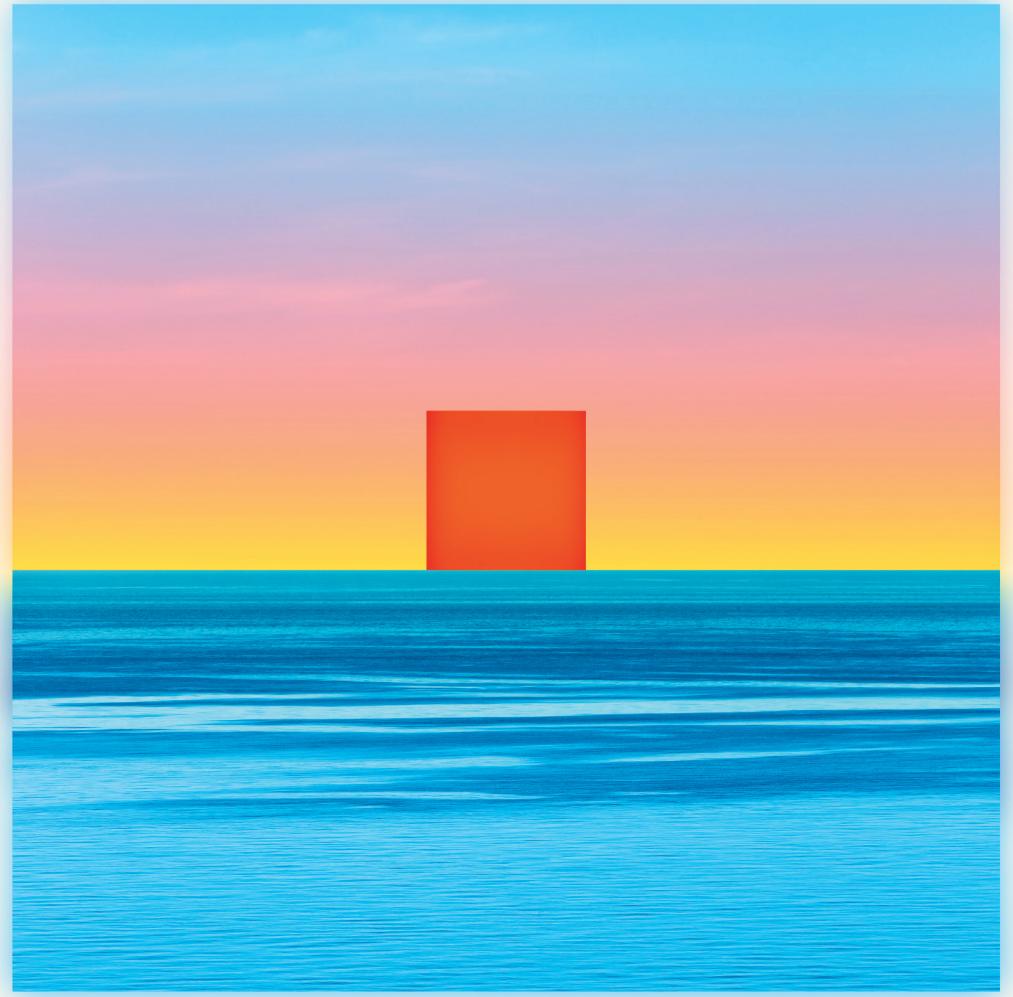
‘Refreshing and radical’
Mustafa Suleyman, author of *The Coming Wave*

Read Write Own

Building the Next Era of the Internet

Chris Dixon



Cornerstone Press

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To Elena

When the great innovation appears, it will almost certainly be in a muddled, incomplete and confusing form. To the discoverer himself it will be only half understood; to everybody else it will be a mystery. For any speculation which does not at first glance look crazy, there is no hope.

—Freeman Dyson

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Introduction

The internet is probably the most important invention of the twentieth century. It transformed the world much as earlier technological revolutions—the printing press, the steam engine, electricity—did before.

Unlike many other inventions, the internet wasn't immediately monetized. Its early architects created the network not as a centralized organization but as an open platform that anyone—artists, users, developers, companies, and others—could access equally. At a relatively low cost and without needing approval, anyone anywhere could create and share code, art, writing, music, games, websites, startups, or whatever else could be dreamed up.

And whatever you created, you owned. As long as you obeyed the law, no one could change the rules on you, extract more money from you, or take away what you built. The internet was designed to be permissionless and democratically governed, as were its original networks, email and the web. No participants would be privileged over others. Anyone could build on top of these networks and control their creative and economic destinies.

This freedom and sense of ownership led to a golden period of creativity and innovation that drove the growth of the internet through the 1990s and 2000s, leading to countless applications

that have transformed our world and the way we live, work, and play.

And then everything changed.

Starting in the mid-2000s, a small group of big companies wrenched control away. Today the top 1 percent of social networks account for 95 percent of social web traffic and 86 percent of social mobile app use. The top 1 percent of search engines account for 97 percent of search traffic, and the top 1 percent of e-commerce sites account for 57 percent of e-commerce traffic. Outside of China, Apple and Google account for more than 95 percent of the mobile app store market. In the past decade, the five biggest tech companies grew from about 25 percent to nearly 50 percent of the market capitalization of the Nasdaq-100. Startups and creative people increasingly depend on networks run by megacorporations like Alphabet (parent of Google and YouTube), Amazon, Apple, Meta (parent of Facebook and Instagram), and Twitter (rebranded as X) to find customers, build audiences, and connect with peers.

The internet got intermediated, in other words. The network went from permissionless to permissioned.

The good news is that billions of people got access to amazing technologies, many of which were free to use. The bad news is that for those same billions, a centralized internet run by a handful of mostly ad-based services meant fewer software choices, weakened data privacy, and diminished control over their online lives. And it became much harder for startups, creators, and other groups to grow their internet presences without worrying about centralized platforms changing the rules on them and taking away their audiences, profits, and power.

Even though Big Tech companies deliver significant value, their services come with considerable negative externalities. Widespread user surveillance is one issue. Meta, Google, and other ad-based companies run elaborate tracking systems that monitor

every click, search, and social interaction. This has made the internet adversarial: an estimated 40 percent of internet users use ad blockers that protect against tracking. Apple has made privacy a centerpiece of its marketing—a thinly veiled dig at Meta and Google—while simultaneously expanding its own advertising network. In order to use online services, users need to agree to complicated privacy policies—which almost no one reads and even fewer can understand—that allow their personal data to be used in almost any way the services please.

Big Tech also controls what we see and watch. The most visible example of this is deplatforming: when services eject people, usually without transparent due process. Alternatively, people may get silenced and not even know it, a practice called shadowbanning. Search and social ranking algorithms can change lives, make or break businesses, and even influence elections, yet the code that powers them is controlled by unaccountable corporate management teams and hidden from public scrutiny.

A subtler and equally troubling point is how these power brokers architect their networks to restrict and constrain startups, impose high rents on creators, and disenfranchise users. The negative effects of these design choices are threefold: (1) they stifle innovation; (2) they tax creativity; and (3) they concentrate power and money in the hands of a few.

This is especially dangerous when you consider that the killer app of the internet *is* networks. Most of what people do online involves networks: The web and email are networks. Social apps like Instagram, TikTok, and Twitter are networks. Payment apps like PayPal and Venmo are networks. Marketplaces like Airbnb and Uber are networks. Almost every useful online service is a network.

Networks—computing networks, of course, but also developer platforms, marketplaces, financial networks, social networks, and all variety of communities coming together online—have always

been a powerful part of the promise of the internet. Developers, entrepreneurs, and everyday internet users have nurtured and nourished tens of thousands of networks, unleashing an unprecedented wave of creation and coordination. Yet the networks that have lasted are mostly owned and controlled by private companies.

The problem stems from permission. Today creators and startups need to ask for permission from centralized gatekeepers and incumbents to launch and grow new products. In business, permission seeking is not like asking your parents or teachers for permission, where you get a simple yes or no answer. Nor is it like traffic lights setting the rules of the road. In business, permission becomes a pretense for tyranny. Dominant tech businesses leverage the power of permission to thwart competition, desolate markets, and extract rents.

And those rents are exorbitant. The combined revenue of the five largest social networks—Facebook, Instagram, YouTube, TikTok, and Twitter—is about $150 billion per year. Nearly all major social networks have "take rates"—the percentage of revenue network owners take from network users—of 100 percent, or near to it. (YouTube is the one outlier with a take rate of 45 percent, for reasons we'll get into later.) This means the vast majority of that $150 billion goes to those companies instead of the users, creators, and entrepreneurs who contribute, build on top, and create value for all.

Mobile phones—which dominate computing today, especially internationally—underscore the imbalance. People spend about seven hours per day on internet-connected devices. About half that time they spend using phones, where apps occupy 90 percent of their time. That means people spend about three hours per day in the thrall of an app store duopoly: Apple and Google. These companies charge up to 30 percent for payments. That's more than

ten times the payment industry norm. Such steep take rates are unheard of in other markets, and they reflect how powerful these companies have become.

This is what I mean when I say corporate networks tax creativity. The taxation is literal.

Big Tech companies also wield their power to squelch competitors, reducing options for consumers. Facebook and Twitter famously took antisocial turns in the early 2010s, cutting off third-party companies that were building apps for users on top of their platforms. These abrupt crackdowns punished many developers and, therefore, punished users by offering fewer products, fewer choices, and less freedom. Most other large social platforms have executed the same playbook. Today almost no new startup activity takes place on top of social networks. Developers know better than to lay foundations on quicksand.

Pause for a moment: Social networks, whether in person or online, are the essence of human connection and coordination. They are one of the most widely used applications by people of all ages, and yet no new startups have survived, let alone thrived, on top of these platforms for many years. And all for a simple reason: Big Tech says so.

Facebook isn't the only capricious gatekeeper. Other platforms are just as ruthless, as Facebook itself pointed out in response to antitrust lawsuits brought by the Federal Trade Commission and state attorneys general at the end of 2020. "This restriction is standard in the industry," a Facebook spokesperson said of the platform's third-party-neutering practices, citing similar policies at LinkedIn, Pinterest, and Uber, among others.

The biggest platforms are anticompetitive. Amazon learns which products in its marketplaces are top sellers and then undercuts their makers with its own cheap basic versions. While physical retailers like Target and Walmart do this all the time with their

own version of generic brands alongside name brands, the difference here is that Amazon is not just the store but the infrastructure. It would be as if Target controlled not just its store shelves but also the roads that all stores build on. This is too much control for one corporation to wield.

Google abuses its power too. In addition to charging high mobile payment fees, Google faces scrutiny over using its popular search engine to boost the prominence of its own products over those of its competitors. Many searches today show only sponsored ads, including Google products, above the fold, crowding out smaller rivals. Google also aggressively collects and tracks user data to improve its ad targeting. Amazon plays a similar game, ranking its own products above others and harvesting people's data to enlarge its fast-growing, $38 billion ad business, which trails only Google's ($225 billion) and Meta's ($114 billion).

Apple commits similar sins. While many people love using Apple's devices, the company routinely rejects competitors from its App Store and squeezes the ones it lets in—to the point that it is now embroiled in multiple high-profile lawsuits. Epic, the developer of the ultra-popular game *Fortnite,* is one plaintiff, taking Apple to court after the company shut down Epic's game developers' ability to access the App Store. Spotify, Tinder, the location tag maker Tile, and others have filed similar complaints over Apple's high fees and anticompetitive rules.

Big Tech platforms have more than just a home field advantage. They get to rewrite the rules of the entire game for their sole benefit.

Is that so bad? Many people don't see a problem with the way things are, or they don't think much about it. They are satisfied with the comforts afforded by Big Tech. We live in an age of abundance, after all. You can connect to anyone you want (assuming the corporate network owners are okay with it). You can read, watch,

and share as much as you like. There are plenty of "free" services to satiate us—the price of entry being just our data. (As they say, "If it's free, then you're the product.")

Lots of people are happy with the status quo. Maybe you too think the trade-off is worth it, or perhaps you see no other viable alternative for life online. Either way, whatever your stance, one trend is undeniable: centralizing forces are drawing the internet inward, collecting power into the center of what was supposed to be a decentralized network. This inward turn is stifling innovation, making the internet less interesting, less dynamic, and less fair.

To the extent that anyone recognizes a problem, they usually assume the only thing that might rein in existing giants is government regulation. That may be part of the solution. But regulation often has the unintended side effect of cementing existing giants' power. Larger companies can deal with compliance costs and regulatory complexity that overwhelm smaller upstarts. Red tape restrains newcomers. We need a level playing field. And in service of that, we need thoughtful regulation that respects this fundamental truth: startups and technologies offer a more effective way to check incumbents' power.

Moreover, knee-jerk regulatory responses ignore what sets the internet apart from other technologies. Many of the usual calls for regulation assume that the internet is similar to past communications networks, like telephone and cable TV networks. But these older, hardware-based networks are different from the internet, a software-based network.

The internet depends, of course, on physical infrastructure owned by telecom providers, such as cabling, routers, cell towers, and satellites. Historically, this infrastructure has been a strictly neutral transport layer, treating all internet traffic without bias. Today, regulation over "net neutrality" is in flux, but so far the industry has mostly upheld its policies of nondiscrimination. In this

model, software takes priority. It is the code running at the network edges—on PCs, phones, and servers—that drives the behavior of internet services.

This code can be upgraded. With the right set of features and incentives, new software can propagate across the internet. Thanks to its malleable nature, the internet can be reshaped through innovation and market forces.

Software is special because it has a nearly unbounded range of expressiveness. Almost anything you can imagine can be encoded in software; software is the encoding of human thought, just like writing or painting or cave drawings. Computers take those encoded thoughts and run them at lightning speeds. This is why Steve Jobs once described the computer as "a bicycle for the mind." It accelerates our abilities.

Software is so expressive that it is better thought of not as engineering but as an art form. The plasticity and flexibility of code offer an immensely rich design space, far closer in the breadth of possibilities to creative activities like sculpting and fiction writing than engineering activities like bridge building. As with other art forms, practitioners regularly develop new genres and movements that fundamentally shift what's possible.

That's what's happening today. Just as the internet seemed to be consolidating beyond repair, a new software movement emerged that can reimagine the internet. The movement has the potential to bring back the spirit of the early internet, secure property rights for creators, reclaim user ownership and control, and break the stranglehold Big Tech has on our lives.

That's why I believe there's a better way and that these are still the early days. The internet can still fulfill the promise of its original vision. Entrepreneurs, technologists, creators, and users can make it happen.

The dream of an open network that fosters creativity and entrepreneurship doesn't have to die.

Three Eras of Networks

To understand how we got here, it helps to be familiar with the broad strokes of internet history. Below I'll provide a brief overview, which I'll unpack in greater detail in the chapters ahead.

The first thing to know is that power on the internet derives from how networks are designed. Network design—the way nodes connect, interact, and form an overarching structure—might seem like an arcane technical topic, but it is the single most relevant factor in determining how rights and money are distributed across the internet. Even small initial design decisions can have profound downstream consequences on the control and economics of internet services.

Simply put, network design determines outcomes.

Until recently, networks came in two competing types. The first, "protocol networks," like email and the web, are open systems controlled by communities of software developers and other network stakeholders. These networks are egalitarian, democratic, and permissionless: open to anyone and free to access. In these systems, money and power tend to flow to the network edges, incentivizing systems to grow around them.

"Corporate networks" are the second type: networks that companies, instead of communities, own and control. These are like walled gardens with one groundskeeper; they're theme parks controlled by a single megacorp. Corporate networks run centralized, permissioned services that allow them to quickly develop advanced features, attract investment, and accrue profits to reinvest in growth. In these systems, money and power flow to the network center, to companies that own the networks, and away from users and developers at the network edges.

I see the history of the internet as unfolding in three acts. Each act is marked by a predominating network architecture. In the first act, called the "read era," circa 1990 to 2005, early internet protocol

networks *democratized information.* Anyone could type a few words into a web browser and read about almost any topic through websites. In the second act, the "read-write era," roughly 2006 to 2020, corporate networks *democratized publishing.* Anyone could write and publish to mass audiences through posts on social networks and other services. Now a new type of architecture is enabling the internet's third act.

This architecture represents a natural synthesis of the two prior types, and it is *democratizing ownership.* In the dawning "read-write-own era," anyone can become a network stakeholder, gaining power and economic upside previously enjoyed by only a small number of corporate affiliates, like stockholders and employees. This new era promises to counteract Big Tech consolidation and return the internet to its dynamic roots.

People can read and write on the internet, but they can also now *own.*

A New Movement

This new movement goes by a few names.

Some people call it "crypto," since the foundation of its technology is cryptography. Others call it "web3," implying that it is leading to a third era of the internet. I sometimes use these names, but I generally try to stick to well-defined terms like "blockchains" and "blockchain networks," which are the technologies driving the movement. (Many industry practitioners refer to blockchain networks as protocols, but I avoid this label to better distinguish these networks from protocol networks, two very different concepts in this book.)

Whichever name you prefer, the core technology of blockchains presents unique advantages, if you know where and how to look.

Some people will tell you that blockchains are a new type of

database, one that multiple parties can edit, share, and trust. That's a start. A better description is that blockchains are a new class of computer, one you can't put in your pocket or on your desk, as you might with a smartphone or laptop. Nevertheless, blockchains fit the classic definition of computers. They store information and run rules encoded in software that can manipulate that information.

The significance of blockchains lies in the unique way that they, and the networks built on top of them, are controlled. With traditional computers, the hardware controls the software. Hardware exists in the physical world, where an individual or organization owns and controls it. That means that, ultimately, a person or group of people is in charge of both the hardware and the software. People can change their minds and therefore the software they control at any time.

Blockchains invert the hardware-software power relationship, like the internet before them. With blockchains, the software governs a network of hardware devices. The software—in all its expressive glory—is in charge.

Why does this matter? Because blockchains are computers that can, for the first time ever, establish inviolable rules in software. This allows blockchains to make strong, software-enforced commitments to users. A pivotal commitment involves digital ownership, which places economic and governance power in the hands of users.

You may still be wondering, *So what? What problems do blockchains solve?*

The ability for blockchains to make strong commitments about how they will behave in the future allows *new networks* to be created. Blockchain networks solve problems that plague earlier network architectures. They can connect people in social networks while empowering users over corporate interests. They can underpin marketplaces and payment networks that facilitate commerce,

but with persistently lower take rates. They can enable new forms of monetizable media, interoperable and immersive digital worlds, and artificial intelligence products that compensate—rather than cannibalize—creators.

So yes, blockchains create networks, but unlike other network architectures—and here's the key point—they have more desirable outcomes. They can incentivize innovation, reduce taxes on creators, and let the people who contribute to the networks share in decision making and upside.

Asking "What problems do blockchains solve?" is like asking "What problems does steel solve over, say, wood?" You can make a building or railway out of either. But steel gave us taller buildings, stronger railways, and more ambitious public works at the outset of the Industrial Revolution. With blockchains we can create networks that are fairer, more durable, and more resilient than the networks of today.

Blockchain networks combine the societal benefits of protocol networks with the competitive advantages of corporate networks. Software developers get open access, creators get direct relationships with their audiences, fees are guaranteed to stay low, and users get valuable economic and governance rights. At the same time, blockchain networks have the technical and financial capabilities to compete with corporate networks.

Blockchain networks are a new construction material for building a better internet.

Seeing the Truth

New technologies are often controversial. Blockchains are no exception.

Many people associate blockchains with scams and get-rich-quick schemes. There is some truth to these claims, as there was truth to similar claims about tech-driven financial manias of the

past, from the railroad boom of the 1830s to the dot-com bubble of the 1990s. The 1990s were full of spectacular failures, such as Pets.com and Webvan. The public discussion mostly focused on IPOs and stock prices, but there were also entrepreneurs and technologists who looked beyond the ups and downs, rolled up their sleeves, and built products and services that eventually delivered on the hype. There were speculators, but there were also builders.

Today, the same cultural divide exists around blockchains. One group, which I call the casino, is often the much louder of the two, and it is primarily interested in trading and speculation. At its worst, this culture of gambling has led to catastrophes like the bankruptcy of the crypto exchange FTX. This group gets most of the media attention, which influences the public image for the entire category.

The other group, which I call the computer, is the far more serious of the two, and it is motivated by a long-term vision. This group's practitioners understand that the financial aspects of blockchains are only a means to an end, a way to align incentives toward a larger goal. They realize the real potential in using blockchains is to build better networks, and therefore a better internet. These people are quieter and don't get as much attention, but they are the ones who will have lasting effects.

This isn't to say the computer culture isn't interested in making money. I work in venture capital. Most of the tech industry is profit-driven. The difference is that real innovation takes time to generate financial returns. That's why most venture capital funds (ours included) are structured as ten-year funds, with purposefully long hold periods. Producing valuable new technologies can take up to a decade and sometimes longer. Computer culture is long term. Casino culture is not.

So, it's the computer versus the casino battling it out to define the narrative for this software movement. Of course, optimism

and cynicism can both be taken too far. The dot-com bubble, followed by bust, reminded many people of that.

The way to see the truth is to separate the essence of a technology from specific uses and misuses of it. A hammer can build a home, or it can demolish one. Nitrogen-based fertilizers help grow crops that feed billions of people, but they can also be used in explosives. Stock markets help societies allocate capital and resources where they can be most productive, but they also enable destructive speculative bubbles. All technologies have the capacity to help or harm; blockchains are no different. The question is, how can we maximize the good while minimizing the bad?

Determining the Internet's Future

This book aims to give you an appreciation for the essence of blockchains, the technology—that is, the computer—and all the exciting new things it can do. My hope is that you will, along the way, come to understand exactly what problems blockchains solve and why the solutions they present are so urgently needed.

The thinking, firsthand observations, and mental models I share here are the result of my experiences over the course of a twenty-five-year career in the internet industry. I started as a software developer, then became an entrepreneur in the 2000s. I sold two companies, one to McAfee and the other to eBay. Along the way, I took up investing, placing early bets on companies such as Kickstarter, Pinterest, Stack Overflow, Stripe, Oculus, and Coinbase, all of which have products in wide use today. I have been a longtime advocate for community-owned software and networks, and I have been blogging on the topic, as well as technology and startups, since 2009.

My own path into blockchain networks began in the early 2010s after reflecting on the failure of protocol networks like RSS, an open-source publishing protocol, against corporate-owned

rivals like Facebook and Twitter. These experiences turned me toward a new model of investing, one that guides my philosophy today.

I believe to understand the internet's future, you must understand its past. To that end, in part 1 of the book, I chart the history of the internet, focusing on the two most recent eras from the early 1990s through today.

In part 2, I dive deeper into blockchains, explaining how they work and why they matter. I show how blockchains and tokens can be used to construct blockchain networks, and explain the technical and economic mechanisms by which they work.

In part 3, I show how blockchain networks empower users and other network participants, answering the "why blockchains?" question people often ask.

In part 4, I address controversial questions head-on, including policy and regulatory topics and the harmful casino culture that has developed around blockchains that hurts their public perception and undermines their potential.

Finally, in part 5, building on the history and concepts presented earlier, I go deeper into intersecting areas like social networks, video games, virtual worlds, media businesses, collaborative creation, finance, and artificial intelligence. I hope to give a flavor for the power of blockchain networks, and how they can underpin better versions of existing applications along with new applications that weren't possible before.

This book encapsulates what I've learned throughout my internet career. I've had the privilege to work with many outstanding entrepreneurs and technologists. Much of what I discuss here, I learned from them. I hope that whether you're a builder, founder, corporate leader, policymaker, analyst, journalist, or someone who just wants to understand what is happening and where we're all headed, this book can help you build, navigate, and participate in the future.

Blockchain networks are, I argue, the most credible and civic-minded force to counterbalance internet consolidation. I believe this is the beginning, not the end, of internet innovation. There's an urgency to that conviction, though: the United States is already losing its lead in this new movement, with the share of global software developers here going from 40 percent to 29 percent in the past five years. The rapid rise of artificial intelligence will also likely accelerate the trend toward Big Tech consolidation. Artificial intelligence holds incredible promise but tends to favor well-capitalized companies with large accumulations of data.

The decisions we make now will determine the internet's future: who builds, owns, and uses it; where innovation happens; and what the experience will be for everyone. Blockchains, and the networks they enable, unlock the extraordinary power of software as an art form, with the internet as its canvas. The movement has an opportunity to change the course of history, to remake humanity's relationship to the digital, to reimagine what's possible. Anyone can participate—whether you're a developer, creator, entrepreneur, or user.

This is a chance to create the internet you want, not the internet you inherited.

Part One
Read. Write.

1. Why Networks Matter

I am thinking about something much more important than bombs. I am thinking about computers.
—John von Neumann

Network design is destiny.

Networks are the organizing framework that enables billions of people to intelligibly interact. They decide the world's winners and losers. Their algorithms decide where money and attention will flow. The structure of a network guides how that network will evolve and where wealth and power accumulate. Given the scale of the internet today, software design decisions up front, regardless of how seemingly small, can have cascading downstream consequences. Who controls a given network is the central question when analyzing power on the internet.

This is why critics who knock the tech startup industry for placing more emphasis on the digital world than the physical world—on "bits" versus "atoms"—miss the mark. The internet's influence extends far beyond the digital realm. It intersects, permeates, and shapes large-scale social and economic landscapes.

Even pro-tech investors play up the idea. As Peter Thiel, the venture capitalist and PayPal co-founder, once mused, "We wanted