowdfunding campaigns.

they are not. Surely they would never have any real interest in creating welfare state institutions, other than perhaps as symbolic exercises in corporate social responsibility?

Let us go back and remember for a moment how the modern welfare state was invented. Chancellor Bismarck of the German Empire did not invent the welfare state because he was a bleeding-heart leftist. He was an arch-conservative who opposed liberals and socialists with all his might. He was of the opinion that the "great questions of the time will not be resolved by speeches and majority decisions . . . but by iron and blood."[20] His empire was locked in total competition for supremacy with other great powers of Europe. And yet at this crucial moment, he chose to invest his nation's resources into social welfare. Why?

Bismarck did not invest in welfare despite being a ruthless conservative locked in total competition but because of it. He saw that if Germany was to beat the other powers in steel and armaments output, it had to protect its human capital. It could not afford to lose workers to sickness and accident. And it could not afford to lose their commitment to hard work by failing to take care of them and their families in old age and disability. In premodern principalities, the extended family, local community, and Catholic

monasteries had cared for the sick and infirm. But in the industrial cities of the new empire, the fabric of society was different. A single young worker or a nuclear family of wage earners was too small and precarious a unit to absorb the risk of one member falling ill. The risks had increased, too: diseases spread faster in the cramped conditions, and jobs like coal mining were inherently dangerous. Industrial society required new social institutions so as not to succumb to its own perils, and that was what Bismarck provided.

The effects of Bismarck's social policies were dramatic. Deaths from infectious diseases fell significantly.[21] The whole nation became healthier. Emigration to America fell sharply.[22] Though work in the New World offered higher pay, the security given by the safety nets led workers to pick Germany instead. Bismarck also invested in education. A free public education system had already been introduced in the nation earlier. Education built up human capital that the industrial economy required. Healthy, loyal, and well-trained workers set the country on a course toward becoming the continent's dominant industrial and military power.

Other great powers soon imitated the Iron Chancellor's policies. The neighboring Austro-Hungarian empire copied aspects of the model within years. Britain and France followed a couple of decades later. The modern European welfare state was born—begot not by socialists but by rich conservatives competing among each other for wealth, power, and prestige. Indeed, Bismarck knew that his safety net would steal the thunder from Germany's growing socialist movement, and the socialists opposed it fiercely.[23] In today's parlance, we might say that Bismarck created the welfare state to own the libs.

Somewhat like the great powers of nineteenth-century Europe, today's tech empires also need healthy and well-educated people to power their platform economies. Instead of coal miners and steel workers, they need delivery drivers, data labelers, content moderators, app developers, online merchants, and social media influencers. Somewhat like the old great powers did at first, the five great powers of the Internet are for the moment relying on the earlier social order to produce and maintain all that human capital. But just as industrialization eventually undermined premodern support networks, platformization is undermining the territorial states' social safety nets. When people like Sofia fall ill, there may not be anyone to catch them, and their human capital is lost from the economy.

Yet a difference between Bismarck and Bezos is that Bezos can better rely on inbound migration to replace spent workers. The German Empire did receive migrant laborers from Eastern and Southern Europe. But Amazon's platforms can draw virtual immigrants from almost anywhere in the world. The pieceworkers who took Sofia's place when she stopped logging in to Amazon Mechanical Turk were if not from the United States then probably from India or Pakistan.[24] The translator who took her place on oDesk was probably from China or the Philippines.[25] As a result, worker welfare may not become a strategic competitiveness issue to Bezos anywhere near as quickly as it did to Bismarck.

However, the above holds only for remote laborers. The great powers of the Internet also need on-site workers, such as delivery drivers. Here the limits of the available human capital have already become apparent. Demand for delivery services went up during the pandemic, while the supply of drivers went down, partly because the virus killed and debilitated so many of the unprotected front-line gig workers. This left Uber, Lyft, and other transport and delivery platforms scrambling for drivers.[26] Similarly, Amazon's managers have become concerned that they are burning through warehouse workers and delivery drivers at such a rate that they might run out of people to hire in the United States.[27]

The tech firms have not responded to this scarcity by paying more taxes or enrolling their gig workers in employee insurance schemes. Instead, they have taken tentative steps toward developing their own insurance and health-care schemes. Bezos recently launched Amazon Care—his empire's own "telemedicine" system.

PEOPLE VERSUS PROFITS

The great powers of the Internet also need highly skilled remote workers, such as e-commerce merchants, app developers, online marketers, and content creators. Here the main bottleneck for the moment is education and training.[28] Not many people in the world are highly skilled in these areas. Tech firms have collaborated with public educational institutions around the world to help develop suitable curricula. But as Sofia discovered, the companies have also begun to create their own education systems in the cloud. They comprise everything from curricula and study

materials to testing and virtual accreditation. Like the public education systems of the European empires, these systems not only develop the skills that the economy requires but may also instill in their students a pinch of loyalty for their particular empire.

As they race to develop and attract human capital into their empires, the five great powers of the Internet increasingly invest into their platform education systems. Yet at least for now, their education systems do not even begin to offer a substitute to territorial nations' industrial-era education systems. This is because the great powers assume that students are already literate and numerate and have advanced computer skills. Often they also assume that students are fluent in English. For all these prerequisites, they still rely on conventional schooling.

Less obviously, on-demand platform education systems also rely on students coming in already in possession of advanced learning skills, analytical thinking skills, and self-regulation skills.[29] These are skills developed especially in higher education. As a result, highly skilled workers and entrepreneurs in the platform economy tend to have first attended a conventional college, even if most of their actual job skills were later picked up from platform education systems, online communities, and work experience. Disproportionately many also hold graduate degrees.[30]

Internet empires are undermining industrial society's mechanisms of building and maintaining human capital. The emperors have taken tentative steps toward building new mechanisms that might replace them. All the largest US platform companies are making investments into private health care and education.[31] But insofar as they are doing so, they are doing so only to gain an edge over their rivals in the great games of the twenty-first century. Just as Bismarck condoned child labor so as not to jeopardize Germany's economic competitiveness, so Bezos is unlikely to protect people when it clashes with his business priorities. It's simply a means toward an end.

The welfare state was invented by a steely conservative with a seemingly instrumental view of human life. But it was later expanded into the universal safety net that we know today by twentieth-century social democrats who eventually took over from the conservatives and libertarians. A similar political shift would be needed in the platform economy for its social institutions to begin to protect people for their own sake.

12

CONCLUSIONS

The Internet was supposed to change the structure of society. It was supposed to get rid of gatekeepers and middlemen.[1] It was supposed to empower individuals and communities, create a "level playing field," and give "everyone access to the same information."[2] It was supposed to obsolete centralized authorities that set up artificial boundaries and compile dossiers on us.[3] It was supposed to be governed by "ethics" instead of "systems erected to impose order."[4] It was supposed to topple autocrats and promote individual liberty over top-down control.[5] This is what Internet visionaries and technologists promised us. But they delivered something very different. They created some of the most powerful gatekeepers in history. They carved up the Internet into walled domains and registered us into their databases. Instead of making state authority obsolete, they rivaled it. Why did they do this? What does it mean for our societies and economies? And what is to be done about it?

UNDERSTANDING THE GREAT BETRAYAL

The most straightforward explanation for how we ended up in our current situation is that all that talk about technology as a means to universal liberation was always just a ruse. "Jeff [Bezos] is good at making it sound as if he's baring his soul, that he's telling you what's really going on. . . . but this is still all part of the big plan," said Amazon's second employee in late

1990s.[6] Tim May, founder of the crypto-anarchist movement that birthed Bitcoin, wrote to his followers in 1994: "Crypto anarchy means prosperity for those who can grab it. . . . The clueless 95% will suffer, but that is only just."[7] "Competition is for losers," confessed PayPal founder and Facebook investor Peter Thiel in the *Wall Street Journal* in 2014. According to this explanation, the real aims of the digital revolution were always just domination and disenfranchisement.

Compelling as it may seem, this "evil man" theory of the betrayal of the Internet's early promises is too simplistic to be the whole story. Were it true, all that would be needed for us to reach paradise would be more ethical technologists who keep the faith and resist the temptation to sell us out. But many early cyberlibertarians, like John Barlow and Pierre Omidyar, thought about ethics a lot. They were quite sincere about their desire to improve the human condition. And entrepreneurs like Odysseas Tsatalos and Stratis Karamanlakis really did want to improve the world besides making money. That none of their plans ever quite succeeded in the form that they had originally envisioned was not necessarily due to any bad faith on their part. Instead, it was because even on the Internet, technologists are not omnipotent. There are social and economic forces beyond their control that influence what kinds of institutions are viable.

From the first part of this book, it is possible to identify four forces in particular that shaped the evolution of the institutional structure of electronic commerce from 1980s to the present day: (1) the challenge of maintaining social order; (2) the problem of scale; (3) the economies of scope; and (4) the alluring power of central planning. Let us examine these forces and how they led to where we are now.

1. THE CHALLENGE OF MAINTAINING SOCIAL ORDER

Cyberlibertarians like Barlow did not fully appreciate the difficulty of the problems that an Internet economy would face. We saw that traders must still overcome the problem of exchange—that is, how to avoid getting cheated.[8] We saw that managers still need to overcome the principal-agent problem—that is, how to be sure that workers really do what they are being paid to do—while workers need to be assured that they will actually get paid.[9] We also saw that exchanges happen only if they are not made uneconomical by search costs—the costs and effort required to find a suitable match.

Nothing about the Internet makes these fundamental problems disappear. No amount of bandwidth can guarantee that the person at the other end is being earnest. One way or the other, these problems of social order must be solved before exchange is possible. The same challenge that faced would-be market creators in earlier eras now confronts technologists and Internet visionaries, even if they failed to realize it at first.

2. THE PROBLEM OF SCALE

Visionaries like Barlow and Omidyar thought that the Internet could be used to solve any problems of social order in some new way—some innovative method that relies on self-enforcement by individuals and communities.[10] But we saw that rules enforced by the participants themselves—also known as *informal institutions*—are a very old idea.[11] And as in the past, they could only maintain order up to a certain scale. When communities grew into boom towns, informal order unraveled. No matter how much technologies had changed, people were still the same.

In the end, all the visionaries who succeeded in fostering virtual megalopolises with thriving economies did so only by instituting official rules and enforcing them coercively when necessary.[12] In other words, they created *formal institutions*—rules enforced by a third-party authority—and assumed for themselves the role of the coercive authority that they had been trying to abolish.[13] Even Ross Ulbricht, libertarian founder of the narcotics marketplace Silk Road, ultimately found that he couldn't sustain a sizeable market without resorting to coercion.[14]

Some pioneers refused to change their approach, and small pockets of informal cooperation still persist on the fringes of today's digital economy. But the gains obtainable from insular exchange within a small group are limited compared to the possibilities offered by a market of millions of people. Thus the vast majority of exchange on the Internet as elsewhere is now underpinned by formal institutions, despite visions to the contrary.

3. THE ECONOMIES OF SCOPE

At first, formal institutions on the Internet were disconnected from each other. Someone looking to hire a remote contractor could post a vacancy in Usenet's "misc.jobs.contract" group. When they found a contractor, they could use a time tracking and remote monitoring tool to address the

principal-agent problem.[15] If there was a problem in the relationship, the parties could take the matter to a stand-alone online dispute resolution service such as the Virtual Magistrate.[16] To ensure that the contractor got paid, the client could deposit the funds in a stand-alone escrow service such as Escrow.com pending the delivery of the work. All of these institutions underpinning the labor contract were administered by different organizations. In this sense, the early institutional framework of the Internet was decentralized. Nobody was in charge.

But we saw that technologists like Tsatalos and Karamanlakis eventually bundled all the institutions necessary to support exchange into integrated platforms.[17] Significant economies of scope could be obtained this way. Dispute resolution is much easier when the "judge" has direct access to the parties' original transaction records and correspondence.[18] Enforcement is much more likely to succeed when administrators have control over parties' financial flows and market access. Matching is more accurate when there is a verifiable record of past transactions. And every administrative operation is much easier to carry out when each user has a single persistent identity across the board.[19] For users, too, it is much less effort to use an integrated service that provides the full suite of institutions necessary to carry through a deal.

The bundling of stand-alone Internet institutions into platforms to some extent parallels the way in which European nation states first emerged. In medieval Europe, a patchwork of institutions structured interactions. Feudal lords concerned themselves primarily with protecting property rights in land and in the peasants who worked the land. Civil disputes were often left for peasants to adjudicate in their own gatherings. Markets, industry, and vocational training were regulated by semi-autonomous towns and guilds.[20] The Catholic Church provided what passed for higher education and social protection. The state was just the monarch's estate. Often the key institutions were in conflict with each other.[21]

The territorial nation state—in which important institutions are organized into a neat hierarchy under central government oversight—is a comparatively recent innovation.[22] It emerged in the eighteenth and nineteenth centuries. One driving force was the many wars that Europeans of the time fought with each other. Thanks to economies of scope, centralized government was far more efficient at drafting men and munitions for

warfare than was the medieval jumble of lords, bishops, and masters of dubious loyalties.[23] Centralized states triumphed over realms with more disconnected institutions. In an analogous way, the Internet came to be structured by centralized platforms instead of decentralized patchworks of services, despite predictions of a cybersociety free of gatekeepers.

4. THE ALLURING POWER OF CENTRAL PLANNING

We saw that platforms' institutional bundles came to function as infrastructures that helped Internet users to buy, sell, work, and pursue any interactions they wished. They supported innovation and experimentation as people came up with new ways of using them. The variety and quality of apps available for mobile phones exploded once Apple and Google launched app stores that developers could use to market their inventions cheaply and safely.[24] In an analogous way, open institutional infrastructures set up by states and market towns multiplied trade and innovation in early modern Europe. Economic historians called such institutions *generalized*.[25] Internet scholars came up with the term *generative*.[26]

However, governments were not content to remain just passive infrastructure providers. They began to generate and analyze *statistics* or data about the state and its people. Each citizen was given a legal identity and registered into an administrative record.[27] The data was used to craft policies intended to optimize the economy, address social problems, and steer the nation toward government priorities in an attempt to gain an edge in the competition against other European states.[28] In a similar way, digital platform companies found that they could benefit from registering each user into a database and collecting data on them. They could use the data to identify problems, optimize services, and steer development as they attempted to gain an edge in the competition against other platform companies.[29]

Government use of data to steer the economy reached a high point in the Soviet Union. The state's institutions no longer functioned as infrastructures that people could build on according to their own priorities, but instead served as tools for the state to impose its priorities on the people. In an analogous way, platform companies have drifted over time from providing open marketplaces toward managing their participants from above.

EBay and Amazon now micromanage their merchants with performance indicators and quotas. Uber calculates what it considers to be the optimal solution at any given moment and nudges its drivers to implement it. All major platforms carry out an increasing amount of algorithmic matching and prioritizing.[30]

Soviet central planning eventually collapsed as Moscow lacked the data and the computational power to manage an increasingly complex consumer economy. But Silicon Valley commands far more data and computational power and is still exploring the full extent of what can be achieved with it. "AI-enabled" platforms that make choices on users' behalf appear to be winning over purely infrastructural platforms that leave users to make their own choices and mistakes.[31] Despite visions of individual empowerment, competitive forces push the Internet toward varying degrees of central planning.

WHY PLATFORMS ARE OVERTAKING THE STATE

The institutions of modernity, their terrible flaws notwithstanding, are the product of several millennia of institutional innovation, experimentation, and contestation. The task that Internet visionaries and technologists set for themselves—fostering large-scale market exchange—was the same task that modern state administration has, in many ways, evolved to do. Almost inevitably, then, the technologists converged on analogous solutions: centrally administered bundles of complementary formal institutions that function as infrastructures but also seek efficiencies from central planning. The same forces that once favored the rise of the state now led to the rise of platforms. Barlowian ideas of informal, decentralized, non-coercive social order at scale succumbed to the rigors of human nature, though not for want of trying. The visions were betrayed not so much by evil men as by their own innocence.[32]

A lot of what so-called technology companies now do is thus in a certain sense just traditional statecraft. Silicon Valley technologists reinvented the economy only in the sense that through trial and error they rediscovered much of what states already knew. Instead of revolutionizing our social order, they reimplemented it with computer code and customer service

agents. Big data is statistics. Blockchain is sortition.[33] Algorithmic decision making is just another word for bureaucracy.[34] After a decade and a half of "moving fast and breaking things," Mark Zuckerberg noticed that Facebook had ended up "more like a government than a traditional company."[35]

The reverse is also true: what states traditionally do is in a certain sense just technology. The world's first databases were ancient Mesopotamian empires' tax and administrative records.[36] Ancient empires also developed maps, postal networks, abacuses, mathematical algorithms, and cryptography to govern their holdings.[37] More recently, states powered the development of the computer, the Internet, and the Global Positioning System.[38] Most statecraft is just different forms of information processing and communication, so information and communication technologies have always been foundational to it.

But if tech companies simply rediscovered what the state was doing all along, then why do they appear to be overtaking the state in some areas? Why do e-commerce platforms resolve more disputes than the world's court systems? Why is the fastest-growing labor market regulated from Silicon Valley? Why are personal transportation services in many cities now administered by Uber and Lyft?

One answer is that around the turn of the twenty-first century, many governments suddenly decided that they didn't want to be society's central information processing hubs anymore.[39] United Kingdom, Australia, and many other countries outsourced almost all government information technology functions to technology contractors. Databases, algorithms, networks, and the skills to maintain and develop them were all divested from the state. The state turned from a technological administrator to a tenant of external vendors and cloud service providers.[40]

At the same time, platform companies did the opposite. Amazon brought previously outsourced systems in-house as its operations expanded. It added increasing numbers of software developers and systems administrators to it ranks. It became more—not less—adept at the practicalities of administering people and things with information technology. Other platform companies acted similarly.

Then, as citizens and small businesses joined the Internet en masse, they quite predictably sought someone to provide order and security in this

new domain to unlock its potential for exchange. The hollowed-out state was in no position to deliver much of it. Even such fundamental things as means for people to prove their identities online proved beyond most governments' abilities to deliver. Amazon, Apple, Google, and other tech firms quickly stepped in to fill the void. People rushed to the relative safety of their platforms from the wilderness of the unincorporated 'net, where fraudsters and criminals roamed unpunished. Millions placed themselves under the technologists' protection and prospered. Thus it was not by capturing the city but by founding it that the technologists rose to power.

But government retreat is only a part of the explanation for why digital platforms are ascendant today. Another reason is that platform companies are able to cut corners in ways that democratic states aren't. Platforms' rule enforcement and dispute resolution can be quick and efficient in part because they are under no obligation to ensure that the processes are fair. Uber can deactivate drivers with much less evidence and due process than a state would need to revoke a taxi license. Apple's administrators can enforce App Store rules selectively when it suits the company.[41] Amazon Mechanical Turk can let clients get away with abusing digital pieceworkers if it helps their economy to grow.[42]

Platforms' economic institutions may be fairly modern, but in terms of political institutions—including individual rights—they remain in the dark ages. This allows platforms to compete against state institutions with low-cost institutional frameworks that prioritize expediency over fairness and dignity.

I will return to the problem of platforms' political institutions and lack of accountability later in this chapter. But first we must consider one further reason why platforms are ascendant today, perhaps the most important one: despite platforms' and states' institutional similarities, the two nevertheless differ in one crucial aspect—the shapes of their jurisdictions. State jurisdiction is primarily territorial: a state's rules apply to all activities within a specific area of the earth's surface that the state controls and up to about 100 kilometers above it, depending on which state you ask.[43] Control over territory is part of how a state is defined in international law. In contrast, a platform's jurisdiction is personal: its rules apply to any and all who have signed up and subjected themselves to its authority—wherever in the world they may be. So while platforms' techniques resemble

statecraft, they do statecraft in a way that's not tied to territory. They are states without estates, empires in the cloud.

A momentous practical implication of this is that exchanges on a platform don't have to follow territorial boundaries. Over 90 percent of sellers on eBay export to other countries, according to data published by the company.[44] Over 90 percent of contracts on Upwork are between employers and workers who are located in different countries.[45] Amazon Marketplace, Apple App Store, Google Play Store, Mechanical Turk, and numerous other platforms are likewise intensely transnational. These platforms are not merely competing with states for control over territorial markets: they are constructing entirely new markets not delimited by territory.[46]

STATES WITHOUT ESTATES

In Barlow's words, there is an economic "voltage potential" between distant places.[47] Potential gains from long-distance trade are enormous because skills and resources that are scarce locally are often abundant somewhere else. Yet cross-border commerce is exactly what a world order based on territorial nation states does poorly. States provide institutional frameworks that facilitate exchange within their territorial jurisdictions, but in the process of doing so, they end up making cross-border exchange more difficult. Standards and regulations differ; parties find it hard to enforce rights and contracts in foreign courts; border formalities add costs and delays. The more intricate and developed a state's institutions are, the greater the number of nitty-gritty differences with its neighbors.

These so-called nontariff trade barriers hold back exchange even when two countries have a trade agreement that removes import duties. For instance, the US-Canada border is a land border between two countries with a cordial relationship and a long-standing free trade agreement. Yet in one study, the border was found to have the same dampening effect on trade as 2,870 kilometers of additional distance.[48] Due to institutional differences, it was as if an ocean stretched between Canadians and Americans.

In earlier times, borders didn't matter as much because transport and communication costs were the bigger bottlenecks to long-distance trade. But as transport and communication technologies improved, humanly contrived institutional boundaries became bigger and bigger roadblocks

to trade and employment. According to some estimates, humanity's gross domestic product could more than double without borders—and that would probably be among the lesser consequences of such a change.[49]

Digital platforms don't quite eliminate national borders, but they do in some ways transcend them. They use the Internet to establish transnational institutional environments—states without estates—in which people from different countries can engage in business among each other almost as if no national boundaries separated them. This ultimately could turn out to be platforms' most transformative impact.

Platforms are by no means the first privately established transnational institutional environments. Western intellectuals constructed a metaphysical "Republic of Letters" through mail correspondence as early as the fifteenth century.[50] But like Barlow's cybersociety, the republic relied on informal norms to support cooperation. It reached tens of thousands of members before coming apart in the late eighteenth century.

A more recent analogy is the International Chamber of Commerce (ICC), a transnational membership organization for businesses involved in cross-border commerce that was founded in Paris in 1919. Besides lobbying governments, it establishes rules for cross-border business deals and resolves disputes arising in such deals via its International Court of Arbitration. Yet membership can costs thousands of dollars per year, and the minimum cost of an arbitration case is around $5,000 in administrative fees alone, not to mention arbitrators' fees and expenses.[51] In practice, the ICC remains inaccessible to the vast majority of the world's businesses and independent contractors.

Outside digital platforms, cross-border business is today dominated by large corporations. Just 5 percent of German exporters were responsible for 81 percent of all German exports in 2003.[52] In France, the top 5 percent were responsible for 88 percent of exports. In Peru, it was 91 percent. Large corporations possess the resources to overcome the border effect, leaving them to monopolize lucrative long-distance trade. Contrast this with eBay, where the top 5 percent of German exporters were responsible for only 54 percent of German exports in 2012.[53] Top French exporters were responsible for less than 35 percent of exports. Top Peruvians exporters, only 16 percent. On eBay, hundreds of thousands of small businesses traded across borders.

And while outside eBay most exporters exported to just one or two countries, on eBay they exported to dozens of countries. Export destinations on the platform were determined not by the seller's ability to navigate foreign institutions and strike distribution deals but instead by the interest that consumers around the world showed in their product. One study estimated that eBay reduced the effects of distance on trade by 65 percent.[54] The authors—one of whom worked for an eBay contractor—attributed this to the platform's ability to reduce search costs, overcome language barriers, and enforce cooperation between distant parties.

Yet greater market access also means greater scope for competition. Gains from trade may be distributed between a wider base of sellers, but they may also end up being captured by the buyers, as sellers around the world undercut each other's prices. Upwork's policy makers raised a virtual border around their domain and instituted strict immigration controls that helped to prevent workers' earnings from falling below a level that they considered acceptable.[55] Other platforms adopted similar policies. These virtual boundaries helped to balance supply and demand, but they also reintroduced inequalities between those within and those without familiar to us from territorial borders.

In markets for digital goods—where manufacturing and shipping costs place no constraints on growth—digital platforms can have another, curious distributional consequence. A large platform can allow a single company with a single great product to become a digital superstar that satisfies a huge proportion of the entire global demand.[56] For instance, a 2016 study of the global mobile app market found that just one company—the Finnish game studio Supercell—sold so many apps that it had a larger market share than most entire countries in the sample.[57] Even a tiny business can end up a digital superstar, as occasionally happens with self-published books on Amazon. But the digital superstar effect is fickle, disappearing as soon as more alluring products appear on the marketplace. In 2020, Supercell's revenues were down 40 percent from their peak.

The social and economic impacts of transnational trade are always complex. While trade generally speaking creates value for both parties in a transaction, it can also redistribute value in surprising ways, creating winners but also losers. Either way, the ability of digital platforms to create new deterritorial markets apart from our territorially bounded ones is surely

among their most transformative qualities from an institutional perspective. It is also a big reason that so many people and businesses have now come to rely on them.

BUILDING A DIGITAL SINGLE MARKET

To emphasize how significant it is that digital platforms have succeeded in fostering deterritorial markets, let us consider for a moment how states have struggled with this very same task.

The European Union is a political and economic union of twenty-seven independent states founded expressly for the purpose of tying the nations' markets together to prevent another war on the continent. EU citizens were among the world's earliest Internet adopters, and by 2007, the majority of homes in the union had Internet access.[58] A third of Europeans were buying things online, and that share was growing rapidly.[59] Yet only one in sixteen had bought something online from another EU country, and their number was not growing. EU's digital economy was actually an archipelago of twenty-seven disconnected national markets—the very opposite of the Union's aim.

The reason for this lack of cross-border trade wasn't lack of consumer demand. A study conducted by the European Commission found that for at least half of online product searches, a much cheaper offer could be found from another EU country, even after shipping and handling fees.[60] Many sought-for products weren't even available from local online stores. People wanted to use the Internet to access these wider opportunities.

The problem was that whenever European consumers tried to place orders across internal EU borders, things got difficult. In many cases, the seller didn't offer a suitable means of payment. Different regions of the Union favored different means of paying online; it was expensive for sellers to support all. In other cases, sellers simply refused to serve buyers from other member states. Different states had different consumer protection rules, different value-added tax regimes, and different reporting requirements, and complying with twenty-seven different regimes was just too much for most small businesses. While the majority of EU retailers sold online, only 21 percent were willing to sell to another member state.[61]

These barriers applied to digital goods as well. Introversion Software was an independent game studio based in the picturesque old market town of Walton-on-Thames, England. Founded by three friends, the studio had produced two critically acclaimed PC games. The games were sold at retail stores across the United Kingdom. The friends wanted to use their website to start selling their games to other countries. After all, the Internet should be the ideal medium for distributing digital games across borders. It was early 2000s, the UK was still part of the EU, and there were no tariffs on online sales.

Yet Introversion's team discovered that to correctly handle the different VAT rules, payment methods, and other cross-border differences, they would need to spend months of development time and significant amounts of money on building up their digital distribution system. Most businesses of their size could not have afforded to make such an investment. But Introversion got lucky: they managed to obtain a UK government export aid grant that provided funding for the project and set to work.[62]

Meanwhile, embarrassed about how territorially fragmented the Union's digital economy was turning out to be, the European Commission decided to mend it. "The next Commission will . . . tackle the main obstacles to a genuine digital single market," announced President José Manuel Barroso in 2008.[63] The Commission's aim was to ensure that online merchants could offer goods and services across Europe based more or less on a single set of rules—a common platform, so to say.

But progress toward creating such a platform was slow. The Commission is the Union's equivalent of a federal government, only much weaker: legislative proposals require approval from member state governments as well as from the European Parliament. Member states and their various interest groups disagreed on how things like consumer rights, taxation, data protection, and copyright should be harmonized and which authorities should be in charge of enforcing them. Thus when Barroso's term as Commission president came to an end, his successor Jean-Claude Juncker had to acknowledge that a digital single market still did not exist and that "difficult regulatory and policy issues" remained.[64]

The friends at Introversion Software eventually finished their multicountry digital distribution system. However, it didn't increase the company's

sales as they had hoped. The company's online store was away from the web's well-trodden paths, so few people ever visited it unless they were already fans. Such a system did, however, incur heavy maintenance costs. To continue operating, it would have needed to be defended against cyberattacks and updated every time relevant regulations changed in the countries that it covered.

A few months later, Introversion Software signed up with Steam—a new online marketplace where developers could sell PC games directly to gamers. Created by US-based Valve Corporation, the platform had 6 million registered buyers around the world and was growing rapidly. It handled much of the international billing and administrative complexity that Introversion had previously had to handle itself and allowed consumers to shop in the language of their choice. It also protected Introversion's products from software piracy and gave consumers a simple way to obtain a refund for games that didn't work on their computers. In these and other ways, the platform dramatically lowered the risks and costs for all parties. With no additional investment required, Introversion's sales shot up immediately: within three weeks, their latest game had sold more units via Steam than it had sold through all other sales channels in nine months.

The EU has a digital single market today, but it wasn't made in Brussels: it was made in Silicon Valley. Europeans buy British games on Steam, pick Italian shoes on Amazon, watch French films on Netflix, and hire Serbian programmers on Upwork. Mobile games created in Finland, Sweden, France, the United Kingdom, and Turkey took up eight spots of the list of top ten best-selling iPhone games in Germany as of June 2021. Europeans make desirable products, especially digital products, but it took American technology companies to build a harmonized business environment where they could finally sell them to each other.

DEPOSING DIGITAL DESPOTS

Digital platforms succeeded where states failed and created transnational institutional infrastructures for small businesses to trade across borders. But that now leaves private platform companies in charge of these vast markets. We saw how Jeff Bezos's Amazon went from being "very democratic and egalitarian in the best sense" to "really predatory toward successful

third-party sellers," according to the assessment of two of its "partners."[65] As soon as the platform established its dominance, it began to prey on the publishers and merchants gathering at its marketplace. And Amazon wasn't the only platform to behave in this way. As autocrats throughout history are wont to do, platform princes eventually start directing a growing part of the wealth of their economies to their own ends. Open infrastructures give way to more top-down control than people are willing to bear. This is the platform economy's political problem: tech firms protect us, but who will protect us from the tech firms?

In the second part of this book, we learned about platform users' attempts to grapple with this problem—by voting with their feet, by building decentralized alternatives, and by demanding a voice via collective action. In the remainder of this chapter, I will build on these experiences to consider what the policy makers of territorial nation states could and should be doing to address platforms princes' power. Just as social and economic forces shaped the evolution of the Internet's economic institutions, there are forces at play that shape its politics. But compared to economic forces, the forces that apportion political power turn out to be much more malleable.

The most common starting point in analyses of digital platforms' power is that in legal terms, they are simply for-profit companies. Microeconomic theory suggests that competition should force companies to treat their customers nicely. Insofar as that doesn't seem to be happening—platforms charge extortionate fees and impose unfair rules—the theory suggests that competition has somehow broken down and should be restored by the state. According to this approach, talk of platform autocrats and political institutions misses the point. Platforms are simply businesses like any other, and the way to govern them is through competition.[66]

The branch of law that gives the state the tools to restore competition is known as *competition law* or *antitrust law*. Ironically, scholars in the early years of platform commerce thought that platforms like Amazon would diminish the need for competition law because they fostered intense competition between sellers around the world.[67] The notion that the platform companies themselves could become too powerful was not given as much consideration at the time.

Modern competition law was first developed back in the Gilded Age to fight industrial monopolists such as the Standard Oil Company. Cofounded

by John D. Rockefeller in 1870, Standard Oil used predatory pricing and other tactics to drive competitors out of business until it dominated America's oil market. It then began to extort its customers. To restore competition, the US government created laws that enabled it to break up abusive monopolists into pieces. In 1911, Standard Oil was divided into thirty-four smaller firms that competed against each other.

Legal scholar Lina Khan argues that similar interventions could now address our problems with platform companies.[68] After all, many platform companies hold dominant shares of their respective markets, just as Standard Oil once did. According to one estimate, Amazon's 2019 US market share was twice the share of the next top ten e-commerce sites put together.[69] From a competition law perspective, the most straightforward solution would seem to be to break up the giant into Lilliputians. President Joe Biden recently appointed Khan as the chair of the Federal Trade Commission—the government agency responsible for antitrust enforcement. Bezos and other platform princes might soon be hearing from her.

A FAILING MARKET FOR RULES

However, competition as a means to govern platforms is complicated by their state-like characteristics. A platform's product is not a commodity like oil but an institutional infrastructure—a set of rules. Unlike in the market for oil, in the market for rules a large market share can be an essential part of a provider's appeal. This is because an infrastructure with more members tends to be more valuable to each member since it gives the members access to a greater number of potential exchange partners.[70] Entrepreneurs from around the world flock to the United States partly because of the massive size of its domestic market. For the same reason, online merchants flock to Amazon. Breaking up a platform into several similar but smaller platforms would reduce its market power but also reduce its value to people. And since the breakup would not eliminate the network effect that generated the concentration in the first place, the market would eventually be liable to tip right back into near monopoly.

Having said that, not all market concentration in platform markets can be attributed to network effects. Amazon has probably used predatory pricing to capture some of its market share.[71] Facebook bought potential

rivals WhatsApp and Instagram before they could threaten its dominance. Because of factors such as diverse user needs, a platform market doesn't need to tip in favor of a single monopolist; there may well be space for multiple large platforms in a market, unless anticompetitive practices prevent it.

Indeed, in many markets today, there are at least two major platforms: Apple iOS and Google Android, Uber and Lyft, Upwork and Fiverr, and so on. Yet even this availability of choice doesn't seem to generate very intense competition. Many of the platforms' professional users still seem to feel trapped in their platforms. "You use them because you have to . . . no one has any other option," complained one contractor.[72] Why?

One fundamental reason is that the choice between alternative institutional frameworks is not an individual choice—the kind that happens on a market—but a collective choice. Institutions govern interactions between people; one person cannot choose to play by different rules than those used by the people they are interacting with. People can choose to leave the entire community and start afresh in another one, but that means that they are giving up on a lot more than just a rule set. They may be giving up on their contacts, their reputation, their name recognition, their repeat customers, their fluency in the local culture, and so on. Because of such drastic *switching costs*, a market for rules is rarely liquid enough to be a sufficient constraint on rulers' power.[73]

And in markets that have multiple large platforms, many professional users are in fact already on all of them. For instance, all leading app developers distribute their apps through both Apple's app store and Google's app store.[74] But the two platforms are not alternative ways of interacting with the same customers, which the developers could play against each other. Like two halves of a country, the platforms are inhabited by nonoverlapping sets of customers—iOS users and Android users. We saw that developers had to maintain a presence on both halves to remain economically viable. Governing the platforms through competition simply wasn't working.

In some markets, customers "multihome"—that is, use multiple platforms simultaneously. In such markets, the different platforms are genuinely alternative ways for sellers to reach their customers. But none of the alternatives are necessarily any better. Microeconomic theory posits

that oligopolists tend to silently collude with each other to maintain their rents. Algorithmic pricing—as practiced, for instance, by Uber and Lyft[75]—increases the potential for such tacit collusion even further: a smart algorithm will not attempt to capture market share by cutting prices (or raising wages) if it sees that the cuts (or raises) are immediately reciprocated by the competitor's algorithm.[76] Competition once again fails to hold the platforms in check.

For all these fundamental reasons, a market for rules is inherently less competitive than a market for a commodity like oil. This is not to say that professional users never switch platforms. They do. But clearly they don't do so enough that it would actually function as a form of governance. "If you don't like the rules of the game . . . you can get off the boat," advised Dread Pirate Roberts, the captain of Silk Road.[77] But is that really an option once the ship has left the port? The Gilded Age remedy of a horizontal breakup—dissecting a giant into multiple competing Lilliputians—doesn't appear likely to solve our present-day problem.

However, Khan introduces another competition law remedy from the Gilded Age: vertical breakup. Standard Oil was active not only in oil production but also in refining and distribution. It used its power in one part of the value chain to hurt competitors in another—using its oil pipelines to squeeze out competing oil producers, for instance. To prevent this, the US government broke up the giant not only horizontally but also vertically, turning oil production, refining, and distribution into separate businesses that had to compete on their own merits.

In the same way, some major platform companies not only operate marketplaces but also participate as sellers on their own marketplaces. We saw how Amazon and Apple used their control of the market to tilt the playing field in favor of their own products.[78] Nothing in our notion of platform companies as state-like infrastructures implies that vertical breakup wouldn't work on them. On the contrary: a modern market liberal state is very much expected not to get involved as a competitor in the markets that it oversees, since such competition would be inherently unfair.[79] Amazon the regulator should doubtless be separated from Amazon the merchant in some way, and other platform giants should be subjected to similar scrutiny. Since 2019, India has restricted Amazon's ability to operate as a seller on its own marketplace, to its merchants' acclaim.[80]

Vertical breakup addresses one of the ways in which platform giants can abuse their power. Yet it does nothing to address all the other abuses, such as extortionate fees,[81] preferential treatment for favored partners,[82] and unfair rules or simply carelessness that results in poor working conditions.[83] The root problem remains: the marketplace is ruled by billionaire technologists and venture capitalists whose interests diverge after a certain point from the interests of the people and businesses who populate the platforms.

ESSENTIAL INFRASTRUCTURE VERSUS CREATIVE ANARCHY

Recognizing the limits of competition law as a means to govern platforms, Khan turns to another approach popular in the early twentieth century: governing monopolies as *public utilities*. Probably the most powerful and interventionist tool that the state has at its disposal, public utility regulation is in many ways the opposite of competition law. Instead of trying to foster competition, utility regulation tries to stop competition, reap the benefits of centralization, and align the behavior of the resulting giant with the interests of the people through close government regulation and oversight.

Many of the high-tech companies of the early twentieth century, such as railroads and electricity grids, were similar to digital platforms in that they were infrastructural in nature and benefited from network effects and economies of scale and scope.[84] Like platforms, they often ended up as monopolies poised to abuse their customers via favoritism and extortionate fees. Recognizing the futility and even counterproductivity of trying to enforce competition in essential infrastructure, governments at the time turned to public utility regulation instead.

In practice, this meant that governments created regulations that limited the fees that companies deemed as public utilities could charge and required these companies to treat all customers equally, among other things. "[W]hen private property is devoted to a public use, it is subject to public regulation," Khan quotes the chief justice of the United States Supreme Court justifying the regulations at the time.[85] Insofar as digital platforms are the railroads and electricity grids of today's economy, the same could apply to them, argues Khan.

The European Union's proposed new Digital Markets Act adopts an approach very much like this.[86] It designates certain essential platforms as "gatekeepers" and imposes new requirements on them. For instance, it requires gatekeepers to "apply fair and non-discriminatory conditions" to ranking search results on their platforms—similar to what governments in the past have required of public utilities. Platforms will no longer be allowed to play favorites in search results, among other requirements.

However, the public utility regulation approach to platform governance is once again complicated by the fact that a digital platform's product is not a commodity like transport or electricity but is an institutional framework that consists of complex rules and regulations in and of itself. The requirement that electricity is offered to every customer under the same terms is fairly straightforward to define. But requiring platforms' rules and regulations to be in alignment with the interests of the people and applied fairly to everyone is much harder to express in unambiguous legal terms.

For instance, Apple recently excused Amazon's Prime Video app from the "Apple tax" that everyone else on its marketplace had to pay, giving Amazon a big competitive edge over video streaming rivals like Netflix. Apple probably bent the rules for Amazon because it needed a certain favor from Bezos.[87] But the company claimed that it was simply following its policies—that it had an "established program" to offer exemptions for "qualifying premium video entertainment apps," which Prime Video just happened to qualify for and Netflix didn't. Industry experts had never heard of such a program before. But proving that it was a fig leaf for favoritism could be difficult.

A digital marketplace platform is such a complicated piece of infrastructure that if the management wants to play favorites or capture value from the participants, then it can probably always come up with some ruse to do so. A generally worded legal obligation to apply fair and non-discriminatory conditions will probably result in constant court wrangling and encourage platform managers to use even more underhanded methods to achieve their aims. I suspect that to be a truly effective way of governing platforms, public utility regulations would have to be so detailed and tie platform managers' hands so tightly that the platforms would in effect fall under government administration.[88]

Indeed, many other complex utilities today *are* very tightly regulated and even outright nationalized by the state—especially in Europe. And many people—especially Europeans—are now calling for platforms deemed as essential public infrastructure to be nationalized likewise.[89] This is an entirely valid policy position with economic and ethical justifications. When one "devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good," argued the US chief justice.[90]

Electronic Frontier Foundation, the Internet freedom advocacy group cofounded by John Barlow, opposes the use of government regulations to turn platforms into de facto public institutions.[91] But the organization is in a slightly awkward position today. Having spent years lobbying against government intervention in the Internet, it has contributed to the present situation in which digital spaces are instead ruled by giant corporations that are even less accountable.

The EFF's favored solution to the power of platform companies is to return to the glory days of the old Internet. "On the early Internet, the protocols everyone used to communicate . . . were open and interoperable."[92] Usenet, dubbed the world's first social media, ran on the servers of multiple competing service providers that communicated between each other through a standard protocol.[93] If you did not like your service provider, you could easily switch to another one and still keep interacting with the same friends.

The EFF proposes that policy makers should try to introduce the same kind of interoperability to today's services—by requiring large platforms to open up their data troves and permit interconnections from competing services. The EU's proposed Digital Markets Act contains some provisions of this sort. The EFF argues that users could then easily move between competing services, competition would bring platform princes to heel, and we would once again return a little closer to the creative anarchy of the old Internet—without the government having to regulate platforms more closely.

But as we saw in chapter 2, the Usenet Marketplace failed precisely because the network was an anarchy of many providers, none of which

could enforce order in the market. People abandoned the disorder of the unincorporated 'net and sought refuge behind the walls of eBay, Amazon, Upwork, and other platform states. Borders—all the things that make it difficult for people to jump from one jurisdiction to another—are not merely a bug but, to some extent, a constitutive feature of how modern states and platforms create order.[94] Porous platforms are open to competition and innovation but also to rackets, scams, and spam.

Large platforms should probably be more open and interoperable than they are now. But there are some fundamental limits to how open they can be and still function as formal institutions that provide order. Saying that we should simply "go back" to the way things used to be before centralized platforms existed is a little like saying that we should go back to the way things used to be before modern states existed. It could solve some problems, but reintroduce others; there's a romantic appeal to it, but it's a little ignorant of how bad things used to be for many people, especially for those not at the top of communal hierarchies.

Barlow died in San Francisco in 2018 at age seventy. The EFF still keeps alive his beautiful, flawed idea of a self-organizing Internet, and refuses to come to terms with the fact that even on the Internet we need some form of public authority. The trouble with the organization's nostalgia is not merely that it's ineffectual but that it can be actively harmful toward efforts to tackle the platform economy's political problem. By proffering innovation and competition as alternatives to public accountability, the organization sometimes ends up providing cover to unaccountable rulers, whether platform princes, cryptocurrency manipulators,[95] or the protocol engineers who reigned during the days of the old Internet.

That's right: even the old Internet of screeching modems and monochrome terminals was never quite the egalitarian anarchy that Barlow made it out to be. To the extent that it worked, it actually worked thanks to the efforts of engineers and system administrators who coordinated decisions behind the scenes in accordance with their own values and priorities.[96] As Barlow himself once admitted: "inside every working anarchy, there's an old-boy network."[97]

PLATFORM NATIONALISM OR PLATFORM COOPERATIVISM?

If we want our institutional infrastructures to have real public accountability, then close regulation up to the point of de-facto nationalization appears to be the most viable way forward so far. But here is the rub: how do you nationalize a transnational platform? Amazon is the most visited online marketplace in fifty-eight countries.[98] Apple's App Store is available in 175 countries. Upwork has users in 180 countries. Amazon Mechanical Turk's workers are spread across 190 countries. A very large part of the appeal of digital platforms is how they serve as transnational institutional infrastructures. Which nation should be the one to nationalize them?

In legal and practical terms, the country best positioned to nationalize a transnational platform is the country within whose territorial jurisdiction the company is headquartered. The great majority of large platform companies are headquartered in the United States and China. According to one study, the top five platform cities by estimated company value are San Francisco, Seattle, Beijing, Hangzhou, and Shenzhen.[99] Only 15 percent of the platform companies are headquartered in Europe, representing only 4 percent of total market value. The only European city to make it into top ten is Walldorf, Germany, home of enterprise software giant SAP. It ranks seventh, just after Tokyo.

In other words, the problem with calls to nationalize platforms is that the country that does the nationalizing might not be your own. If platform nationalism became a geopolitical trend, then Europeans and those in much of the rest of the world might quickly find themselves conducting their digital lives on foreign cybersoil. The United States and China already use their existing leverage over their local platform companies as a means of projecting power beyond their territorial and sometimes also legal boundaries.[100] Closer state regulation up to and including nationalization would give these governments even more tools to do so.

For instance, the United States' National Security Agency—which Barlow called the "American Occupation Army of Cyberspace"—already uses data from US platform giants to spy on people around the world, including on its European allies.[101] Even as America's physical military withdraws from places like Afghanistan, Washington could use more direct cooptation of platform power to continue to project its will abroad.

Similarly, the Chinese state censorship apparatus is known to monitor and censor users of Tencent's WeChat platform inside and outside of Chinese territory.[102] The affected users are often overseas Chinese and people of Chinese ancestry. WeChat is a multipurpose "super app" used for everything from messaging and games to e-commerce and payments, with over a billion active users. For the Communist Party leadership, closer cooptation of a platform like WeChat could offer a means for consolidating Chinese diasporas around the world into a cybermotherland that transcends the nation's physical borders.

European attempts to achieve "digital sovereignty" through tightening the grip on platforms could thus backfire if it ends up stoking a geopolitical race toward platform nationalism. Instead, platform-poor Europeans should perhaps be thinking of the very opposite: how to strengthen the platforms that we depend on against state influence. If you are not in control the infrastructures that you depend on, then the second-best thing is that neither are your rivals.

However, such an objective seems to be in direct conflict with the need to make the platforms more publicly accountable. Can this conundrum somehow be solved?

What if the public that had a legitimate interest in controlling essential infrastructure was not the public of any particular nation state but the public that used that infrastructure—the actual users of the platform? Public utility regulation relies on the notion that the state can faithfully represent the interests of the utility's users. But the fact is that no territorial government can really represent the interests of the users of a deterritorial digital platform. Only some of the users belong to the constituency of any particular government. Often "[t]hat's not enough for anyone in government to care," as digital labor organizer Kristy Milland discovered.[103] Instead of relying on governments to solve the platform economy's political problem, what if users took matters into their own hands?

Many academics and activists have proposed that users should cooperate to build their own platforms[104] or to buy struggling platforms off venture capitalists' hands.[105] Such platforms could be governed democratically for the benefit of their user-owners, solving the political problem once and for all. In fact, dozens of such platform cooperatives have already been launched. Fairmondo, a member-owned version of eBay, was

launched in Germany in 2013. Loconomics, a cooperatively owned freelancing marketplace, was launched in San Francisco in 2014. Daemo, a worker-governed alternative to Amazon Mechanical Turk, was launched by Stanford researchers in 2015. Juno, an "Uber killer" that gave drivers an ownership stake, was launched in New York City in 2016.

Cooperative and democratic governance as envisioned in these projects is not about decentralizing the administrative power of the system, as is the focus of interoperability proponents, blockchain enthusiasts, and lately so-called "web3" evangelists. Instead, it's about decentralizing the system's legislative power. In other words, it's about distributing rule-making, not rule-enforcement. Just as in modern democratic states, we can benefit from the scalability of formal institutions and the economies of scope that arise from bundling complementary institutions under the same administration, as long as we ensure that that the power to define the rules of the system is distributed among the people. This is achieved using political institutions such as voting.[106]

However, the fact is that Daemo, Juno, and Loconomics no longer operate. Fairmondo's usage remains marginal. Despite numerous attempts over the past decade, no cooperative or similar effort has succeeded in mounting a serious challenge to any platform giant's rule. It is next to impossible even for a fully funded startup to outcompete one of the platform giants today;[107] the feat is even harder for a cooperative organization that cannot raise hundreds of millions in venture funding. Cooperatives content to operate in the margins may provide better livelihoods or at least lifestyles for small numbers of people, but for us masses, the mainstream platforms will clearly remain the go-to infrastructure into the foreseeable future.

That being the situation, could the users of these mainstream platforms somehow then begin to take up a role in governing them? That is, in essence, what Milland and her fellow workers suggested—that users had a moral right to participate in shaping the rules that governed them.[108] After all, like states, digital platforms constitute institutional frameworks that function as public infrastructure. And like states, they are hard to exit.[109] They are not impossible to exit, but neither are states. Thousands of people become refugees every year, and yet we don't think that having people vote with their feet is an effective way of holding governments to account. When people cannot easily exit an institution, then we tend to think that

they should have some kind of a voice in it. Indeed, they often begin to demand a voice in it.[110]

A BOURGEOIS REVOLUTION

How might the path from platform autocracy to some sort of platform democracy look? In Europe, the corresponding transition happened many times and in different ways, but one prominent pattern is the so-called bourgeois revolution. European markets expanded dramatically during the course of the Middle Ages. This was helped by feudal lords who installed scales and mints in their towns, enforced commercial contracts, and protected traders against bandits. The lords did this for selfish reasons—to attract suppliers for themselves and to generate tax revenues. But the expanding market opportunities also multiplied the numbers of traders and craftspeople and compounded their wealth. Over time, these people coalesced into a new social layer between impoverished peasants and powerful lords, a layer known as the burghers.[111]

Peasants' attempts to resist their lords usually ended in tears or worse.[112] But burghers—thanks to their significant resources—were gradually able to start pushing back against the lords' power. The burghers did various things that helped to translate their resources to political power. They exchanged letters and published newsletters, bringing transparency to matters of the realm. They joined guilds and fraternal associations, helping them to act with common purpose. They practiced majoritarian decision making and elected individuals to represent groups, enabling legitimate and yet efficient leadership. They recruited powerful allies, such as bishops, monarchs, and mercenaries. With such political institutions in place, the burghers gradually won for themselves greater and greater influence over the administration of the cities in which they plied their trades—sometimes to the point of wresting control from their feudal lords entirely. Self-governing city states and independent merchant republics were established, precursors to today's democratic nation states.[113]

In digital platforms, it is possible—admittedly with some creative license—to identify similar dynamics. There are at least four social classes in the platform economy. The aristocrats at the top tend to abuse their subjects, as ever. The cattle at the bottom—us, the consumers—lack the

consciousness to do much about it. The menial laborers—moderators, transcribers, data labelers, virtual assistants, and others whose labors keep the platforms running—have begun to make demands, but they lack the resources to enforce them.[114]

Above the laborers and below the aristocrats are the new burghers of the platform economy: successful app developers, online merchants, freelance specialists, streamers, influencers, OnlyFans models, and various other traders and craftspeople of the digital era. Digital marketplaces have earned these burghers the resources to start pushing back against the platform artistocrats' power, and some of them have begun to do so.

Platform burghers have created some informal institutions analogous to those of the medieval burghers. For instance, they tend to be somewhat organized and networked with each other for commercial and cultural reasons. Online merchants discuss tricks of the trade on forums. App developers attend seminars on latest technologies. Streamers and freelancers network on social media and collaborate. These groups were not created for political purposes but can be used for such.

There is also emerging platform journalism that is keeping the digital middle classes informed of what is happening in their platforms' politics. For instance, Ina and David Steiner in Massachusetts used to be part-time eBay sellers.[115] They started a website called EcommerceBytes to share tips with other online merchants. The site became so popular that Ina Steiner started producing stories full time, reporting on what the leaders of e-commerce marketplaces such as Amazon, eBay, and Etsy are doing. Her stories are read by numerous merchants and marketers who need to know about the platforms' policies and future plans.

It is possible, then, to see in the platform economy the beginnings of power dynamics and informal political institutions that bear some resemblance to the circumstances around many parts of medieval Europe. In Europe, these circumstances set in motion a gradual bourgeois revolution in which power shifted from aristocrats to the new middle class. In chapter 10, we saw an example of how one of today's most powerful platform aristocrats conceded to the digital middle class.

However, platform aristocrats are not standing still. Like their premodern predecessors, they are fighting back against the increasing scrutiny and push-back. In 2018 and 2019, EcommerceBytes published several

articles that were embarrassing to eBay's leadership: "eBay short on engineers to fix annoying shipping issue"; "eBay overcharges sellers"; "Sellers see higher costs going into the New Year." The final straw to the aristocrats was a story in which Ina Steiner revealed that then-CEO Devin Wenig earned 152 times the average eBay employee's salary. EBay's communications chief texted to Wenig: "We are going to crush this lady."[116]

A team of eBay employees and contractors began a disturbing campaign against the Steiners. They stalked and harassed the reporters online. They sent shipments to their home containing things like live insects and a funeral wreath. Before they were caught by law enforcement officers, the eBay goons flew from California to Massachusetts with the intention of breaking into the couple's garage and installing a GPS tracker on their car.[117] This attempt to silence a prominent critic of the platform aristocracy failed, but most likely it wasn't the only one of its kind.

Platform aristocrats are also harnessing consumers to gain their support in political struggles.[118] But digital burghers and laborers are gaining new allies, too. Some of the tech companies' own rank-and-file employees—software developers, researchers, platform administrators, warehouse workers, and others—have begun to push back against their leaders' policies. Employees at Amazon, Apple, and Google have publicly protested against their leaders on issues such as military collaboration, content moderation, workplace discrimination, and contractors' working conditions. On some issues, they stand on the same side as platforms' professional users. In early modern Europe, the growing ranks of well-paid civil servants ultimately joined the rest of the middle class in opposing their rulers' absolutism.[119]

There are thus now forces endogenous to digital platforms' internal political economies that are pushing toward greater accountability and popular participation in their decision making. There is no law of history to say that these forces will win and that digital platforms will inevitably emerge as democracies—far from it. But political forces are malleable, depending as they do on how organized or diffuse the various interest groups are. This means that territorial policy makers today have another policy option before them as they ponder how to address tech firms' growing abuses: besides breaking up, regulating, and nationalizing digital platforms, policy makers can support their democratization.[120]

WRITING A DIGITAL CONSTITUTION

Supporting the democratization of digital platforms does not mean suddenly firing their leadership and imposing the trappings of Western democratic institutions on them. Countries around the world have experienced plenty of this type of democratization from Western political leaders. In the best case, the democratizer ends up forever propping up the hollow institutions, resulting in dependence instead of democracy. In the worst case, the experiment ends in disorder and destruction.

Instead of imposing democracy on platforms by force, policy makers should start supporting platforms' indigenous proto-democratic institutions. This means helping platforms' different social classes to organize for their own benefit, encouraging them to collectively defend their interests against platform aristocrats and protecting them from retaliation when they do. It also means helping them to form alliances both within and beyond the platform's political economy, including with tech companies' employees, consumers, labor unions, and business associations. And it means helping them to access information on what is happening around the platform economy and on what the aristocrats are doing.

The European Union's new Platform-to-Business Regulation takes some tentative steps in this direction. It is so named because it regulates platform companies' relationships with their business users. Business users are defined broadly as "any private individual acting in a commercial or professional capacity . . . or any [company] which, through online [platforms] offers goods or services to consumers."[121] The regulation obligates platform companies that operate in Europe to provide business users with some basic transparency about their policies and decisions. For instance, platforms must notify business users of any planned rule changes at least fifteen days in advance, more if the changes are significant. When states amend laws, the notice period is much longer—months or even years before an amendment enters into force. But the very notion of advance notice is a step forward for transparency in platform politics.

The EU regulation also empowers associations formed by business users to sue platform companies on their members' behalf. This may turn out to be important because it gives merchants, app developers, freelancers, and other business users a new incentive to organize into formal

associations. Even if the associations never actually sue—for succeeding against the giants in court may still be very difficult and slow—the mere act of organizing and facing the platform as a collective already affords the users far more power than they have alone.

As a practical matter, it is also more feasible for platform aristocrats to negotiate policies with users' legitimate representatives than with millions of individual users. Largely for this reason, one online game company has asked the users of its popular gaming platform to elect a representative body and has held regular meetings with the body for over a decade now.[122] The meetings are attended by the company's top management and detailed minutes are published online. Marketplace platforms' users could push for similar types of engagement as a first step.

Moving from user organizing to platform administration, it is possible to identify some proto-democratic institutions here as well. Platforms' rulers often rule by fiat, which means that they issue ad-hoc diktats as it suits them. But all platforms also publish some kind of written rules that purport to govern activities on the platform. They may be called the "Terms and Conditions," the "Code of Conduct," or as in the App Store case, the "Review Guidelines."[123] Administrators may apply these rules selectively. And the published rule set rarely includes all rules that are in force. In particular, the rules underlying the algorithms that determine how users are matched and ranked in search results are rarely explicated at all. But nevertheless, all major platforms do at least to some extent already recognize the idea that administrative decisions should be based on previously published rules. In political science, this idea is known as the *rule of law*.

The rule of law can be distinguished from the *rule of men*, understood as arbitrary ad-hoc decision making by those in power. When the rule of law prevails, the same rules apply to everyone, and people will know beforehand what things are permitted and what things are not. The current situation on platforms is somewhat analogous to early modern England, where written laws already governed many aspects of the economy but were liable to being overridden at any time by royal prerogative.

The EU Platform-to-Business Regulation contains several provisions that promote rule of law over rule of men on digital platforms. Platform companies are required to publish a terms and conditions document written

in intelligible language—the platform's "constitution." The platform cannot promote its own products over those of third-party merchants unless the grounds for doing so are explicitly set out in the constitution. The platform must also set out the criteria that are used in ranking search results. Any suspensions and other punishments that administrators mete out to users must likewise be justified on the basis of the constitution, whether the administrators are human or computer-algorithmic.

Furthermore, the EU regulation seeks to push platforms' complaint-handling processes toward something resembling judicial review. For instance, business users are sometimes frozen out of their livelihoods without any intelligible reason or seemingly because they competed with the platforms' own products or favored partners. Most major platforms have a process in place for users to complain in situations like this. But the handling of the complaints is often arbitrary and opaque and offers little practical recourse.

The new EU regulation obligates large platform companies to provide business users with a complaint process that is free, easily accessible, reasonably fast, and "based on the principles of transparency and equal treatment." Business users can use this judicial review to challenge administrative decisions that they feel are not in alignment with the constitution. Unlike actual court decisions, these decisions are not public, but platforms are required to publish aggregate statistics on them. If a business user is unhappy with the outcome of this review, it has the further right to appeal to a high court of external arbitration.

As discussed earlier in this chapter, one reason that platforms are able to carry out state-like administrative tasks more quickly and cheaply than the state itself is their lack of commitment to basic rights. As the EU regulation pushes platforms' terms of service toward a constitution-like status, complete with judicial review, then they begin to function as a source of basic rights that limit platform rulers' exercise of power against their users, just as constitutions limit states' power. Legal scholar Nicolas Suzor calls this idea "digital constitutionalism."[124] For now, users' constitutional rights remain very limited. But the mechanism of broadening them in this framework is clear: amend the terms of service.

Thus we return back to the issue of who gets to write the platform's rules in the first place. Transparency, rule of law, judicial review, and basic

rights offer at best temporary solace to the abused as long as the abuser can change the rules at will. As in history, the first and foremost thing that must happen is that the people and now especially the middle classes organize and build alliances to enhance their power relative to the aristocracy. Territorial policy makers, business associations, unions, and civil society organizations can help this by promoting and protecting platform users' organizing efforts until they reach a position where they can begin to bargain over the rules with the princes effectively. The bourgeois democratic revolution in Europe took several centuries to unfold. But as we have seen, institutional transformations in the digital economy have so far happened at a hundredfold pace.

WHAT WE OWE THE FOUNDERS

If the idea of a joint-stock company transforming into a public body with a democratic government still seems outlandish to you, consider the following piece of history. The state of Virginia was once a joint-stock company, called the Virginia Company of London. It was founded in London in 1606 by a young entrepreneur with seed funding from four high-net-worth individuals. The founder raised additional funding through a public share offering, in which 1,700 individual and institutional investors across England bought stakes in the venture. The business plan was to construct a town in North America and to attract artisans and tradesmen from Europe to power its economy. The town was governed from London by the company's board of directors, and like any other company, it was expected to turn a profit for its investors. But these governance arrangements clearly did not last, for today, Virginia is a democratic commonwealth and one of the constituent states of the United States of America.

Almost every state in the world was at some point in its history more or less the personal possession of some rich man, woman, or group of people. Today we remember and respect many of these people and the roles that they played in building our public institutions, even as we reassess the legacy of some of them. But any debt we may feel we owe to them is purely one of gratitude. In no way are these founders or their descendants still entitled to ownership or control over our public institutions. Surely the same will be true of digital institutions.

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—Oxford, April 27, 2022

NOTES

CHAPTER 1

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