

Data fairness: A new social contract for the 21st century economy



Preface

This report, “Data fairness: A new social contract for the 21st century economy,” is an MIT Technology Review Insights report sponsored by Omidyar Network. It explores the key data inequality trends, their root causes, and the ideas and tools available to solve them, from national and global regulation through to data trusts and cooperatives. This report is informed by expert interviews conducted in late 2020 and early 2021, and draws from a two-day conference held in November 2020, which was organized by Omidyar Network. Adam Green was the author of this report, Francesca Fanshawe was the editor, and Nicola Crepaldi was the producer.

We would like to thank the following experts for sharing their time and insight.

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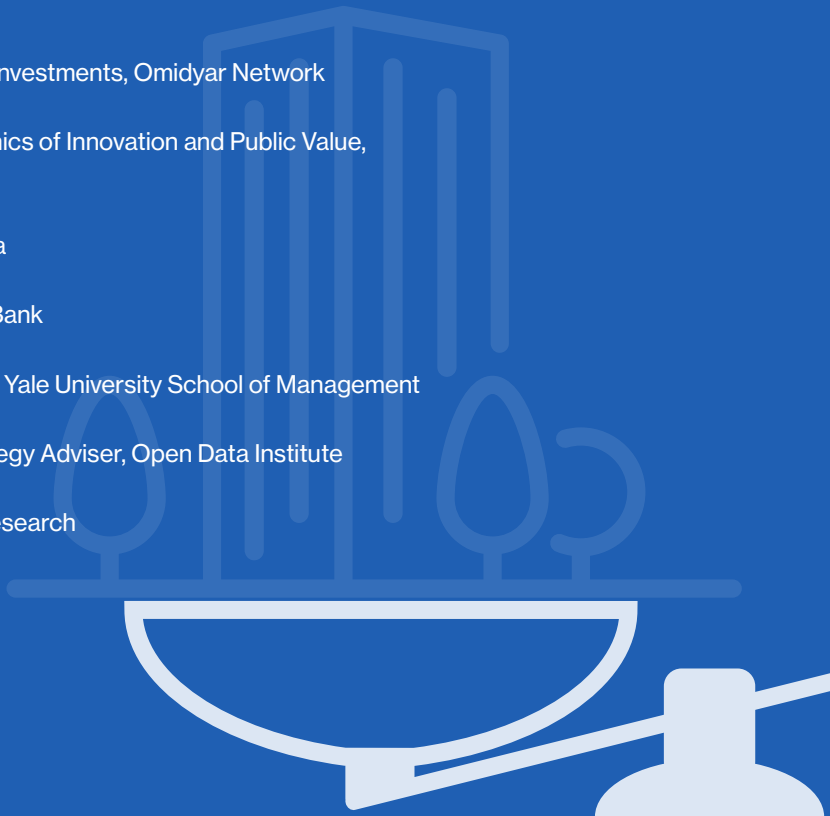
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Foreword

Incentives drive behavior. Currently, tech giants are incentivized to collect as much data as possible so they can narrowly target advertising to consumers, which in turn, increases their earnings. Big Tech does everything it can to increase users' screen-time and engagement, all in service of data collection. And it's working quite well for them. Facebook's profits in the first quarter of 2021 nearly doubled and advertising revenue rose by 46% compared to last year.¹

But while these platforms are seeing record profits, it's coming at the expense of other stakeholders in the system: government, communities, gig workers, and the users themselves. Government is losing out because these companies don't pay their fair share of taxes in countries of operation, thereby constraining public investments. These platforms use extractive and intrusive ways to collect data, stripping communities and individuals of privacy and control. And Big Tech uses data to control their employees, especially gig workers, which leads to suppressed wages and deteriorating work conditions for people working in the gig economy.

Omidyar Network, a social change venture, believes we must learn how to balance the data economy so that it is equitable for all stakeholders, not just serving the interests of the Big Tech giants. That's why we've partnered with MIT Technology Review Insights. We wanted to have a better understanding of potential pathways to reimagine the data economy that is rife with systemic flaws. This paper is intended to share emerging ideas, spark debate, and solicit feedback.

This paper is informed by early scholarship from individuals and institutions that are investigating this issue. They have found three emerging pathways to reimagine the data economy. First, the essential infrastructure that enables a global, open internet must focus on generating public value rather than private profits. Second, governments will need a holistic approach to regulating the data economy. Traditional antitrust and privacy measures need to be complemented by data governance that creates necessary safeguards and room for innovative applications for data. Finally, the data economy needs mechanisms for participatory governance and practice-based intermediation approaches. This report provides examples from Estonia and Taiwan and shares the progress made by entrepreneurs in the field of data trusts and data collaboratives. These approaches can be strengthened with regulatory support and public funding.

We hope these pathways provoke a much needed reckoning of the data economy. As we continue our journey to reimagine the data economy, we invite you to join us.

We are grateful for our partnership with MIT Technology Review Insights for its in-depth exploration into the data economy, and our many partners, including The Rockefeller Foundation, that share our commitment to building a more equitable data economy.

Sushant Kumar

Principal, Responsible Tech Investments
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01 Executive Summary

The data economy has become progressively more unequal, with a small number of tech giants controlling the gathering, processing, and application of data, and the computational infrastructures that now undergird our society, from artificial intelligence (AI) to cloud computing platforms.

Around the world, governments are “taking on” the tech industry in everything from data governance to anti-competitive practices. A growing community of voices, ranging from economists and lawyers to civil rights groups, are also pushing for a new social contract between the tech industry and citizens. At issue across many of these discussions and clashes is the way in which data are collected, processed, and put to use.

This report, which draws from a wide-ranging expert interview program and a two-day conference that took place in late 2020, explores the key data inequality trends, their root causes, and the ideas and tools available to solve them. The key findings are:

- **The data economy has become increasingly unequal, dominated by a small number of tech companies and failing to deliver the full societal gains possible.** A diverse community of critics, including data science experts, lawyers, historians, anthropologists, and social scientists, believe the data economy—and the computational infrastructures that power it, such as artificial intelligence—is increasingly unequal and unfair. Citizens, non-commercial actors, and governments are key contributors to the data ecosystem, yet they are not full partners in developing the data economy nor in sharing its profits. Societies as a whole could leverage

more benefit from the data revolution whose proceeds are delivering outsized commercial returns to tech giants with underwhelming impact on wider societal challenges.

- **Data is a novel resource requiring new tools to calculate its value, identify its participants and beneficiaries, and allocate its profits.** To convey its economic and social value, data is frequently likened to other essential phenomena such as oil, water, sunlight, and carbon dioxide. It is also likened to a form of property to which ownership rights can be allocated. In truth, while analogies are helpful, data has its own dynamics that call for a distinctive approach to tabulating its value. Its power is relational and cumulative, realized in the aggregate, which makes the “data privacy” agenda an important but limited perspective. Data is the product of many participants and users who are at times unwitting in their “data labor,” and at other times not compensated fairly for it. We need more sophisticated tools for understanding the unique properties and dynamics of data.
- **Innovations to redress the imbalance of the data economy range from top-down government interventions to bottom-up institutions, and networks led by civil society groups and social impact-oriented startups.** Governments can enlarge the beneficiary pool of the data economy through a range of targeted regulatory reforms, such as taxation to disincentivize data harvesting practices in areas like digital advertising, and antitrust to reign in market abuse. They can also be more assertive in ascribing public value to data and seeing themselves as builders of the data ecosystem. Bottom-up, civil society-led innovations are also equally critical. “Data stewardship” can be fostered through institutions like trusts, cooperatives, and unions, which give people more control and agency. There are no silver bullets. Regulatory change must be skilfully designed to avoid unforeseen consequences. Data stewardship institutions and organizations need to reach financial sustainability without compromising their mission and independence. There is a need for more evidence on the relative effectiveness of different models for solving specific problems. Overall, a broad community of perspectives should be included in any efforts to rebalance the digital economy. Those challenges should not deter stakeholders from working toward a new social contract for the 21st century.

02

From commons to enclosure



In the earliest days of the internet revolution, optimists envisioned an open, decentralized commons beyond the control of corporations or governments. Those hopes were arguably naïve at the time—the internet’s origin was as a military technology, after all—but today they look positively utopian.

Critics believe a transformative public infrastructure has fallen under the control of a small group of tech giants whose ownership of data, “computational infrastructures” such as artificial intelligence and cloud computing platforms, and the very design of dominant internet platforms in areas like social media, search engines, and e-commerce, leads to an unequal exchange that disproportionately benefits data controllers to the disadvantage of citizens, governments, and even the private sector, including smaller technology businesses.

Evidence for the economic might of tech platforms is everywhere to be seen. Seven of the top 10 largest companies globally are technology and data firms. And the covid-19 pandemic has further turbocharged the

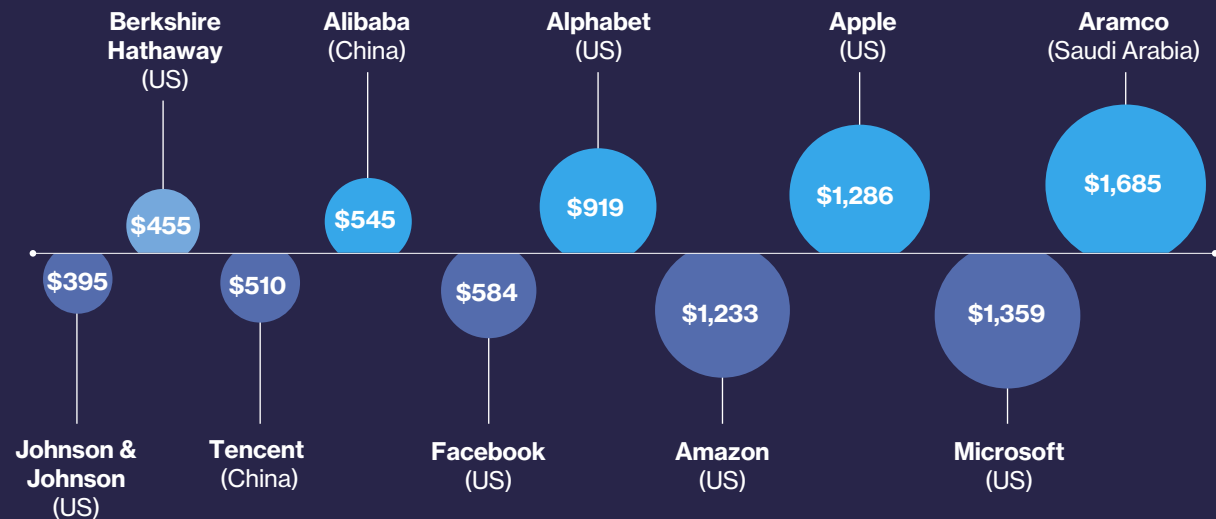
technology industry. Even as other sectors stagnated or collapsed, tech’s top seven companies added \$3.4 trillion to their valuations in 2020. Key digital economy domains are dominated by a small clutch of firms; Facebook, Amazon, and Google now account for nearly two-thirds of digital advertising dollars spent in the US.² And Amazon’s market share of US online sales reaches as high as 74% in some product categories. In Europe, the European Commission fined Google more than €4 billion for anticompetitive practices after Google imposed restrictions on Android device manufacturers and mobile network operators that further cemented its dominance in internet search.

While criticisms are varied in their content and intensity, they share a common theme in opposing the idea of data as a commercial resource ownable by corporations alone. Given the value of data as an economic and social asset, capable of positively influencing everything from medical research to public transport mobility, critics question its concentration in a small number of tech giants who are securing significant de facto ownership and generating outsized corporate profits, while outcomes for other

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Figure 1: The largest companies in the world by market capitalization 2020 (\$ billion)

Seven of the top 10 largest companies globally are technology and data firms.



Source: Compiled by MIT Technology Review Insights based on data from Statista, 2020³

stakeholders and data contributors—such as governments, consumers, and workers in the data economy—such as governments, consumers, and workers in the data economy—appear marginal.

Rather than viewing data as a marketable and ownable commodity, some critics describe it as a common good with many contributory actors including citizens and governments. “One way of looking at the problem is of the privatization of data and digital spaces and the way in which the growth of the internet—as a result of the advertising-driven business model of the data economy—has enabled networked companies to build, expand, and privatize data in the digital domain,” says Carly Kind, director at AI and data research body, the Ada Lovelace Institute in London.

The public sector risks being edged out of data systems in terms of control, ownership, and benefits. Carly Kind cites transit data as an example, which was “originally the purview of public bodies, [and] is now in the hands of private companies,” she says. Another sign of tech’s new role in public infrastructure is covid-19 track-and-trace systems, which tech companies played a significant role building and shaping. “[It is a] significant act of power that shows the inequality between governments and companies. The Big Five are exercising state-level power over what are now essentially public utilities,” says Kind.

Governments are at a disadvantage where they cannot access ostensibly public data that could be put to use for public benefit. Two leading economists—Diane Coyle at the University of Cambridge and Mariana Mazzucato at University College London—have called for, and are currently leading, research initiatives to enrich our understanding of the public value of data.

Citizens are also losing out from current data power inequality due to either a lack of information or unequal exchanges. “Individuals and communities are getting more and more marginalized in the data economy because our ability to negotiate, to bargain, to even access a certain reality, with regard to the way our data is being used, is limited. It is important to think of us as being able to negotiate as a collective,” says Astha Kapoor, co-founder of the Bangalore-based Aapti Institute.

In some cases, individuals are in effect contributing “data labor,”⁴ from tagging friends in photos to asking Alexa to skip a song, or writing a review of a barber.⁵ This generates data that inform the development and evolution of powerful algorithms and automation systems.

Big Tech employs relatively few people proportional to size. According to a tool called the Marx Ratio, which measures approximately how much publicly traded firms reward their shareholders relative to their rank-and-file

employees, Alphabet earns around \$158,000 per worker and Facebook achieves around \$635,000, which is significantly more than a company like Walmart, which earns \$4,288 per worker.⁶ Critics believe much data work is effectively outsourced to users, not always transparently.

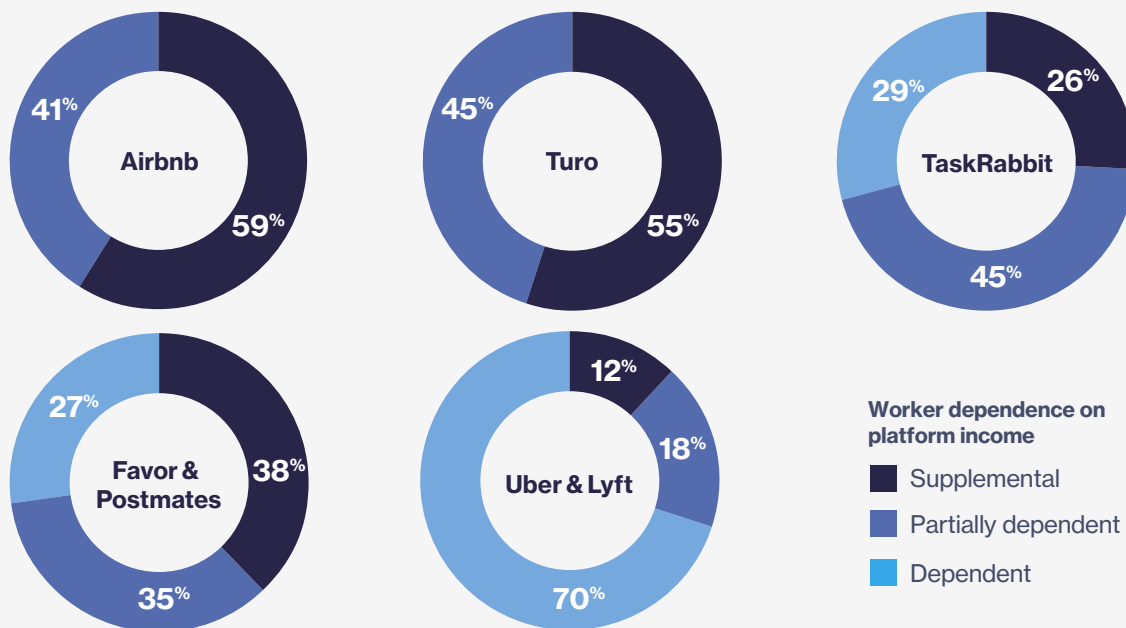
At its most benign, this is a barter: access to free services in return for contributing data to make those services better. For some critics, however, the worry is that the AI systems crafted by Big Tech could further reshape labor markets through increasingly powerful automation technologies, a focal area for big tech companies in domains ranging from language generation to autonomous vehicles. In effect, users could be building systems that may replace them.

As workers, citizens are also being poorly rewarded in key segments of the data economy. For workers at hyper-scaler platforms in the sharing and gig economy, like ride-hailing apps, for example, their labor and the data they generate—such as routing and timing—are important inputs to the business model. But their contribution to making these models possible—and to the data repositories on which algorithms and data intelligence tools are built—is under-recognized. Precisely as

on-demand platforms grow more powerful and dominant, workers lose agency in negotiating fair terms of trade and rights relating to their working hours, employment protections, and payment terms.

Data inequality—defined here as the uneven sharing of gains from a resource whose value is created by many stakeholders—is a problem ascribed to the practices of tech giants, but in truth the issues are pertinent to smaller and newer tech firms, too. Startups are engaging in data practices that can lack accountability or transparency. Consumer gene testing app 23andMe, which gives users information on ancestry and health based on saliva samples, faced criticism after pharmaceutical giant GlaxoSmithKline took a \$300 million stake in the company in 2018 and thereby gained access to genetic information without, some argue, fully informed consent of users, or of their relatives who share genetic similarities.⁸ The company's downward trajectory in user numbers may, its CEO acknowledged, relate to consumers' privacy concerns about how their data are used.⁹ With 23andMe recently valued at \$4 billion, there may also be a question as to whether the consumers whose data helped build the business are part of that success story.¹⁰

Figure 2: Platform labor, 2020: The extent to which workers on seven platforms in the US are dependent on platform income to pay basic expenses compared to working for supplemental income.



Source: Compiled by MIT Technology Review Insights based on data from Theory and Society, 2020.⁷

Other data-driven startups have sold sensitive user data without consent, raising questions about the true breadth of unethical or illegal data practices as more and more of people's lives are spent online. Location-based social networking and dating app Grindr recently paid an £8.6 million fine—10% of its global revenue—for sharing personal information of its users including location, sexual orientation, and mental health details with advertisers.¹¹ Flo, the period tracker app with over 100 million users, recently settled with the US Federal Trade Commission (FTC) over charges that it lied to users about sharing private health data with third-party firms.¹²

In fact, when the FTC tested 12 apps and two “wearable” electronic devices back in 2014, when the data market was far less sophisticated than today, they found they collectively transmitted data to a total of 76 undisclosed parties.¹³ Given the opacity of data markets today, and the sophistication of data-harvesting tools, there are questions as to whether these cases are just the tip of the iceberg in terms of data monetization practices.

A data dialog

Criticisms leveled at unfair data practices are not, of course, without contestation. Without the digital tools built by the Silicon Valley giants, including cloud computing, teleconferencing, and e-commerce, the pandemic year could have been significantly worse. Demand for collaborative software from the tech industry, especially large providers including Amazon, Microsoft, and Google, soared in 2020.

But the range of experts worried about data inequality—from mainstream economists to anthropologists, data science experts to labor rights activists—along with the

market consolidation and profits earned by tech giants in the pandemic year, indicate a strong case to explore the critiques. Many of those leading the conversation are technologists who seek a grander vision of data, rather than tech opponents trying to turn back the clock. If this eclecticism shows a broad dissatisfaction with the status quo, it also indicates diverse views on the nature of the problems and how to fix them.

Up until now, it has been easier to identify the issues than to find the solutions, and previous attempts to take on Big Tech have had unexpected consequences. For example, antitrust measures against IBM in the 1990s benefited the newly ascendant Microsoft, which was gaining a startling amount of power in the personal computing market. Later, the clipping of Microsoft's wings arguably opened the door to Google.¹⁴

“Big bang” legislation can also end up hurting smaller companies more. When the European Union's General Data Protection Regulation (GDPR) came into force in 2018, large companies were in a more favorable position to tackle the new rules as they had greater resources for ensuring compliance and rolling out changes seamlessly,¹⁵ whereas smaller companies have been more likely to lose subscribers and users from consent opt-ins.¹⁶ The new rules have also made it harder for smaller third-party ad tech companies to collect personal information, whereas tech giants that already have direct relationships with customers have been able to secure consent directly from a large pool. And marketers have also spent more money on big tech platforms since GDPR because they are more trusting of the larger companies' standards of compliance¹⁷—or their ability to withstand fines or charges.



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Parminder Jeet Singh, Executive Director, IT for Change

The first exploitative data practices of the internet age can be seen in the airline industry, which was accused of price fixing in the 1990s. Today there are signs of unethical or “gray zone” practices in the use of social media data to inform insurance premiums and credit-scoring.

One-size-fits-all responses have also exposed differences of opinion, strategy, and practice between tech companies themselves, as evidenced in the clashes over privacy between Apple and Facebook¹⁸ or Microsoft’s criticism of the data practices dominant in social media platforms.¹⁹

Unfair data practices are not limited to the tech industry. The first exploitative data practices of the internet age can be seen in the airline industry, which was accused of price fixing in the 1990s.²⁰ And today there are signs of unethical, unfair, or at least “gray zone” practices in the use of social media data to inform insurance premiums and credit-scoring. While “breaking up Big Tech” makes for punchy headlines, examples of data inequality practices can be found far beyond Silicon Valley.

One hopeful remedy is: “responsible AI”; a laudable movement that hopes to ensure data-intensive artificial intelligence systems are ethical and fair. The idea behind responsible AI is to put in place mechanisms that ensure AI-based decisions are transparent and explainable, and to detect and root out instances in which AI models might be unfair. But these interventions require value judgements that vary across cultural and political contexts, as well as between disciplines. Moreover, some of society’s most vulnerable citizens cannot be assumed to have the time, resources, and wherewithal to engage in what is in essence a high-tech rights advocacy issue.²¹

Another proposed solution is to give individuals more control over their data by letting them earn money from it. But this too has drawn criticism. Diane Coyle of the University of Cambridge thinks the income-generation approach misses a crucial point: that data’s value is relational and collective (her own attempt to find a price for her data using an online tool delivered a mere \$5). It also underplays the degree to which there are collective rights among data groups and communities; individual data can be used to derive insights about wider social groups without their consent.

It is a fallacy to view data as falling under either individual or corporate control, says Carly Kind of the Ada Lovelace Institute. “A focus on individualized claims to privacy can undermine a collective sense of the risks as well as collective claims on realizing the value of data,” says Kind. Anita Gurumurthy, executive director of IT for Change, concurs. “There is a fetishization of personal data and individual rights. In this binary logic, so long as data is protected, things are fine. Data is a system resource—it is only valuable in its relationality with other pieces of data. Emphasizing social relationality frameworks is the right paradigm,” says Gurumurthy.

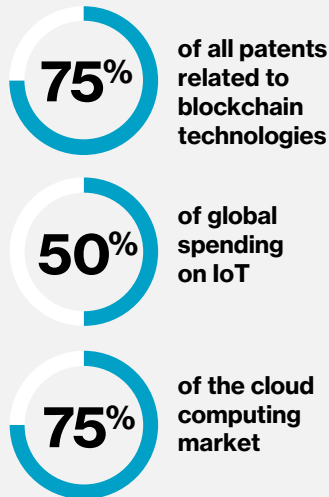
Others want to ensure data governance discussions include an international dimension. Parminder Jeet Singh, executive director of IT for Change, talks of a new “data colonialism” in which raw materials are extracted, processed in the global North (this time the US and China), and sold back. “Data gets processed and developed into a finished product—call it intelligence—and embedded into digital products, whether it’s a search engine, Uber, or Amazon. There is a question of which communities are contributing data in this process, and their economic rights to that data,” he says.

Data inequality also has an international dimension with respect to its crucial role in determining economic competitiveness and, thereby, the relative economic power of countries in the international order. The so-called “Fourth Industrial Revolution,” which fuses cyber, biological, and physical systems, hinges on the collection and application of data. As with the West’s leadership in the earlier waves of industrial transformation, which were then reflected in their dominance of international institutions and governance frameworks, from the World Trade Organization to the World Bank and the International Monetary Fund (IMF), today a small cluster of countries is pulling ahead of the pack. Ten countries²² accounted for 90% of all global patents and 70% of all exports associated with advanced digital production

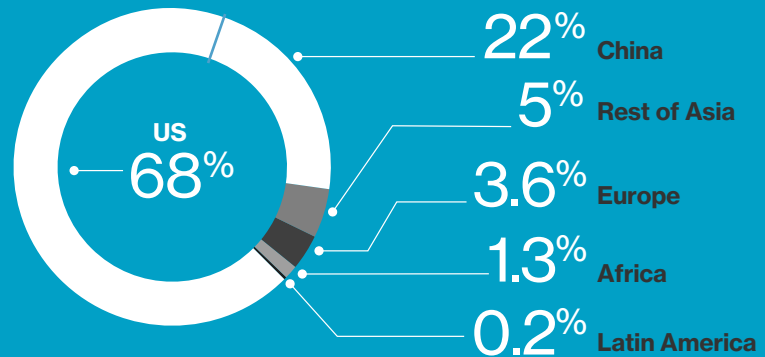
Figure 3: Geography of the digital economy, 2019

The US and China are taking the lead in many areas of digital technological development, while other countries trail behind.

■ US and China
 ■ Rest of the world



US and China: 90% of the market capitalization value of the world's 70 largest digital platforms



Half of the world remains offline



In least developed countries, only 1 in 5 people are online



Gender gap is the widest in the poorest economies



Source: Compiled by MIT Technology Review Insights based on data from UNCTAD, 2019.²³

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technologies. The US and China are particularly dominant, accounting for 75% of all patents related to blockchain technologies, 50% of global spending on the internet of things (IoT), and 75% of the cloud computing market.²³ If this dominance is reflected in their respective power in other domains, from security to financial systems, data inequality today could set the foundation for a new North-South divergence tomorrow.

While libraries can be written about each critique, it is beyond the scope of this paper to accommodate all such discussions. But as crucial as the diagnosis is, getting the right remedy is of the utmost importance. The remainder of this report explores the principles and strategies that could help rebalance the data economy and direct it in more egalitarian directions.

03

The fix(es)



Design thinking: Building systems for fairness and equity

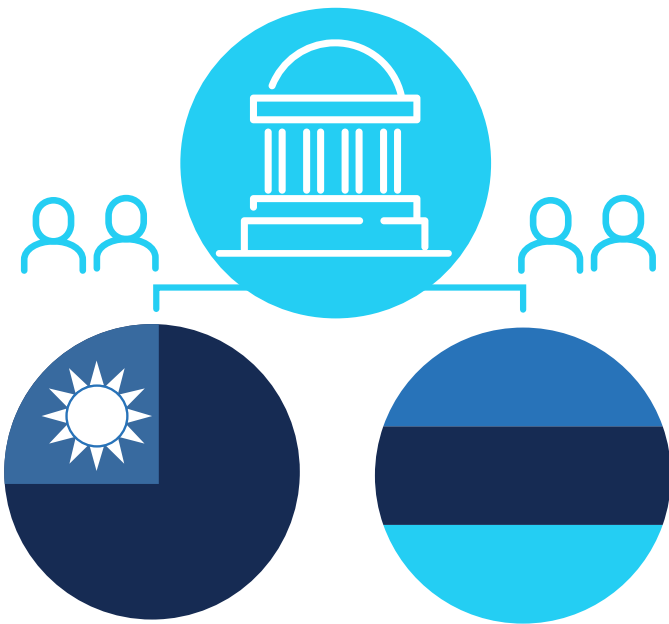
“Every system is perfectly designed to get the results it gets,” said American engineer W. Edwards Deming.²⁴ This insight offers hope that the outcomes of the digital economy are not predetermined; much depends on what the system is designed to achieve. There are already powerful examples of digital platforms that foster inclusion and share benefits as a result of the way they are designed.

Wikipedia’s recent 20th birthday celebrations prompted a flurry of plaudits about the site’s status as a “welcome oddity” of the modern internet.²⁵ Wikipedia hosts over 50 million articles, written by unpaid volunteers, and is more visited than Netflix or Instagram. It has no shareholders or advertising, and its plain format is the polar opposite of the gamification and “attention engineering” practices refined by the social media industry. While those platforms incentivize the production of misinformation, emotional content, and polarization—they are, in other words, “angry by design”²⁶—Wikipedia’s content is both highly accurate and the outcome of consensus.²⁷

In the government realm, too, digital platforms offer signs of hope about a future that embraces technology’s power to promote inclusion and fairness. Taiwan is a standout

example.²⁸ The Sunflower Student Movement in 2014—in which Taiwan’s national legislature was peacefully occupied for three weeks in protest against planned economic integration with China—sparked a wave of youth activism infused with a sense of “civic hacking,” leading to the integration of technology into political decision-making in unprecedented ways.²⁹ The grassroots g0v (gov zero) movement emerged as an open-source, collaborative approach to policy decision-making that used hackathons and spontaneous technology projects as an alternative means of reaching policy consensus. The government, shaken by the protests, formed an alliance with g0v, leading to the formation of the Public Digital Innovation Space.³⁰

Audrey Tang, a software programmer and activist, became digital minister of Taiwan to promote an open governance agenda that used technology to make politics continual and everyday, rather than fought on divisive binary elections or referendums, and allowed citizens to shape priorities rather than respond to them. “Rather than the ‘Occupy’ approach in the sense of slow down, grind to a halt, or interrupt, they occupied in a sense of showing that the government could do its own work of consensus-building more effectively by using technology,” says Glen Weyl, principal researcher at Microsoft Research New England.



Taiwan and Estonia have explicitly designed government data systems that achieve outcomes its architects value: openness, decentralization, and user control.

The vTaiwan process, which emerged from g0v, asked questions to the citizenry and experts on everything from e-scooters and ridesharing regulations to internet alcohol sales, using Pol.is, a platform built to attract wide-ranging input and forge consensus. The process was made up of several stages, including crowdsourcing evidence, using mass deliberation tools to identify areas of consensus through up- or down-voting, and creating clusters through pattern analysis to allow representative statements to be drawn out. In the final phase, key stakeholders are brought together through live-streaming and face-to-face meetings to develop recommendations.

“Most of the time, opinions expressed in any conversation are pretty similar to other opinions expressed,” says Glen Weyl. “There’s always a very large overlap. What gets in the way is: how do you collect those opinions and make them all manifest? There’s a huge role for technology to play there.” The g0v movement has also prompted “reverse mentoring” in a government that was relatively conservative. Each minister has a reverse mentor who shows them ways to use technology to support democratic policymaking.

Weyl points out Estonia as another country showing how data and platforms can be used to promote citizen-driven outcomes. The country began its digital journey early, through an e-governance system to provide online public services back in 1997.³¹ But while the ease and efficiency of its online government services is impressive, what is more notable is what its technology infrastructure design means for citizen control of data.

The X-Road system means there is no central or master database for e-government, with each agency only handling its own data. Data cannot be stored or moved without a citizen’s permission; they decide who can look at their data, and if they see incorrect data, they can correct it. What unites both Taiwan and Estonia is the importance of design, and intention as a factor in shaping the outcome of digital infrastructures and data. Both countries show that, far from turning away from technology due to its risks, it is possible to double down on it by more explicitly designing systems to achieve outcomes that its architects value—openness, decentralization, and user control.

Top-down governance: Controlling market power and creating public value

In the discussion about rebalancing the data economy, governments are clearly a key actor. Interventions are most commonly framed in terms of enhancing or rewriting rules and regulations to restrain, restrict, or disincentivize unfair practices, but government can also use its own resources and influence to create more public value from data.

In terms of top-down enforcement, at the time of writing, the European Union, the UK, the US, and several Asian governments are taking action to address the market power of tech platforms, including creating new agencies to analyze market power in the digital sphere specifically, and developing more fine-grained categorizations to monitor market dominance behaviors.

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The most frequent government response to excessive corporate power in the past was antitrust, which entailed proving that companies acquired their market power by harming the competitive process—by price-fixing, for example, or buying up or forcing out rivals rather than winning customers on their own merit. The most common historic means of identifying a “harm” from monopoly or monopsony power was price rigging. While this is less applicable in the case of platform services that are generally free or, in the case of Amazon, cheaper than alternatives, price alone is not the only indicator of consumer harm. The fact that no money changes hands does not preclude the possibility of an unequal exchange, argues Fiona Scott Morton, professor of economics at Yale University School of Management.

“Many policymakers think you can’t have a competition problem if it is a barter transaction, meaning there are no payments. But if I give you six apples for six oranges, and then tomorrow say you can only have one apple for six oranges, we are perfectly capable, with our economic tools, of knowing that the price of apples just went up,” says Scott Morton. While barter makes it more difficult to know what is going on, “the revenues show what the net value is, and where that value is going: to shareholders,” she adds.

Through antitrust, governments can punish a company for breaking a specific law, and through regulation, they can identify a problematic practice and create a structure to tackle it (net neutrality, which restricts internet providers from blocking or limiting data or content from certain digital providers, is an example of the latter).³²

Divestiture is one method of breaking up a company in ways that could limit its market-shaping power. “If Google divested Waze, they still have Google Maps, but competitors in ad placement could then partner with Waze. If Google divested Android, they could no longer

withhold Android if a telecoms company didn’t put Google Search as the default search engine,” says Scott Morton.

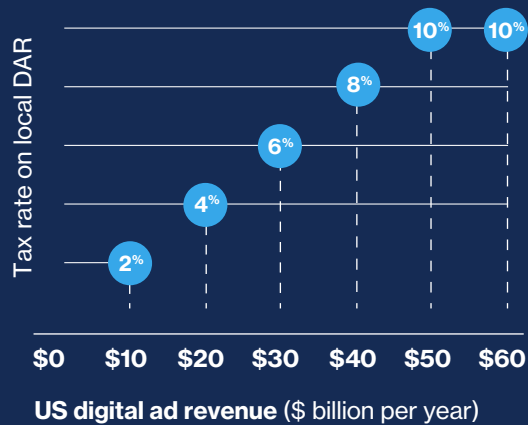
One challenge for governments is understanding the data practices employed by tech giants. “You would need lawyers, but also computer and data scientists to really understand the issues,” says Dirk Bergemann, professor of economics and computer science at Yale University. “Unless you have a deep understanding of computer science at the frontier of what these companies are doing, you will not understand the scope of instruments you have at your disposal.”

Bergemann argues there is a lack of knowledge about how data markets operate, in contrast to other critical sectors. “In financial markets, there is a whole profession that works on this, and corresponding agencies like the SEC [US Securities and Exchange Commission]. In the market for digital platforms, there is no dedicated agency with expertise and knowledge to understand the market for, say, digital advertising placements. A significant difficulty—and one that becomes evident in contrast to financial markets—is that much of the data is internal to the digital companies, say Google for digital advertising auctions, and the public knows very little about the scope and magnitude of the flow of information,” says Bergemann.

The EU, for instance, is reportedly struggling to understand how Amazon’s recommendation algorithms work. This is stymying attempts to build an antitrust case against the platform which, it is alleged, uses merchant sales data to inform and boost its own offerings.³³ But the leadership shown by public figures to understand and grapple with unfair business models has provided a stimulus for governments around the world. This includes a community of leaders at the vanguard of the antitrust wave, including Margrethe Vestager

Figure 4: Prototype market power tax

Ideas for reshaping the platform economy include a progressive tax applied to digital advertising revenue (DAR).



Source: Compiled by MIT Technology Review Insights based on a discussion paper by Paul Romer, 2020.³⁴

(EU competition commissioner), Dina Srinivasan (fellow with the Thurman Arnold Project at Yale University, who is developing the antitrust case against Google and Facebook), and Lina Khan, a law student whose critique of Amazon's market practices helped give rise to the "hipster antitrust" movement and who was recently appointed to join the US Federal Trade Commission.

While antitrust alone "won't change the practices and extractive use of data, at the very least, it will mediate the power that a very small number of companies are able to exercise," says Carly Kind of Ada Lovelace Institute. "But anything that doesn't address the underlying business model of the data economy, which is acquiring data for the purposes of selling advertising space and maximizing engagement, would not fundamentally change the system," she warns.

Advocates argue there are other, more surgical, interventions that could help reshape incentives in the

platform economy. Paul Romer advocates a progressive digital advertising tax which, he believes, has the added benefit of being more politically feasible than antitrust which, as US history shows, can often be hamstrung by the judicial system. It would be applied to revenues derived from digital advertising at a rate that increases via proxy to the size of the company collecting said payments.

While lack of access to data and computer science expertise is a challenge for governments, experts say the issue is not impossible to bridge. "Once you have a law, you tend to get entrants and entrepreneurs coming to you and explaining a problem—such as why something you think is interoperable, for instance, is not," says Fiona Scott Morton. "The agency does not have to figure everything out itself," she adds.

Jeni Tennison, vice president and chief strategy adviser at the Open Data Institute, thinks too much weight is given to the idea that governments face a capacity disadvantage vis-a-vis tech giants due to their unequal access to data talent. Firstly, she says, this misses a distinction between data science and what she calls data literacy: an understanding of issues like data strategy, governance, and ethics. "There is a lot of focus on data science and relatively little on literacy, or on skills needed to be an informed customer," she says. Secondly, Tennison believes there is plenty of tech talent keen to play a role in shaping the future of the data economy. "I encounter a lot of people who are motivated by a public sector mission, especially younger people, and older people who have had a career in industry and want to do something good," she says.

While top-down governance remedies are mostly focused on regulation and restraint, there is another, more

"Anything that doesn't address the underlying business model of the data economy, which is acquiring data for the purposes of selling advertising space and maximizing engagement, would not fundamentally change the system."

Carly Kind, Director, Ada Lovelace Institute

“A significant difficulty—and one that becomes evident in contrast to financial markets—is that much of the data is internal to the digital companies, say Google for digital advertising auctions, and the public knows very little about the scope and magnitude of the flow of information.”

Dirk Bergemann, Professor of Economics and Computer Science, Yale University

constructive mode through which governments can redress data imbalances: by using data as a tool to deliver more effectively on their policy objectives and as creators of new forms of public value from data. “Most data policy is oriented to the Big Tech/ad tech problem, or of evaluating and monitoring the government’s own work, but not looking at data and the availability of data as a tool to achieve their goals,” says Tennison.

Where governments look at the value of their data, they tend to think too narrowly in terms of ways it can be monetized. There might be larger, more diffuse forms of value to creating and opening access to data. “We need a wider perspective on how to understand [the government] return on investment in data,” Tennison says, citing as an example the decision taken by Transport for London (TfL) to release significant quantities of data such as timetables, service statuses, and reports of disruption. This open-data approach led to over 600 apps being developed, which were used by 42% of Londoners, and to economic savings of between £70 million and £95 million in saved time, which reduced uncertainty and lowered information costs.³⁵ “When a huge population is impacted a tiny bit every day, it adds up to a big value,” says Tennison. The step taken by TfL also fostered collaborations with tech companies leading to reciprocal data exchange, including with Waze, Google, and Citymapper. Of course, transit data, which is non-personal, has far lower associated risks. But the principle to be drawn is that government investment in data systems, and opening of access to those systems, can create richer public value than merely directly monetizing data.

In thinking more holistically about the role of state investment in creating dynamic forms of public value, parallels can be drawn with the BBC, a British public

The need for a global data constitution?



A more active and participatory role for government and civil society is one way of rebalancing the data economy, but there is also a global governance gap that requires attention. Currently, there is a global data “Wild West” with significant implications for international economic inequality, given the central role of data in driving economic competitiveness and innovation. A data governance “vacuum” needs to be filled by what Anita Gurumurthy calls a “global constitutionalism for data” that lays out principles to inform and restrain the creation and movement of data throughout the global value chains, and which would determine the boundaries of the data and intelligence economy, informed by inclusive development considerations. Achieving this requires a framework that can articulate community data rights, explore equity-centred benefit allocations for AI systems based on community data, and interrogate digital trade agreements for their implications on data governance, Gurumurthy argues.



“A lot of regulation in data governance at the moment is based on the notion of consent, but is not doing very much in terms of empowerment.”

Sylvie Delacroix, Professor in Law and Ethics, University of Birmingham, Fellow, The Alan Turing Institute and Mozilla Foundation, and Co-chair, Data Trusts Initiative

institution whose contribution to the nation's society—at the individual, societal, and market level—neatly embodies the idea of public value. The BBC has set new standards in technology through its iPlayer streaming service, benefitted society by promoting the values of toleration and inclusion, and acted as a market-shaper by creating commercially successful TV formats that champion diverse voices and address gender stereotypes, such as prime-time scheduling of women's football.

Other government interventions could include systems to improve transparency in algorithmic services, such as accessible registries where users can see where algorithmic systems are mediating their access to public services. Such moves are afoot in Helsinki and Amsterdam. A step further would be more active consultation around the development of these systems, moving from a one-way transfer of information in the interest of transparency to a “two-way engagement and co-design on the systems affecting us,” leading to greater civic participation, says Carly Kind.

Bottom-up data governance: Stewardship

While data inequality may require government to take on new capabilities and more powerful tools, some challenges could be solved through age-old human institutions that evolved to handle problems of asymmetric power. Data stewardship is a broad approach to data governance aimed at enhancing participation and agency, via intermediaries that sit between users, data requesters, and data controllers.³⁶ Specific models include data cooperatives that help users pool their interests; trusts, which embed duty-of-care protections or fiduciary responsibility toward data subjects; and collaboratives and exchanges, which govern data access based on specific purposes and participation. All of these

approaches, which overlap and intersect, are in essence bottom-up civic institutions designed to be beyond government or corporate control.

Trusts, with origins in English jurisprudence, are legal governance structures for managing the interests of individuals or groups. They could, under the right circumstances, be a perfectly sensible vehicle for the management of data, with a trustee having a fiduciary responsibility to exercise a person or group's data rights in a way that promotes their aspirations and interests according to the terms of the trust.^{37, 38}

Sylvie Delacroix, professor in law and ethics at the University of Birmingham and fellow at the The Alan Turing Institute and Mozilla Foundation, who co-chairs the Data Trusts Initiative, believes trusts have a useful role to play in the current environment and that they could go further than other touted remedies. “A lot of regulation in data governance at the moment is based on the notion of consent, but is not doing very much in terms of empowerment,” says Delacroix. In contrast, once a data trust has reached a critical mass, it could effectively reverse the direction of consent: users could sign up to a website like Amazon via a data trust's portal that sets out the terms and conditions in which their data can be held. Trusts are also more robust than similar approaches like data cooperatives, because the latter are based on contract or corporate law, with more scope for legal loopholes.

“In trusts, you have a standard of good faith and more freedom for judges to interpret terms that constituted the trust, in light of what was hoped for or aspired to,” says Delacroix. “I don't need to prove my data trustee has acted improperly. The burden of proof is reversed.” Trusts thus give a judge more room to intervene. This stronger

“Data trusts build on the idea that you can use trust law to empower individuals and create trusted data-sharing arrangements to counterbalance the power of Big Tech, because it is through access to data that they're able to consolidate power.”

Carly Kind, Director, Ada Lovelace Institute

fiduciary duty on trusts would, Delacroix argues, be more onerous than a “duty of care,” as a defendant could be found in breach of their duty if they had not acted with undivided loyalty towards the beneficiaries of the trust. This means trusts can go further in reshaping data relationships and inequalities. “There is one conversation which is about how to protect people from the vulnerabilities they encounter when they go online,” says Delacroix. “There's another about the social goods that can be achieved by sharing data better and more responsibly. Trusts are trying

to bring those two conversations together by creating an institutional structure,” she adds.

Carly Kind of Ada Lovelace Institute also sees potential for trusts as a tool to rebalance the data terms of trade. “Data trusts build on the idea that you can use trust law to empower individuals and create trusted data-sharing arrangements to counterbalance the power of Big Tech, because it is through access to data that they're able to consolidate power,” Kind says.

Figure 5: Models for sharing or accessing data

Data trusts



Data cooperatives



Data commons



Personal data stores



Research partnerships



DISTINGUISHING FEATURE

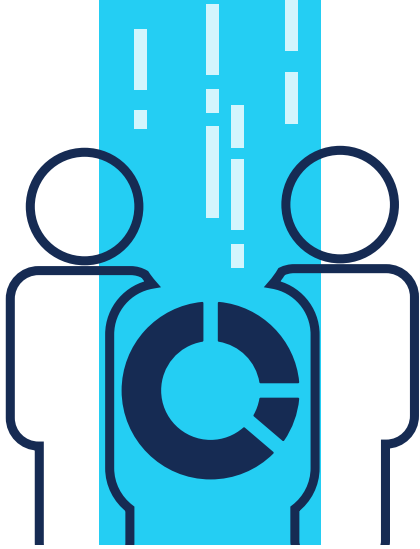
Take what has been learned from the use of legal trusts. Trustees of a data trust will take on responsibility (with some liabilities) to steward data for an agreed purpose.

Takes what has been learned from cooperatives. A mutual organization owned and democratically controlled by members, who delegate control over data about them.

Takes what has been learned from managing common pool resources—such as forests and fisheries—and applies the principles to data.

Stores data provided by a single individual on their behalf and provides access to that data to third parties when directed to by the individual.

When data holders provide access to data to universities and other research organizations.



“Data stewardship means the ability to unlock and share the value of data, while safeguarding rights and making sure that people are active participants in the conversation about how their data is shared.”

Astha Kapoor, Co-Founder, Aapti Institute

Governments see a role for trusts too. Canada’s digital charter includes mention of trusts in supporting data interoperability and the sharing of innovation’s benefits with all Canadians, citing health, clean technology, and agri-business.⁴⁰ They have featured in ongoing discussions about the European Union’s approach to data,⁴¹ and were included in a UK review into artificial intelligence in 2017 and in India’s Non-Personal Data Governance Framework.

Fiduciary responsibility is a useful principle cutting across the structures of data governance. It has a long and practical history, found in sectors like the medical profession, the legal profession, and certain financial services. It stretches from a weaker “do no harm” proviso found in a duty of care, to a “thin” version of a duty of loyalty that avoids conflicts of interests between clients and commercial interests, to a “thick” version of loyalty to actively promote the client’s best interests. Richard Whitt, president of Glia Foundation, says that soon we could see the emergence in some jurisdictions of a “digital fiduciary” that encompasses all these duties. This entity would focus on protecting individuals’ online activities, and provide them with access to agential advanced technologies like localized data storage and personal AIs.

Data cooperatives are an alternative approach that seek to give individuals and groups more control over their data. One example is Midata, a Swiss initiative that allows users to collect their health information, including hospital records and fitness tracker data, and encrypt and store it in the cloud.⁴² They can share their data with their doctor, family members, or even clinical trials to aid research. Cooperatives differ from trusts in placing more ownership and control in the user’s hands, rather than those of a legal institution, but achieve useful ends for those who want to

be more actively engaged in the collection and sharing rights of their data.

There is a growing list of real-world experiments in data governance institutions. Top-down efforts include the NHS Digital Independent Group Advising on the Release of Data in the UK, whose mandate is to consider requests for the dissemination of confidential information.⁴³ Bottom-up initiatives include Luna DNA, a public benefit corporation promoting “citizen science” via a platform, which allows individuals to share health data in an encrypted form that researchers pay to use.⁴⁴ The proceeds earned from research are then passed back to users, who are also shareholders. What binds these innovations and institutions is a simultaneous recognition that data holds enormous social value but that its creation and distribution can lead to uneven gains—and occasional harms. Startups are also offering individuals more active control over data remuneration. Personal data stores like DigiMe and CitizenMe allow citizens to gain pecuniary returns for their data and to control how it is shared with businesses.

Ultimately, the intended benefit from all of these institutions and frameworks can be to escalate the position of the individual in the “participation ladder”—from lacking any control or resource, to having opportunities to redress, through to possessing agential rights to control access to their data—and recognizing both individual and group data rights. The concept of data stewardship cuts across these interventions. “Data stewardship means the ability to unlock and share the value of data, while safeguarding rights and making sure that people are active participants in the conversation about how their data is shared,” says Astha Kapoor, co-founder of the Aapti Institute.

Building the evidence base and sustainable business models

The wealth of ideas out there to redress the data imbalance gives reason for optimism that new and reinvigorated institutions, laws, and frameworks exist to solve the problems. While each has its constraints, further evidence-building and experimentation can ensure that societal responses are effective, especially if handled via an inclusive dialogue that ensures diverse views are factored into the next steps.

One issue is the sheer number of experiments and initiatives, which could lead to a galaxy of separate pilot studies and potentially overwhelm decision-makers, unless there is a corresponding effort to evaluate impact, and draw together best practices and lessons. Trusts, for instance, are not easy to directly replicate. They can be used for everything from gathering imaging and acoustic data to tackle the illegal wildlife trade,⁴⁵ to urban data platforms to inform transport and housing policy.⁴⁶ Organizations are scrutinizing pilot projects to quantify their impact, such as an urban mobility data trust project in India. This initiative is beginning in Delhi with a view to scaling up across the country, offering a guide to the importance of scale. As more trusts are trialed, there is a need for “communities of practice” that enable lesson-sharing.

Financial sustainability is a second challenge. Such initiatives are commonly funded by grants or outside backers, rather than being self-sustaining, which could lead to high rates of churn if they cannot outlive the interest or resources of their patrons. “There are a number of data institutions popping up to counter the imbalances of the data economy, from working people’s rights and data unions to trusts. They face this issue of sustainability, just as any nonprofit does,” says Jeni Tennison of the Open Data Institute. “But then the revenue models they adopt can undermine their purpose, which is focused on data sharing and fairness.”

Achieving financial independence and resilience is critical, Tennison argues, because initiatives that increase access to data are only valuable when data assets are reliable and timely. “Nobody is going to

build anything on datasets they think might disappear,” Tennison warns. Instead, data institutions need to find appropriate revenue models, such as membership fees or selling access to services and insights, and there is a role for philanthropic funds in committing to such endeavors for the long term.

Whether emerging, socially empowering models can truly take on the power of the Big Tech platforms is another question. Take, for instance, platform cooperatives.⁴⁷

These are modeled on the matchmaking markets seen in sectors like transportation (Uber) or travel (Airbnb), but are mutually owned by their participants. Examples include travel accommodation app Fairbnb, which invests proceeds in the communities it operates in, TaxiApp, which is owned by its drivers, and Resonate, a music streaming app collectively owned by musicians, labels, and fans.

These have so far failed to make serious inroads against the commercial platforms they oppose.⁴⁸ The power of network effects means platform power grows exponentially as more participants enter, thereby improving the options for both sellers and buyers. Commercial platforms have huge financial resources and venture backing to improve their technology platforms, and, in some cases, to artificially suppress prices beyond what any institution that needs to balance its books could achieve. There is a danger, then, that “platform mutuals” become like fair-trade groceries, used by a select group of wealthy, ethical consumers, but taking a vanishingly small slice of the overall market.

It is also important to ensure an inclusive process in developing and elaborating data stewardship approaches—and to develop them using evidence based on their merits and real-world impact. “All the current models are very new and some of these organizations are already struggling with “customer acquisition.” How do you get people involved? What’s in it for them?” asks Astha Kapoor. She adds: “We need pilots on the ground to test these models to figure out how people perceive data rights and to see what models are best for the context: is it a trust, a cooperative, a union? We don’t know enough about the business models and that’s a huge gap.”

04 Conclusion

The data economy has, over the past two decades, permeated every aspect of our social and economic lives. Early optimism about the transformative power of the internet has given way, more recently, to a sense that the real profits have not matched the hoped-for potential. For more strident critics, a small group of tech companies have appropriated the benefits.

To date, the focus of criticism—from technologists, data scientists, ethicists, lawyers, regulators, or civil rights organizations—has been diagnostic in nature. A clear picture of how the data economy really functions and the ways that data's collection, processing, and deployment could serve to accelerate inequality are warranted. But attention should now turn in earnest to ways in which the current system can be redesigned to achieve fairer outcomes.

Rebalancing the data economy and ensuring broad benefits from the data sphere is a mammoth task that falls to society as a whole. Each actor has its role and comparative advantage.

- **Governments can reshape markets, incentivize fairer business models, and shape the data economy through a more assertive stance.** Targeted regulations such as a digital advertising tax can profoundly alter the data-gathering incentives facing tech platforms, while broader interventions such as antitrust can limit or eliminate anti-competitive practices. Key challenges for governments include how to fully monitor and interrogate the data practices used by the tech industry, which can be

highly technical—and opaque. Governments can also take a broader view of their own role in the data ecosystem. Strategic funding of data initiatives, a more assertive stance on the financial value of government-contributed data, and an appreciation for the economic and social values of open data are all examples of governments playing an active role in rebalancing.

- **Bottom-up innovations and civil society networks are building a suite of tools and systems to address data inequality.** While governments are essential, civil society groups, social impact startups, and academic researchers are delivering useful innovations and experiments that point toward a new internet era. Data trusts, cooperatives, and unions are each finding ways to give citizens more control over their data, from ensuring informed consent to giving people more voice and agency over who accesses their data and for what—including allowing the willing to contribute more data to initiatives they support, such as medical research, in a consensual and controlled manner. The key challenges for nonstate actors include ensuring financial viability to avoid a churn of initiatives and pilots; building up the evidence base for the different approaches and models to ensure they are applied in appropriate contexts; and striving to include diverse perspectives, rather than be limited to tech-savvy digital rights activists.

- **There is an important role for funders, from philanthropic organizations and grant-givers to social impact investors and the private sector, to support startup initiatives and networks.** Moving from ideas, concepts, and proposals to real-world application requires assistance to back experimental efforts and invest in rigorous reviews of efficacy under different contexts. Such financial and material support can also give emergent institutions the time and space needed to explore sustainable revenue options that support their mission.

While there is no silver bullet to addressing an uneven data economy, changes and reforms will be critical to ensure the 21st century economic model can hold as data permeates ever-more aspects of our economic and social lives, says Carly Kind. “This discussion is necessary in order for the social contract not to break with the fourth industrial revolution and the massive changes that it will bring.”

Footnotes

1. "Facebook's ad business drives surge in revenue, following Google's act," Wall Street Journal, April 28, 2021.
2. "Google, Facebook and Amazon Gain as Coronavirus Reshapes Ad Spending," The Wall Street Journal, December 1, 2020.
3. "The 100 largest companies in the world by market capitalization in 2020," Statista, May, 2020.
4. Ibarra et al., "Should We Treat Data as Labour? Moving Beyond 'Free,'" American Economic Association Papers & Proceedings, December 27, 2017.
5. "We All Work for Facebook," Longreads, April 2019.
6. "Is Capital or Labor Winning at Your Favorite Company? Introducing the Marx Ratio," The New York Times, May 21, 2018.
7. Schor et al., "Dependence and precarity in the platform economy," Theory and Society, August 7, 2020.
8. "23andMe's Pharma Deals Have Been the Plan All Along," Wired, March 8, 2018.
9. "23andMe lays off 100 people as DNA test sales decline, CEO says she was 'surprised' to see market turn," CNBC, January 23, 2020.
10. "Richard Branson-backed Spac in talks to merge with 23andMe," Financial Times, January 27, 2021 (subscription required).
11. "Grindr fined £8.6m in Norway over sharing personal information," The Guardian, January 26, 2021.
12. "Period tracking app settles charges it lied to users about privacy," The Verge, January 13, 2021.
13. "Big Tech's latest moves raise health privacy fears," Financial Times, December 7, 2020.
14. "How the Antitrust Battle of the '90s Set the Stage For Today's Tech Giants," The Verge, September 6, 2018.
15. "Regulation can get it wrong: Google's Sundar Pichai on AI and antitrust," Financial Times, December 23, 2020.
16. "How GDPR is Helping Big Tech and Hurting the Competition," Applico.
17. "GDPR Has Been a Boon for Google and Facebook," The Wall Street Journal, June 17, 2019.
18. "Facebook-Apple skirmish is the latest in a fight that stretches back more than a decade," CNBC, December 23, 2020.
19. "The world's reached a turning point on data and privacy, says Microsoft President Brad Smith," Microsoft, September 23, 2019.
20. "8 Airlines Accused of Price-Fixing: Fares: The carriers unfairly used a computer system to set prices for domestic flights, the Justice Department charges," Los Angeles Times, December 22, 1992.
21. Greenfield, "Radical Technologies: The Design of Everyday Life," Verso Books, May 2018.
22. US, Japan, Germany, China, Taiwan, France, Switzerland, UK, South Korea, and the Netherlands.
23. "Digital economy report 2019 – Value creation and capture: Implications for developing countries," United Nations, September 4, 2019.
24. The W. Edwards Deming Institute.
25. "Wikipedia is 20, and its reputation has never been higher," The Economist, January 7, 2021.
26. "This is how your fear and outrage are being sold for profit," Quartz, June 28, 2017.
27. Jemielniak, "Wikipedia: Why is the common knowledge resource still neglected by academics?," Gigascience, December 8, 2019.
28. "Taiwan is making democracy work again. It's time we paid attention," Wired, November 26, 2019.
29. "The Activist Legacy of Taiwan's Sunflower Movement," Carnegie Endowment for international peace, August 2, 2018.
30. Public Digital Innovation Space.
31. "Estonia – the Digital Republic Secured by Blockchain," PWC, 2008 (pdf, p.3).
32. "The WIRED Guide to Net Neutrality," Wired, May 5, 2020 (registration required).
33. "EU struggles to build antitrust case against Amazon," Financial Times, March 11, 2021 (subscription required).
34. "Progressive, Pigouvian taxes can protect competition and democracy," Paul Romer, November 30, 2020.
35. "Assessing the value of TfL's open data and digital partnerships," Deloitte, July 2017 (pdf, p.4).
36. "Data Economy Lab: What is Data Stewardship? An explainer," Aapti Institute, February 17, 2021 (video).
37. Lau Jia Jun et al., "The Basics of Private and Public Data Trusts," NUS Law Working Paper, September 23, 2019.
38. Sylvie Delacroix and Neil D Lawrence, "Bottom-up data trusts: disturbing the 'one size fits all' approach to data governance," International Data Privacy Law, November 2019.
39. "Data Trusts: Lessons from three pilots," Open Data Institute, 2019.
40. "Canada's Digital Charter in Action: A Plan by Canadians, for Canadians," Innovation, Science and Economic Development Canada, 2019 (pdf, p. 9).
41. "A European strategy for data," European Commission, February 19, 2020 (pdf, p. 5).
42. "Midata.coop," Nesta, 2021.
43. "Independent Group Advising on the Release of Data," NHS Digital, March 2021.
44. Luna DNA.
45. "Wildlabs Tech Hub Showcase," Wildlabs, May 17, 2019.
46. "Greater London Authority and Royal Borough of Greenwich pilot: What happened when we applied a data trust," Open Data Institute, April 15, 2019.
47. "Why 'platform cooperatives' have yet to challenge Big Tech," Tech Monitor, February 17, 2021.
48. "Why 'platform cooperatives' have yet to challenge Big Tech," Tech Monitor, February 17, 2021.

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