

Future Now

50th
Anniversary



**You can't be a
good futurist**

**without being
a good historian**

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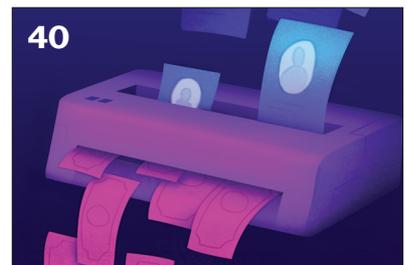
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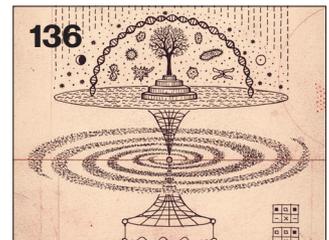
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Future Now

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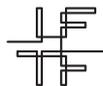
Institute for the Future

Institute for the Future (IFF) is celebrating its 50th anniversary as the world's leading non-profit strategic futures organization. The core of our work is identifying emerging discontinuities that will transform global society and the global marketplace. We provide organizations with insights into business strategy, design process, innovation, and social dilemmas. Our research spans a broad territory of deeply transformative trends, from health and health care to technology, the workplace, and human identity. IFF is based in Palo Alto, California.

The Future 50

IFF's Future 50 partnership is a circle of future smart organizations that think strategically about near-term choices to reshape the long-term future. The Future 50 draws on a half century of futures research from our labs focusing on society and technology, the economy and the environment, food, and health. Its goal is to create the perspectives and expert viewpoints, the signals and the data, to make sense out of disruptive forces in the present. Grounded in a framework of Foresight-Insight-Action, the Future 50 partnership invests in critical research, boundary-stretching conversations, and strategic experiments that will shape the business, social, and civil landscapes of tomorrow.

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Welcome to 1968 Welcome to 1978 Welcome to 1988 Welcome to 1998 Welcome to 2008 Welcome to 2018 Welcome to 2028

“You can’t be a good futurist without being a good historian,” our executive director Marina Gorbis writes in a recent essay called *Time’s Up: Silicon Valley’s Urgent Reckoning*. “You can’t imagine plausible long-term possibilities without understanding how we got to the present and, the larger patterns that have shaped the past and are likely to shape the future.” In the essay, Marina reintroduces a term coined by the author Thomas Pynchon in his 1973 novel, *Gravity’s Rainbow*, which he called *temporal bandwidth*. “The more you dwell in the past and future, the thicker your bandwidth, the more solid your persona,” wrote Pynchon. “But the narrower your sense of Now, the more tenuous you are.” Temporal bandwidth, writes Marina, is “an awareness of our experience as extending into the past and the future.”

Temporal bandwidth is particularly resonant with us here at Institute for the Future as we enter our 50th anniversary. It’s a year in which we are reflecting on our five decades of futures thinking to guide us in imagining the next 50 years for our organization. This issue of *Future*

Now celebrates this half-century anniversary by inviting you to stretch your temporal bandwidth far beyond the immediate present.

The first section is the IFTF Guide To the Future, an A-to-Z anthology of useful facts, tools, insights, tips, frameworks, definitions, and quotes curated from our five-decade history. We surveyed current and past IFTF researchers and Distinguished Fellows to select forecasts that offer our current perspectives on topics like blockchain, drones, health and food, forecasts from as many as 50 years in the past that offer lessons for forecasting, as well as the most useful terms and tools we’ve developed for thinking about the future. In this section, you’ll see that our approach toward thinking about the future is connected to principles and methods our founders developed in 1968 to widen one’s temporal bandwidth.

The A-to-Z is followed by a package called Remodeling Trust, which is the focus of our current research. Each year, IFTF takes an in-depth journey into an urgent future that crosses the

boundaries of markets, sectors, movements, and organizations. These urgent futures demand new ways of thinking about the cultural, political, and human issues that are reshaping the world and which will thrive or die as a result of the strategic choices we make today. For 2018, that urgent future is trust. This section is a deep dive into a future-focused collection of articles, interviews, scenarios, and other findings from our year-long research into the ways people will use emerging architectures of trust to transact with other people, organizations, systems, and machines.

As you read these sections, challenge yourself to widen your temporal bandwidth so it touches 1968 and 2068. What new perspectives develop as a result of thinking of the present as a 100-year band of nowness? (If you can extend further into the “distant present,” the better.) The quantity of information you fill into that band is not as important as the connections you make between topics through the decades.

The issue concludes with a set of articles called *Making Change With Foresight*, which highlights projects, efforts and initiatives of people using foresight to take action and make the future.

This year marks a significant milestone and a pivotal moment of transformation for our organization. We hope this anniversary issue of *Future Now* provokes and inspires you to not only think about the next 50 years, but to shape them, too.

— Your *Future Now* editorial team

What are the QR codes for?

The QR code on this page is a link to Marina’s full essay on Medium. You can read the essay simply by holding your smartphone camera up to the code, then clicking the confirmation on the pop-up notification. You’ll find more QR codes for each excerpt in the IFTF Guide To the Future. A code might be linked to a blog post, a map, a podcast, a video, an article, or even a photocopy of an IFTF report from the 1960s–1990s.



2018

What is the inspiration for this A-to-Z guide?

I’ve never stopped thinking about a remarkable book from 1992 called *A User’s Guide to the New Edge*. It was a playfully optimistic A-to-Z compendium of futuristic topics excerpted from issues of the cyberpunk zine *Mondo 2000*. Published well before the World Wide Web became a global communications medium, the book exerted a strong influence on many people who went on to create the technology we use in our daily lives.

— Mark Frauenfelder

The background is a vibrant collage of overlapping geometric shapes in various colors including light blue, pink, green, yellow, and orange. Some shapes have patterns like polka dots or are semi-transparent. The overall style is modern and celebratory.

IFTF'S GUIDE TO THE FUTURE

50
YEARS

3D PRINTING

What if you could use emerging distributed manufacturing technologies like 3D printing to re-imagine the processes by which you rebuild, restore, and recreate your city?

While the idea of using 3D printers to build and rebuild our urban landscape may sound science-fictional,



2014

massive 3D printers are already in use for rapid home construction in parts of China, able to print out 10 houses per day. More advanced forms of this technology are in development globally.

It would be fun to print medicine in my house, but I'm not going to spend a couple thousand dollars on



2012

something that would be really cool but just marginally more convenient. By contrast, the advantages of 3D printing in places with limited transportation, manufacturing and distribution networks are enormous. That's the insight behind the Coke Freestyle, an increasingly common coke machine that can mix more than 100 different flavors of soda, despite being no bigger than a traditional vending machine. In effect, Coke decided that rather than spend a lot of money running trucks full of bottles between places and wait for transportation to get better, they could instead just find a way to produce soda at much smaller scales. And that's the idea here—that **by rethinking production, a lot of various but critical barriers, such as transportation and distribution networks, become far less imposing.**

3D printers will continue to lower cost for experimentation and small-scale production.



2009

In the long run, they may lead to microniche production aimed at diverse, idiosyncratic communities previously ignored by mass producers. Microniche, in turn, may lead to peer-to-peer design where **objects can be shared online as easily as we currently share music.** The rise of open-source product design is inevitable.

AGING

What new social and cultural forms will emerge as people live longer, and how will they change urban, suburban, and rural spaces?

By 2025, older people will compose a greater proportion of our society than at any time in human history. In the next decade, age-related illnesses and labor dynamics will strain our institutions and support systems in



2014

unprecedented ways, upending assumptions about what it means to age well. The biological and cultural benchmarks for body, mind, wealth, and relationships we've taken for granted are shifting fundamentally.

BODY: People will rely on proven strategies such as diet and exercise to stay physically healthy in old age. They'll take advantage of advances that bring transparency to the process of aging.

MIND: The sheer increase in people living with dementia will expand definitions of mental health. With better understanding of the aging brain, we'll be better able to measure the impacts of our environment and experience on mental and emotional health,

AGING...



which may even reveal more mindful ways of giving care.

WEALTH: The cost of aging-related health care is on an unsustainable track. Those entering retirement in the next decade will not have the pensions of generations past, and the future of Medicare is uncertain. People will develop strategies that tap into alternative resources and social capital to generate new kinds of wealth, including intellectual, natural, spiritual, and experiential assets.

RELATIONSHIPS: Supportive relationships and inclusive communities have proven to increase holistic well-being. Peer-to-peer systems will expand to meet the population's growing needs and form new social safety nets that fill gaps left by traditional institutions. Thriving, multigenerational communities will integrate the elderly as a core asset. In-home technologies and online services will prioritize community and address social isolation.

Giving older people an opportunity to master computer skills can give a big boost to their self confidence. As people



1987

get older, and particularly when they enter retirement, it is easy for them to feel "out of it." Learning how to use a computer can help them prove to themselves that they are still capable of acquiring new skills. Several of the site coordinators mentioned that a number of the participants felt that the workshops allowed them to relate better to their grandchildren, among whom computer literacy is undoubtedly taken more or less for granted.

Aubrey de Grey, a researcher and spokesperson for longevity research at the Cambridge Interdisciplinary Research Centre on Aging coined the term "**longevity escape velocity**" to describe the ongoing pace of incremental improvements in longevity that might allow aging populations, particularly in the West, to surf the age wave and escape aging.



2007

ARTIFICIAL INTELLIGENCE

How can you ensure artificial intelligence is used responsibly?
And what does responsible use even mean?

When we make Artificial Intelligences, we're engineering them to accentuate certain kinds of thinking. Right now they're simple, with just a couple of kinds of thinking. But in some ways, they're superior to our abilities. Your calculator is smarter than you are in arithmetic. Your GPS is smarter than you are in spatial navigation. Any search engine is much smarter than you are in recall. These are very, very narrow AIs, but **the important thing is that AIs don't think like humans, and we don't need or even want them to.** The

reason we're creating self-driving cars using AI is precisely because we don't want them to think like a human, or drive like a human. An artificial intelligence is not worried about whether it left the stove on as it goes down to the street. It's not worried about whether or not it should have majored in finance. It's just driving. It's been engineered in a very specific way.



2016

ARTIFICIAL INTELLIGENCE...

The whole point of AI is that it doesn't think like us. Evolution has taken biological life only so far in making different kinds of minds. We're going to use technology to extend and fill the space of possible ways of thinking. And as you know, in a global economy, thinking different is the primary way to generate wealth.

Even though AI is probably the most important thing going on right now, if I look 25 years into the future, we'll probably still see AI as the most important invention. So what is the next big thing? Whatever it is simply hasn't been

invented. But it will likely be enabled by AI. We're still at the beginning of the beginning of the beginning. Twenty-five years from now, people will look back and say, "You didn't have the Internet. You thought you had the Internet, but you didn't really have it yet. If only I could have been alive back then, before all the things that we have now. You could just take X and add AI. That's all you had to do!"

Right now is the best time in the world to start things because it's just the beginning. That means you're not late.

ALGORITHMS

When algorithms and machines make decisions on humans' behalf, what biases are you encoding in the machines? What data are you using to teach the algorithms? What new risks are there for racism, sexism, ageism, and other forms of hard-coded discrimination in this future? What ethics are you teaching them, or failing to teach them?

The software industry claims to trace its origins to Ada, Countess of Lovelace, a confidant of Charles Babbage who, in the early 1800s, attempted to build a device incorporating the characteristics of modern computers. Babbage's device, made of gears and mechanical linkages, was never completed, but its design reflected several important principles common to modern computers. Most important of these was the notion that Babbage's machine was general in its purpose. It operated according to a set of instructions coded on a chain of cards fed into the machine. **By changing the cards, and thus the instructions, the machine could be made to do a variety of tasks that otherwise would have required several different specialized machines.** The instructions on the cards amounted to the first use of "software," and Ada, who devoted her efforts to understand the relationship between these instructions and Babbage's engine, thus earned her title as the world's first "programmer."



1986

Proponents of evolutionary algorithms (sometimes also called genetic algorithms) say they could replace traditional methods in many fields from designing exotic new types of optical fibre and USB memory sticks to more aesthetic computer-generated art. Critics argue that the technique may lead to designs that can't be properly evaluated since no human understands which trade-offs were made. Essentially, some worry that these designs might perform better, but if we can't understand them, we won't know what hidden costs or disadvantages they carry—until it's too late. NASA scientist Lohn puts it a different way: He sees EA as forcing people into one of two schools of thought. "One school of thought says you need a black box that does X, Y and Z. If I use evolution to get something that does X, Y and Z, I don't care what's in it as long as it works." And the other school? "That one says, 'I need to understand what's in there,'" Lohn says. "Those are the people we can't really help, because a lot of times, we don't know what's in there."



2007

The question isn't whether these designs work, but whether it's important for us to understand why they work.

AMARA'S LAW

What can technology do? What else will it do? How much do you need? What risks do you incur?

Amara's Law is well-known in the futures world, and comes from Roy Amara, past president of the Institute for the Future. Amara's Law states: "**We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.**" This is true of many changes over time, but tuning ourselves to the historical rhythms of change can help us grasp the relationship between moments of change and innovation and long-term consequences.



2016

ATTENTIONAL PROXIMITY

As you design tools and processes for remote collaboration, what if we re-envisioned this end state of "being there" in the physical sense, and instead started designing for attentional proximity, regardless of where we're located?

It's a familiar scenario: you're in a room with six other people, and that guy in the corner absentmindedly trolls his twitter feed, occasionally nodding and interjecting an "mmhm" to indicate he is following along. You wonder...how is it possible he doesn't realize how obvious it is that his mind is somewhere else? Moments like these remind us that it's possible to have physical proximity—sharing a close physical space—without having attentional proximity.



2014

Attentional proximity is all about paying attention to the same thing, at the same time, with all of the social cues that let others know where your focus is. It's the social experience of a reciprocal turn toward each other, and it can happen irrespective of physical distance. If we do this right, the next decade will usher us into an era of what sociologists like Shanyang Zhao call copresence; a subjective sense of shared time and place.

AUGMENTED REALITY

How can you benefit by seeing layers of information in shared environments?

VR blocks out the real world and replaces it with a virtual simulated environment. **AR allows users to continue to see the world while overlaying virtual objects and information on top of it.** Imagine walking through a factory and seeing real time performance data from every piece of machinery. Imagine a surgeon who is able to overlay a patient's 3D MRI on their body as they operate. Imagine a world overlaid with artistic and educational layers of information and objects.



2017

AUTOMATION

How can you can shape education to better train students in skills that robots can't do?

It's said that Henry Ford II once showed Walter Reuther, the leader of the United Automobile Workers, around a new automated car plant. "Walter, how are you going to get those robots to pay your union dues," said Ford. Reuther quickly replied, "**Henry, how are you going to get the robots to buy your cars?**"



2014

We are in the midst of a transformation that is changing how we're organizing our economic activities. If you look at data for the last 30 years you see that the kinds of jobs that can be automated have been automated. It started with manufacturing, but automation is increasingly moving into the white collar, knowledge-based, workforce, where the routine and repetitive tasks of clerical and administrative workers will soon be taken over by robots and electronic systems. Increased automation has many worrying how we can prepare today's children to be successful in a world of ever-proliferating robotics. **By identifying the sort of things that robots can't do—those tasks that are not routine and repetitive—we can shape education to better train students in skills like higher-level thinking, problem-solving, storytelling, and literacy in media.**



2012

Four primary forces will drive development of the U.S. robotics industry:



1985

1. Foreign competition will force U.S. industries to find new production techniques, including robotics.
2. New technical capabilities in robots will fill technical needs in industry.
3. Changes in the labor force will make automation more attractive.
4. Government incentives for investment and a strong economy will promote automation.

As cloud computing and intelligence becomes pervasive and available on-demand, machines will gain the ability to capture and make sense of data, effectively enabling them to see, hear, and quantify sensory information. They will be able to simulate outcomes to optimize planning, scheduling, and strategic decision-making. Products that were once considered finished upon shipping will be constantly upgraded and enhanced with software. **And as the billions of machines that surround us become increasingly autonomous, we will be challenged to embed and encode our most complex ethical principles into the things that surround us.** The ubiquity, connectivity, and intelligence of these machines will enable automation at an unprecedented scale.



2015

AUTOMATION...

What if you could buy insurance that pays out if your line of work gets taken over by machines? We coined the term “reskilling window” to refer to the period between when a person’s job becomes susceptible to automation and when that person actually loses their job. **The idea behind automation insurance would be to help people identify that window, and provide them with a financial cushion as they navigate a path toward a new career.** By offering this service as an insurance product on the free market, insurance companies would be incentivized to do their own research about work and automation.



2017

Artificial neural networks are statistical computing models inspired by biological networks, such as ecological systems and the brain. They’re used to understand relationships in data and provide a framework for computers to learn and automate decision-making. Key to computer vision and voice recognition systems, **artificial neural networks allow algorithms to create models of the world** through data and become more “intelligent.”



2015

BIOHACKING

How will biodesign be used as an ingredient for innovation in the next decade?

Taken together, biodesign and synthetic biology—the integration of living organisms as building blocks into larger systems, and the ability to make those building blocks with specific properties—create a platform for innovating rapidly, iteratively, and with an ecological perspective. Over the next decade, **experimental biodesign will expand our potential to create new flavors and food experiences** with systems-level impacts.



2017

In the more developed countries, the leading causes of disease are now noninfectious and chronic illnesses such as cancer, cardiovascular problems, and diabetes. **The next major advances in pharmaceuticals, drugs that will treat and even prevent these chronic illnesses, are likely to come from the biotechnology revolution.**



1986

BLOCKCHAIN

What are the benefits and risks of transacting on a permanent database that no one can erase?

When you vote, do you wonder whether your ballot is actually counted? If you meet someone online, how do you know that they're who they say they are? When you buy coffee that's labeled "fair trade" what makes you so certain of its origin? To be sure, really sure, about any of those questions, you need a system where records can be stored, facts can be verified by anyone, and security is guaranteed. That way no one could cheat the system by editing records, because everyone using the system would be watching. Systems like this are on the horizon and the software that powers them is called a blockchain.

Blockchains store information across the network of personal computers, making them not just decentralized but distributed. This means no central company or person owns the system, yet everyone can use it and help run it. This is important because it means it's difficult for any one person to take down the network or corrupt it.

The people who run the system use their computer to hold bundles of records submitted by others, known as "blocks," in a chronological chain. The blockchain uses a form of math called cryptography to ensure that records can't be counterfeited or changed by anyone else.

You've probably heard of the blockchain's first killer app: a form of digital cash called Bitcoin that you can send to anyone, even a complete stranger. Bitcoin is different from credit cards, PayPal, or other ways to send money because there isn't a bank or financial middlemen involved.

Instead, people from all over the world help move the digital money by validating others' Bitcoin transactions with their personal computers, earning a small fee in the process. Bitcoin uses the blockchain by tracking records of ownership over the digital cash, so only one person can be the owner at a time and the cash can't be spent twice, like counterfeit money in the physical world can.



2016

But bitcoin is just the beginning for blockchains. In the future, blockchains that manage and verify online data could enable us to launch companies that are entirely run by algorithms, make self-driving cars safer, help us protect our online identities, and even track the billions of devices on the Internet of Things.

With blockchain, it's possible (though often socially difficult) to create distributed systems for an impressive array of things—transferring money, enforcing contracts, tracking property titles, voting, etc. However, regulators and central coordinators often serve very important functions that don't get done in blockchain environments. For instance, central banks go to enormous lengths to ensure the value of their currencies stay stable—a process that takes a lot of coordination and analysis. Courts and regulators serve the purpose of mediating disputes, and providing punishment when parties renege on their commitments. When these centralized systems work well, and at a fair price, there is little reason not to use them. **Blockchain provides the most benefit when central intermediaries are unreliable or don't exist at all.** Blockchain tools broker trust in "VUCA" environments—volatile, uncertain, complex, and ambiguous. The clearest use case for blockchain arises in high delta markets, sometimes called "frontier markets"—global areas of high volatility and, often, growth, including much of Sub-Saharan West Africa, Indonesia, and Tier 2 and 3 cities in India or China. These markets are constantly changing economically, politically, socially, and technologically, and the most impressive distributed computing innovations in the next decade will emerge there.



2016

BLOCKCHAIN...

In the heady aspirations of blockchain-biased social entrepreneurs, what could be a better blockchain application for the good of the planet than fixing the global climate problem? Last year, energy analyst Edward T. Dodge pitched the idea of using the blockchain for carbon pricing. In short: **Every time you emit carbon, you pay for it with a kind of carbon coin. Every time you sequester carbon, you get paid in carbon coins. When all carbon coins have been redeemed, the world is running at net zero carbon.**



2016

In the case of carbon emissions, the solution to trustworthy data may be a consensus of oracles—third-party evaluators of emission and sequestration claims—using multiple data sources and approaches to measuring carbon. These sources might include self-reporting, audits, government analyses, and even sensor-based direct measurements as the Internet of Things comes online. They could even include self-reporting by products that have a positive or negative carbon footprint over their lifetimes. Such a network of oracles would still need a way to resolve differences and disputes about emissions reporting, of course.

The question is whether these oracles can be automated to provide qualified consensus data to a carbon coin blockchain at the right moment—that is, could they reduce the friction in the measurement system enough to make it the foundation for a viable exchange? This is perhaps an example of where the blockchain will meet artificial intelligence. The blockchain by itself is probably not going to be sufficient to manage a carbon trading system. But combine it with machine learning and a robust IoT linked to a network of oracles and it may well be not only feasible but essential to the future of the planet.

CITIES

How can you use emerging distributed manufacturing technologies to re-imagine the processes by which we rebuild, restore, and recreate our cities?

Cities have been the fundamental technology of civilization for nearly 12,000 years. The economic and cultural transformation now underway promises to radically reshape how we make and remake our cities. Over the next decades our cities will unlock as-yet-unimagined possibilities of urban life. They will draw in nearly a billion new dwellers and spur the fastest reinvention of our built environment in human history. In the process, **cities will capture the creativity and inventiveness of a new breed of citizens—the makers—opening up participation, resources, imagination, spaces, and economic opportunity.** These makers, in turn, will quite literally fabricate a new kind of city: the open city.



2014

COMPUTATIONAL PROPAGANDA

How can you design technology for democracy?

States in the modern political-economy are straining to meet the challenges of the globally connected 21st century citizenry. From low voter turnout and highly polarized public debate to existential threats to the free press and the specter of computational propaganda, **our political**

institutions have become faint proxies for the truly participatory democracies that inspired them. These failings not only cause suffering for citizens today, but will ripple through time, impacting future generations and the very health of our planet.



2016

COMPUTATIONAL PROPAGANDA...

In 2012 IFTF ran a contest to see how bots could influence people on Twitter. The winning bot was a “business school graduate” with a “strong interest in post-modern art theory.” It got 14 followers and 15 retweets or replies from humans. To us, this confirmed that **bots can generate followers and conversations. In other words, they can influence social media users.** The proliferation of computational propaganda bots will accelerate efforts to enlist bots to influence public opinion on everything from election and voting choices to brand identity and advertising.



2017

The more common ways of detecting bots—looking for really low follower numbers but really high followed numbers, or looking for no Twitter picture, and things like that—are increasingly becoming obsolete as ways to spot a bot, because **people who build bots are onto the most basic ways of detecting a bot.**



2017

It’s important to remember that **bots, as tools, can be crucially useful for building upon social media for artists, activists and publics.** #botsfordemocracy



2018

CROSS-IMPACT ANALYSIS

How can you evaluate changes in likelihood of occurrence among an entire set of possible future events and trends in light of limited changes in probability for some of the items in that set?

Cross-impact analysis is a methodology developed by Theodore Gordon and [IFTF co-founder] Olaf Helmer in 1966 to **help determine how relationships between events would impact resulting events and reduce uncertainty in the future.** The Central Intelligence Agency (CIA) became interested in the methodology in the late 1960s and early 1970s as an analytic technique for predicting how different factors and variables would impact future decisions.



2018

The cross-impact analysis tries to **identify the few most important chains of occurrences from among the many possible chains.** This is done by evaluating the effect of changes in the likelihood of some events on the longer-term likelihoods of occurrence of other events. Perhaps two of the most useful aspects of the cross-impact analysis are (1) that the events which may be included in the set under analysis are not constrained to any one discipline or type (it is possible to use this method to assess the effect of changes in technology on technology, society on society, technology on society, and so on), and (2) that the results which may appear counterintuitive at first are always retractable from the data used as the inputs for the analysis.



1971

DELPHI METHOD

How can you achieve clarity on a future-related issue even in the absence of a group consensus?

In the late 1950s Olaf Helmer, who co-founded Institute for the Future in 1968, developed a forecasting technique while he was at the Rand Corporation. **The Delphi Method, as he called it, replaced isolated futurists making “haphazard intuitive gambles” with panels of diverse experts** engaged in “operational games,” acting out the “roles of decision- and policy-making entities.”



2017

By being **exposed within a simulated environment to a conflict situation involving an intelligent opposition**, the “player,” no matter how narrow his specialty, is compelled to consider many aspects of the scene that might not normally influence his opinions to the same extent as they do when he works in isolation.



1967

The Delphi Method also employed a unique method of arriving at a consensus. **Instead of holding a round table discussion to hammer out a group position, which is often flawed by compromise, strong personalities, and deference to senior people at the table, the Delphi Method used a series of questionnaires that the experts filled out anonymously.** The results of each questionnaire were summarized and fed back to the experts, who were invited to reconsider their previous answers. The process was repeated four times. Opinions would usually converge. Occasionally they would bifurcate into two distinct opinions. In those cases, Helmer wrote, “the Delphi technique would have served the purpose of crystallizing the reasoning process that might lead to one or several positions on an issue and thus help to clarify the issue even in the absence of a group consensus.”



2017

Delphi is often presented as a method of collecting data in which the data-gatherer acts as an objective collator of the opinions of others. And yet, in this, as in any questioning process, the investigator is not a passive recorder of events. He intercedes with numerous editorial prerogatives, much as a reporter does when he interviews for his newspaper. And as has been said of the reporter, “Our grossest error would be to conceive of the interviewer as an automaton—a bland presenter of questions and a faithful recorder of replies.” For in both these roles, that of the questioner and that of the recorder, **the investigator inevitably influences the quality and usefulness of the responses he receives.**



1971

DIGITAL TWINS

What if you could connect real things to virtual counterparts?

Sensors attached to things will send the sensor measurements to software models of those things. You can tune the models so they respond just like their real-life counterparts do. They become “digital twins” that operate in sync with their physical siblings. **When physical things acquire digital twins, and they become entangled with sensor data, new possibilities emerge.**



2017

ENERGY

How will the trend towards decentralized power sources present new opportunities?

Distributed energy increases the modularity of energy grids, encouraging life and commerce in uncommon places. With the rise of microgrid technologies that can power rural homes and offices as well as breakthroughs in battery technology, **electrical power is becoming cheaper, more sustainable, and easier to access** in extreme environments.



2015

FORESIGHT ENGINE

What games can you play that will help you plan for the future?

IFTF has a collaborative forecasting platform called Foresight Engine that makes it easy to set up games without a lot of investment in game design. The platform invites people to play positive or critical ideas about the future and then to build on these ideas to form chains of discussion—complete with points, awards, and achievements for winning ideas. While the focus of the platform is on Twitter-length

ideas of 140 characters or less, a Foresight Engine game does much more than harvest innovative ideas. It **builds a literacy among players about future issues addressed by the game, and it also provides a window on the crowd's level of understanding of complex futures**—laying the foundation for future literacy building.



2018

GEOGRAPHY

How can you improve our ability to understand, create, and use spatial information and maps in navigating, in describing phenomena, in problem-solving, and in artistic expression?

There is a strong need for improved world maps. **Currently 70 percent of the world's maps are considered inadequate, and the remaining 30 percent are obsolete.** Furthermore, the time lag between data collection and the publishing and distribution of new maps tends to perpetuate this problem. While it is doubtful that these needs could justify a satellite by themselves, there would be a significant benefit to mankind if data were collected by a multi-functioning satellite.



1969

ENVIRONMENT

How will you adapt to accelerating climate change?

We can anticipate three kinds of climate change over the next 20 years:



1999

Increased variability of weather conditions. This growing instability produces more destructive storms and life-threatening hot spells. It changes agricultural conditions. The result? Pockets of misery, devastation, and famine.

Increased average temperature. No one knows how fast average temperature is increasing, but 10 of the warmest years on record occurred in the last 15 years. The global climate can change rapidly—ice cores from Greenland show that temperatures increased 59 degrees in 50 years during the last ice age.

Unpredictable climate shifts. Global warming doesn't mean everybody gets balmy weather all year round. It means some places may suffer dramatic cooling while others heat up. Europe may be a primary candidate for Siberia-like weather.

GEOGRAPHY...

Imagine, however, a world in which we can move about physical places, accessing not only what is stored in our brains but also multiple layers of information that have previously been inaccessible: experiences of friends, colleagues, and complete strangers in the same space; information about who lives and works in the place, their demographic characteristics, and perhaps their political affiliations; crime statistics for the area; the history of community events, from celebrations to calamities; information about businesses in the area and their products; changes that have reshaped the natural environment over time, and much more. This is precisely the physical landscape we will likely inhabit in ten years. Wireless location-aware devices, new geospatial software, global location services, and online geodata repositories are all eroding the limitations to human perception, making accessible a rich spectrum of digital information in real time and place. **The physical landscape we move in will become “deep” with vast amounts of digital information—in text, images, and other sensory forms.**



2004

GIG ECONOMY

How will you build platforms that promote positive outcomes for people's livelihoods?

The freelance economy is not a phenomenon caused by smartphone technology. It's a business model created to cope with volatile and uncertain employment environments. **That platform-based work is now outcompeting centralized models in Europe. The United States is a bellwether for these markets that are becoming more uncertain and complex.** They're a symptom of changing cultural norms, not a driver of them. We know this because the same business models, without the aid of technology, have been used in volatile, uncertain environments for decades.



2016

The platform economy can have something for everyone. People needing goods or services get what they want, people who have the time and skills to provide the goods and services get paid, and people who built and invested in the platforms that connect customers with providers get a cut of the action. Win-win-win, right?

Well, sometimes. But if you take a higher altitude look at the growing landscape of algorithmic matchmaking services, you'll see some troubling aspects. For example, traditional workers can usually converse with human bosses, but on a platform, workers are told what to do by algorithmic “managers” who consider humans to simply be part of a pool of inputs to be allocated

in response to changes in network conditions. To make things worse, workers in the gig economy are isolated from one another, making it extremely difficult for them to develop a collective voice to negotiate with platform owners and designers about issues that affect their livelihood.



2016

Without taking action, this lopsided relationship between platform workers and platform owners could get worse, becoming like a high tech version of the day laborers in Upton Sinclair's “The Jungle,” standing at the gates of the Chicago slaughterhouses in hopes of being selected for a shift of low-paid labor.

GIG ECONOMY...

Overall, the platform economy provides unique opportunities to work and learn at the same time, though the resources for learning are unevenly distributed across this emerging landscape and tend to benefit those who are highly motivated and proactive. **Platforms that facilitate learning, advancement, and mastery of skills could tap a strong motivation for workers' participation in the platform economy.** You could

seize opportunities to design learning opportunities and resources, such as documentation tools and self-diagnostics, into the platform. Such tools should not be required for using the platform, as some may find them distracting, but should be easily available and accessible to those who need and want them.



2016

HIGH-DELTA MARKETS

How can your organization make use of the business systems and processes developed in global areas of high volatility?

Frontier markets in global areas of high volatility are constantly shifting and changing economically, politically, socially and technologically. Small-scale entrepreneurship (kiranans, bodegas, kiosks, etc.) drive commerce and large companies rely on these entrepreneurs to distribute their product. These properties of small-scale entrepreneurship and distributed, informal work increasingly characterizes America and Western Europe. Look to Uber, Lyft, UpWork, AirBnB as proof. **Business models in High Delta Markets are resilient, and built to benefit from volatility and diversity.** Before digital self-employment platforms existed, High Delta Market businesses harnessed the trust of social connections, rather than technology, to achieve similar ends. Over the next decade, High Delta Markets will generate new disruptive business models, as well as new technologies to support them, and Silicon Valley (and other global innovation hubs) will continue to pioneer new platforms and technologies. To understand the bigger picture of disruptive change on a global scale, we must study both these landscapes, to understand how they will benefit each other, and disrupt one another.



2016

IDENTITY

How might you serve people differently if you could only identify them from their actions or segmented profiles, and not their underlying biological identity?

When you go to a new Web site that collects personal information about you, a lot of it gets captured without your permission—through cookies, correlation, and things of that nature. In the future, personal identities will no longer be shared as a whole with services and institutions. Rather, we'll work with fragmented personas and their associated interactions managed on cryptographically-secured

blockchains. The Internet of Things is rapidly onboarding physical objects, while smart contracts are turning code into autonomous software objects on the blockchain. The protocols for assigning blockchain addresses to these non-human objects are taking shape, and these addresses will be the seeds of complex evolving identities. As they evolve, the distinctions between humans, physical objects, and smart contracts on the blockchain will blur. **Once objects acquire identities, they will also acquire economic and even citizenship rights.** They will earn reputations and responsibilities, including voting.



2017

INTERNATIONAL INTERACTIONS

How will you plan for a future of ever increasing global connectedness?

Clearer than almost any other change in the environment of the corporation is the extent to which societal interactions have become international and global. Communication, transportation, production, and distribution systems are bringing nations closer and closer together. Obsolescence of traditional political, economic, and ideological boundaries is occurring because of population growth, decreasing costs of transportation and communication, and emergence of new patterns of economic interaction.



1972

The world has thus become more dependent on the resources of the entire planet than ever before. As a result of this increasing interdependence, there is a growing interlocking of economies, technological development, and social progress.

KITCHENS

The Japanese word for kitchen is *daidokoro*, or literally, “machine place.” In the age of an Internet of actions, kitchens will change more profoundly than any other room in the home. How can you learn from the way kitchens evolve to plan for an increasingly automated world?

As we build the Internet of Actions, and by extension kitchens of actions, we’ll understand the value of these intelligent systems through the kinds of actions they perform, decisions they make and negotiate, and the broad sets of human goals and values they help us pursue. Even as these technologies empower us, they will create new questions about how to interact, negotiate, and navigate new possibilities with each other. **The challenge is for us to decide how much we automate or engage with our food**, what values we consider and design for, and the roles these technologies will play in our kitchens and in our lives.



2017

LEADERSHIP

Leaders who make the future will make sense of the VUCA world and transform Volatility into Vision, Uncertainty into Understanding, Complexity into Clarity, and Ambiguity into Agility. What skills will allow future leaders to thrive?

Most leaders are at their best when they appear in person. When they are not present physically, there is often a big gap.



2017

As we move towards decentralized and distributed organizations, **leaders will need to have a presence at all times, anyplace, anytime.** Sometimes, they will need to feel present everywhere, every time—without feeling intrusive. Leaders will need to make very smart decisions about when to travel and when to use which virtual medium in what way with whom.

Five leadership literacies: (1) forecast likely futures so you can “look back” prepare now for the changes to come, (2) use low-risk gaming spaces to work through concerns about the future, (3) lead shape-shifting organizations where you can’t just tell people what to do, (4) **be a dynamic presence even when you’re not there in person**, and (5) keep your personal energy high and transmit that energy throughout your organization.



2017

LEARNING

What is the relationship between online learning platforms and finding a job?

The driving forces behind distance education include: **increasing demand by students, business, and industry to have education delivered at times and places of their convenience**; advances in educational technology that are making it easier and often cheaper to delivery such education cost-effectively and flexibly; the groundswell of success stories of this mode of delivering education.



1992

LONGEVITY

How would it change your behavior if you know you could live for centuries?

In an age of accelerated technological change, it's easy to forget that demographic changes, particularly those related to longevity, are slow. However, they are relentless and can have a tremendous impact over the long term. **A population that regularly lives to be 120 in robust, active bodies must confront some fundamental questions about how societies are structured.** Economic issues of retirement, financial planning, and social security may be the most obvious, but basic questions about human relationships may be more profound.



2009

LONG-RANGE WEATHER FORECASTING

How far in the future can you predict the weather? What parts of your organization are like the weather?

Satellite information has greatly accelerated the entire process of weather forecasting, so much so that our present scientific understanding of atmospheric phenomena and data-handling capabilities in many cases limits the use of the data capable of being collected. Research in this discipline is under way to improve predictive capabilities and in the future, accurate long-range (seven day) weather forecasting will become a reality. **The financial value of improved long-range weather predictions to farmers, fuel producers, managers of public utilities, builders, and water managers is estimated to exceed \$2.5 billion annually.** Beyond long-range weather forecasts, hurricane and storm suppression plus limited precipitation control are possibilities that can be expected from space meteorology. Exploitation of these developments will require many new large-scale software organizations engaged in data reduction, evaluation, and dissemination.



1969

Media references to “60 is the new 40” are more than marketing slogans; for a growing number of people, social and economic opportunities and expectations in these later years are strikingly similar to those afforded to younger people in past decades. **As lifespans continue to lengthen, the traditional (and government-sanctioned) model of retirement at 65 will make less sense for people expecting to live another 30 or 40 years.** Older people may have decreased physical abilities, but mental acuity can remain sharp well past the conventional retirement age, while social skills tend to continue improving as one grows older. Moreover, these two categories—creative thinking and social interaction—are at the heart of the modern economy.



2007

MACHINE ETHICS

Is AI the ethical solution to major world problems like poverty, scarcity and unevenly distributed resources, and would it be unethical to not use these systems to help optimize and streamline our processes?

As AI systems improve, we become more willing to give up control of decision-making, relying instead on machine-learned automated decision-making. However, this can be a very slippery slope as these AIs are far from perfect and still contain many flaws—including biased and incomplete training sets influencing their decisions. Perhaps more importantly, we need to make sure the systems we're creating support inclusion and objectivity in their decision-making.

“If the training sets don't confront the machines with the situations it is likely to encounter, then the decisions it makes will no longer match reality [...] we have enormous responsibility for trying to build

these artificial intelligences, these machine learning tools, especially if we can't know for sure whether the training we're giving them is adequate.”
—Vint Cerf



2017

There is no question that computers can help speed up processes and minimize expenses, but as we're building these systems the bigger questions around ethics and our responsibilities as humans becomes increasingly important. Before distributing our decision-making across automated systems we should ask if this is power that we're truly willing to give up and if so, **who in the end is responsible for decisions made by an AI?**

MAGNA CORTICA

What are our basic rights for enhancing cognitive function?

We're likely to see the continued emergence of cognitive enhancement technologies intended for augmentation, including technologies that operate at the genetic level, digital artifacts mixing mind and machine, engineered microbes, and even the development of brain enhancements that could push us well beyond what's thought to be the limits of “human normal.”

The legal and political aspects cannot be ignored. We would need extensive discussion of how these cognitive enhancement technologies will be integrated into legal frameworks, especially with the creation of minds that don't fall neatly into human categories. Let's start with five candidates for inclusion as basic Magna Cortica rights, as a way of nailing some ideas to a door.

1. The right to self-knowledge. As the ability to measure, analyze, even read the ongoing

processes in our brains continues to expand, the right to know what's going on inside our own heads should not be abridged. (Of course, there's the inescapably related question: Who else would have the right to that knowledge?)

2. The right to self-modification. This wouldn't just apply to cognition augmentation, of course. The same argument would apply to less practical, more entertainment-oriented alterations.

3. The right to refuse modification. To just say no, as it were. But while this may seem a logical assertion to us now, as these technologies become more powerful, prevalent, and important, refusing cognitive augmentation may come to be considered as controversial and even irresponsible as the refusal to vaccinate is today.



2014

MAGNA CORTICA...

4. A right to modify or to refuse to modify your children. We already grapple with this question every time a doctor prescribes ADHD drugs, when both saying yes and saying no can lead to accusations of abuse. And if the idea of enhancements for children seems beyond the pale, recall the controversy surrounding Louise Brown, the first so-called “test tube baby.” The fury and fear accompanying her birth in 1978 is astounding in retrospect; even the co-discoverer of the structure of DNA, James Watson, thought her arrival meant “all Hell will break loose, politically and morally, all over the world.” But today, many of you reading this either know someone who has used in-vitro fertilization, or you have used it yourself or may even be a product of it.

5. The potential right to know who has been modified. This suggested right seems to elicit an immediate reaction of visions of torches

and pitchforks, but we can easily flip that script around. Would you want to know if your taxi driver was on brain boosters? Your pilot? Your child’s teacher? Your surgeon? At the root of all of this is the unanswered question of whether the identification as having an augmented mind would be seen as something to be feared...or something to be celebrated.

As long as intelligence is considered a competitive advantage in the workplace, in the labs, or in high office, there will be efforts to make these technologies happen. The value of the Magna Cortica project would be to bring these questions out into the open, to explore where we draw the line that says “no further,” to offer a core set of design principles, and ultimately to determine which pathways to follow before we reach the crossroads.

NEW HEALTH AUTHORITIES

What does “health care” mean when algorithms diagnose better than doctors?

IFTF’s Health Horizons team identified for new “sources of authority” that transform who performs health work.

1. Computational authority. When sensors get embedded into everything, we may no longer need to go to the clinic for a check up. Our environments will keep tabs on our health. This will shift authority to those who know what to look for in the data and how to use it.

2. Narrative authority. Research shows that making people feel cared for in clinical encounters increases the chances of positive outcomes. In the next decade, we’ll see people with the uniquely human skills of storytelling and listening, being empathic, accessible, and culturally intelligent become new health authorities.

3. Networked authority. Heart attacks and other “lifestyle diseases” are not communicable, but our social networks strongly influence our lifestyles—and the diseases we do or don’t get as a result of those lifestyles. People who know how to connect people to knowledge and resources will become new authorities.

4. Ambient authority. People who know how to design health into environments and creative thinkers who generate new partnerships and models to finance environmental interventions will become important new authorities in health.



2013



1990

The bottom line for much of the outcome effectiveness research and more effective technology assessment is to help medical societies and others generate standards, practice guidelines, and options for general practitioners and specialists. These will be aimed at **eliminating or reducing dramatically the use of unnecessary and inappropriate procedures** and medical technologies.

OCEANOGRAPHY

What can you learn about the world by studying its oceans?

The possible economic, social, and political uses of the oceans are staggering. While there are many similarities in the data needs of oceanography and meteorology—both involve the need for frequent observations of large sectors of the earth—oceanography encompasses a broader range of measurements than are necessary in meteorology. These include data describing the physical, chemical, biological, and geological aspects of the oceans. Present instrumentation operating from a spatial platform can provide data regarding only the upper layers of the oceans. However, many uses for such data exist, and **adequately describing the ocean's surface requires near continuous coverage of a very large geographic area.** The space implications of measuring data over large areas at high frequencies can be seen from an example involving oceanographic forecasting for potential support of the fishing industry.



1969

Other activities such as monitoring of sea ice, preparing weather forecasts, handling sea transportation, and conducting oceanographic research, also require the monitoring of sea-surface temperatures over large sections of the ocean.

Organizations are a social technology—a means for getting things done, creating economic value, and maintaining social order and cohesion. As a social species, we come together to create, invent, make, and exchange goods and services. And for thousands of years we've been inventing and re-inventing ways of doing so, using the tools available to us at the time. Around three hundred years ago, the industrial revolution ushered in dramatic changes in our...



2018

ORGANIZING

How can you apply the social technology of organizations for specific purposes? Where will it be most effective? What will the second and third order effects from its application be?

The consumer-driven organization—an organization that fully utilizes consumer data as a strategic asset—will set the criteria for success in the marketplace over the next decade. Successful consumer-driven organizations will take advantage of two significant and intersecting trends. The first trend is the growing sophistication of the new consumer and her ability to manage information as a resource in her interactions with business. **The new consumer is an active and sophisticated consumer—one who uses new technologies and new forms of interaction to take action in the marketplace.** The second trend is the continued development and adoption of information and communications technologies by businesses. New forms of gathering, integrating, and displaying information will provide new pathways to the consumer and new channels for interaction. Together, these two trends challenge traditional business supply chains and the role of the consumer in the business-consumer relationship.



2003

ORGANIZING...

organizational landscape. People increasingly started to conceive of their time and labor as a commodity they can sell for money. We also saw the emergence of formal, hierarchical, scientifically managed organizations as a dominant form of creating value and managing economic activities on a large scale.

Today, we are witnessing the emergence of new organizational forms, new ways of getting things done. These organizational forms are more fluid, porous, and distributed. They are often less stable and predictable than industrial era organizations. **Enabled by a new set of technologies, new ways of organizing are forcing us to re-think legacy management structures and approaches.**

For example, Wikipedia, which has just a few hundred employees, uses open source project development practices to coordinate the efforts of millions of unpaid, often anonymous, contributors to publish 800 new articles a day. Wikipedia is now the largest publishing organization in the world. As a result of Wikipedia's success, Encyclopaedia Britannica stopped publishing its print edition in 2012, after a run of 244 years. Wikipedia is one of many signals of networked, distributed, open organizational technologies that are rapidly overtaking and replacing the ones we've relied on for the last several centuries. Not only are the structures and flows of organizations being transformed in this new environment, their function and purpose are too.

PARTICIPATORY PANOPTICON

Can you be happy in a world in which someone could be capturing and uploading what you say or do at any time?

Camera phones and other mobile network devices have become commonplace. While the initial use of these devices may have been to trade messages and humorous or embarrassing images among friends, wireless information and sensory devices have acquired greater social—and political—importance over the last couple years. They are the early manifestation of the **participatory panopticon, a world in which we record our lives as well as**

the lives of those around us.

Everything is potentially on the record, often from multiple perspectives; not only is privacy a thing of the past but potentially secrecy as well. Such a world isn't necessarily intentional; instead, it's the emergent result of individually reasonable technological and social choices, choices we're making right now.

The notion of team rooms is gradually catching on in American businesses.

The room may be equipped in various ways, but the important characteristic is that the room takes on the identity of the team. Wall charts, displays, models, data, and other artifacts that are meaningful to the team are left in the team room. When a team member comes into the room, there are instant reminders of the history and goals of the team. The team room becomes a “club house” for team members. If the team room concept is combined with the capabilities of virtual reality, you could create a situation where a team designs its own ideal collaboration workspace, without the constraints of physical reality. Team rooms can be of use to both formal and informal teams. For example, many businesses are now characterized by “skunkworks” projects— unauthorized attempts to get something done without going through formal channels. **It is easy to imagine “virtual skunkworks” that allow formation of informal (perhaps unauthorized) teams to pursue their own goals, as facilitated by the use of technology.** The existence of new forms of groupware will make it easier for such informal teams to exist and more difficult for them to be controlled— even if management decides to do so.



1990



2007

ROBOTICS

What is your competitive advantage over robots, and where is your place alongside them?

Machines will replace humans in some tasks, but they'll also amplify us, enabling us to do things we never dreamed of doing before.. We'll enter into a new kind of partnership with robots—one that will shine light on the unique comparative advantages of humans: thinking, creativity, spontaneity, adaptability, and improvisation.

Today anyone can buy a \$50 program that will crush most grandmasters. But here's a twist: in 2005, Playchess.com hosted a "freestyle" chess tournament online, in which anyone could compete in teams with other players or computers. Several groups of grandmasters working with multiple computers at the same time entered the competition. As Kasparov describes it in *The New York Review of Books*:

The surprise came at the conclusion of the event. The winner was revealed to be not a grandmaster with a state-of-the-art PC but a pair of amateur American chess players using three computers at the same time. Their skill at manipulating and "coaching" their computers to look very deeply

into positions effectively counteracted the superior chess understanding of their grandmaster opponents and the greater computational power of other participants.

Weak human + machine + better process was superior to a strong computer alone and, more remarkably, superior to a strong human + machine + inferior process.



2010

Amateurs armed with good strategies and harnessing the computational power of machines turned out to be the winning combination! That's the best metaphor for the evolving new machine-human partnership: **with smart machines as our partners, we can operate at the level of grandmasters**, not just in chess but in most domains of our lives, from science and medicine to game playing and commerce. The combination of humans partnering with machines and using superior strategies opens up new worlds for exploration.

Robots of all kinds will be assisting humans in a variety of tasks: during surgery to collaboratively achieve unparalleled precision, putting students through their paces, or sharing the grunt work of repetitive science experiments. **Robots will learn by physically mimicking human actions and behaviors, and getting better with each repetition. But through observation and real-time analysis, they will also evolve new techniques to improve performance.** So while we teach the robots to be more like us, there will be no shortage of lessons to be learned from our machine collaborators. Indeed, the most successful human-robot relationships will be those that are squarely symbiotic.



2010

The first practical industrial robots were developed in 1962 and used in GM plants for spot welding and spray painting. Since

then, robots steadily have become more sophisticated, fitted with computer controls and sensory devices, so that now **we are on the verge of seeing "intelligent" robots capable of using expert systems to make decisions and to control processes.** In 1971, the Japan Industrial Robot Association defined an industrial robot as an all-purpose machine equipped with a memory device and a terminal device (for holding objects), capable of rotation and of replacing human labor by automatic performance of movements.



1985

SOCIAL RESPONSIBILITY OF BUSINESS

How can you promote fair relationships between business and the society that created it?

Since the term “social responsibility” can be interpreted in many ways, it must be carefully defined at the outset. In the present context, “social responsibilities of business” are defined as expectations arising from the transactions between a corporation and the following principal societal claimants: shareholders (including bond holders); employees; consumers; government; public; suppliers, and competitors. **The social aspects of business responsibility stem from the two-sided relationships between business and the society which created it and which it in turn serves.**



1972

It may at first be surprising—in this day of deepening public disappointment in, and distrust



1972

of, technology—to identify the uses of technology as a key force in the future development of our society. And yet, a large measure of our success will depend critically on how well we learn to use it. For **technology provides the economic base for meeting social needs, the resources for contributing uniquely to international trade, and the leading edge for realizing the benefits of a postindustrial and posttechnological society.** Without its continuous development, all our social goals become infinitely more difficult to achieve.

SOCIALSTRUCTURING

How will you build the foundations for the new socialstructured economy and society?

The Nature of the Future: Dispatches from the Socialstructured World outlines IFTF executive director Marina Gorbis’s vision of the world we are moving into, in which **amplified individuals—people empowered with technologies and connections to each other—can do the kinds of things previously only large organizations or no organization could.** This new way of creating value is already transforming many sectors, from education to banking, governance, science, and health. The changes underway are exciting and challenging, as they require us to rethink existing institutional structures, processes, and management paradigms.



2013

At IFTF we talk about a transition from the First to the Second Curve, from the world of institutional production to the world of socialstructured creation, in which many things are accomplished by aggregating efforts of large networks of people using online platforms and tools for algorithmically coordinating activities. How do you ensure that your organization is not only prepared for the future but also shaping it? To start, you need a deep understanding of the big shifts driving the transformation on the horizon. My suggestion is to focus on what investigative journalist Drew Sullivan refers to as “tides, not waves.” This means a **focus not on what’s new and ephemeral but what is underneath,** what is deep and durable and may be an accumulation of multiple forces building up over decades.



2017

SOFTWARE

How will your relationship with software evolve as it continues to play an increasingly greater role in your life?

The size and complexity of programs are limited by the number of people who can work together on the same problem. The cost spent keeping programmers informed of what other programmers are doing rises exponentially with the size of the undertaking. It's akin to having six blind and deaf cooks making a big bowl of soup. A hundred more cooks in the kitchen does not proportionally increase the output. **As the number of cooks increases, so does the chance of encountering one who is so angered by his inability to control the game that he dumps a whole can of pepper into the pot.** Today, it is too easy for one individual to bring the whole system down. But we are learning how to live in such a world. We are learning how to compartmentalize separate parts of a program. We are learning how to standardize the interfaces at which one program terminates and another begins so that small programs become

the building blocks for larger efforts. It is difficult to know where we are in such developments and how fast we are moving.



1970

Buildings will begin and end their lives as a computer model. This model will guide the design process, simulate building operation, and be used to integrate sensing and operations during the building's working life. **Software will in many ways become the building's 'personality' and its capabilities and shortcomings will define the experience of living and working and playing as much as the physical structure itself.** Buildings will summon and manage robots, people and resources to sustain themselves materially. Agent-based models of building inhabitants will be used to help the building predict everything from lunchtime congestion on elevators to evacuation patterns during emergencies. As they age, intelligent environments will grow and develop with the human communities that inhabit them.



2006

SPACE MANUFACTURING

What can you do in space that you can't do on Earth?

Manufacturing in space is a relatively new area of interest. **In space, many terrestrial phenomena change drastically.** For example, the absence of gravity means an absence of buoyancy, and thus permits uniform mixing of materials of different densities, that is, two liquids, a gas in a liquid, a solid in a liquid, or combination thereof. Such mixtures could then be cast or shaped in the zero-gravity environment using properties of the material, such as surface tension, combined with external force fields, kinematic forces, and so on, to produce items that can be used on Earth but fabricated only in space. The absence of buoyancy also minimizes convective heat-transfer effects in liquids and gases, which may result in as yet unidentified processing opportunities in space. This consideration is of particular sig-

nificance in processes involving the liquid-gas transition. Investigations into these phenomena may well lead to identification of space experiments which can affect future space manufacturing opportunities.



1969

It has been postulated that hollow spherical ball bearings can be readily manufactured in space. These devices may result in significant savings in the weight and lifetime of aircraft engines. Other potential products include high acuity optics, ultra-pure materials (by vapor deposition), microcircuitry, and so on. It may even be possible to manufacture large high-quality diamonds in space.

SYNTHETIC BIOLOGY

What are the impacts of programmable life?

Synthetic biology—the ability to redesign the biological building blocks themselves—will expand the scope of biodesign for food. Synthetic biology uses advanced science and engineering to make living organisms by writing new genetic code. Biodesign and synthetic biology create a platform for innovating rapidly, iteratively, and with an ecological perspective. Over the next decade, experimental biodesign will expand our potential to create new flavors and food experiences with systems-level impacts. We'll see new relationships among scientists, chefs, designers, and biohackers as the tools become more accessible. And as we experiment at the level of biological building blocks, **we will reorient our paradigms toward cellular food systems—building from the organism up.** This raises an imperative to think about where this rapidly changing technology will intersect not just with our food system but also with our values.



2017

For 3.6 billion years, evolution has governed the biology of this planet. Molecular biologists can now shift bits of DNA from one organism to another, but the parts they play with are limited to what nature provides. While biomimicry gave designers inspiration to develop new materials, devices, and technologies inspired by nature, **synthetic biology promises the ability to design nature itself.** The traditional engineering principles of modularity, abstraction, and standardization still apply.



2009

As synthetic biology develops into an industry, it will embody the lessons learned from the open-source software movement. This turns biology into an engineering science; however, the value won't be in patented genomes or organisms, but rather in **innovative applications, infrastructure, and methods of production.**



2009

SYSTEMS MYTHOLOGY

How can you use color to vision a future product, service, experience, initiative, or organization?

While designing scenarios one day in 2013, IFTF's Dylan Hendricks had a realization: the emotional tone of the visuals had a bigger impact on how people respond to an idea than the actual idea. For example, the way that you visually depict how drone delivery looks in the future has a bigger effect on how people react to it than the mechanics of how drone delivery might work. To catalog the “feeling of the future” in different scenarios, Dylan surveyed images from science fiction and discovered four “color archetypes” of future visions: blue visions are slick, clean and orderly, (think shiny sleek buildings with rounded corners, and automated vehicles moving in perfect precision); red visions are

busy, chaotic and coercive (think cyberpunk dystopias, with flashing ambient ads crowding each other out to compete for your attention); green visions are warm and organic, (think post-post-disaster societies in which plant-life dominates, people wear flowing earthtone robes, and natural light is abundant); and purple visions, which are uncanny, foreign and mysterious, (think alien landscapes and genetically-altered bodies).

Working with others at IFTF, Dylan turned these observations into a tool that borrows the concept of archetypes from the discipline of mythology and combines it with



2014

SYSTEMS MYTHOLOGY...

the concepts of feedback loops and flows from Systems Thinking (the study of how changes happens in complex interconnected systems). Systems Mythology uses the palette of four colors as a new vocabulary for understanding the underlying worldview and purpose in different visions of and plans for the future:

The **blue archetype** values structure, logic, and objectivity.

The **red archetype** values individual agency, competition, and winning.

The **green archetype** values impressions, emergence, and creativity.

The **purple archetype** values mysteries, hidden truths, and the unknown.

This vocabulary is meant to be used as a tool for people who are visioning a future product, service, experience, initiative or organization. It helps the designers/planners understand the meaning they're communicating with their vision; provide insights into how it will be perceived and used, and facilitate a human-centered feedback process to help you intuit when a system is balanced correctly for your goal, translate ideas between different teams, and understand the limits of your own perspective.

"This framework was created five years ago, but I was just on a call yesterday with a leadership team where people were trying to articulate why they did or didn't like a certain aspect of a strategy and everybody immediately jumped to these colors as an easy shorthand to describe what they objected to and what they wanted to see instead," Dylan said. "Systems mythology gives people a way to talk about feelings that they have instinctively about scenarios and strategies, but have a hard time putting into words."

TOILETS

Could you drive more demand for toilets if people valued the materials they produce?

The Toilet Board has asked to **stop using the phrase "human waste" and instead call it "toilet resources"** in order to acknowledge poop as a valuable fertilizer, protein, and energy source. Changing your language can change what kind of future you get and bring more people on board with your vision. This mindset shift toward valuing toilet resources is closely linked with the idea of the circular economy.



2016

Toilet resources may find themselves at the center of a thriving sanitation economy, and **the toilet may become for distributed health what the phone was for distributed finances.** "Toilet telecoms" will create markets in rapidly growing urban areas, subsidizing the cost of smart toilets in exchange for data-licensing of the accumulated deposits. In some cases, low-income communities eager to see the benefits of health monitoring and diagnostic hubs, may find themselves committing to these licenses without fully understanding the terms of service. Those with more resources may choose to pay for premium smart toilet services (or publicly subsidized options) rather than give up control of their health data.



2017

UNIVERSAL BASIC ASSETS

How will you design your own UBA system?

In order to achieve greater economic equity, our policies should focus on **giving people more access to various types of assets.** We call this solution Universal Basic Assets.



2017

UBA identifies a fundamental set of resources every person needs access to—such as financial security, housing, health care, and education—in order to

UNIVERSAL BASIC ASSETS...

achieve economic security and prosperity. We focus on three broad classes of assets: private assets, like money, land, and housing; public assets, in the form of infrastructure and services such as education, health, and public utilities; and open assets, which are a growing category of mostly digital assets that are communally created and open to everyone, like Wikipedia and other open-source resources.

Access to public resources—public education, healthcare, nature, and transportation infrastructure—are important assets that serve as a great economic equalizer.

IFTF's Universal Basic Assets framework does not advocate collectivizing or seizing and distributing resources. Rather, it is a call to action to collaboratively **identify the key assets people will need today and in the future in order to lead sustainable livelihoods** as individuals, households, and wider communities. UBA offers actionable tools for designing policies and mechanisms for widening access to such resources.



2017

A manifesto for Universal Basic Assets includes eight categories of assets that could create a more equitable world:



2017

Spaces to live, produce, create, and commune.

Life-supporting resources of the natural environment—air, water, sunlight, and the ecosystems of animal and plant life.

Tools and structures upon which human civilizations are built, from roads and waterways to power and communication grids.

Fungible currencies that can be traded for material, digital, and social goods.

Data management tools for acquiring, sharing, interpreting, and verifying information about themselves and their environment.

Skills and knowledge to make their way in life—and to collectively manage the complex systems in which they participate. They need to understand the natural, human, computing laws that regulate these systems. In short, they need to know the “rules of the game.”

Communities to assemble and act in accordance with shared values, identities, ideologies, and life goals.

Economic, social, and legal power to influence their rights in the systems that shape their lives.

VIRTUAL REALITY

How real do you want VR to be?

The best simulations won't be judged by how realistic they are but how real they are. They will



2007

become real in the way that the Internet has become real over the last decade—not only as a platform for learning or academic science, but also as a platform for providing human social interaction and commerce; as a platform for designing the world in real time; and as a platform for inventing and reinventing our individual lives. With some simulations, we will be key players, interacting in digital space with virtual artifacts, phenomena, and each other. Some simulations will even play out at the intersection of the virtual and real worlds, enabling us to bring a sense of physicality to our digital data.

WEALTH

How will you address the growing wealth disparity crisis?

The social instability caused by vast economic disparities is likely to only grow deeper under the pressure of two forces. The first is the unrelenting progression of global warming that is already driving massive migrations of climate refugees due to wars, water and food shortages. The second force—rapid advances in automation, artificial intelligence, and machine learning—is undermining traditional sources of income for vast swaths of populations in developed and developing countries alike. A whole set of **new technological tools, from networking to machine learning to robotics, are making it possible to produce goods and services in abundance without employing large numbers of workers.** Growing numbers of people are making livelihoods in various types of flexible yet precarious employment arrangements rather than in stable, well-paying jobs that come with essential social benefits and risk protections.



2017

Zebras Unite, founded by a group of women entrepreneurs, calls for a more ethical and inclusive movement to counter existing startup and venture capital culture. **As opposed to “unicorns” (private startups valued at over \$1 billion), “zebra” is shorthand for a forward-thinking, long-game economy** that promotes distributive business models that balance profit and purpose, champion democracy, and put a premium on sharing power and resources. Companies that create a more just and responsible society will hear, help, and heal the customers and communities they serve.



2018

As a result, the system that worked relatively well under conditions of scarcity is poorly suited to fulfill the needs of many when products and knowledge can be produced in abundance by relatively few.

ZONES OF INNOVATION

How will you participate in six zones of innovation that are disrupting traditional ways of doing things?

The mission of IFTF’s research labs is help you make decisions in six critical zones of innovation around the world.

Science + Technology Anticipate the impacts of AI and robotics, virtual and augmented reality, the Internet of Actions, bio-engineering, and materials sciences.

Economy + Environment Leverage the evolution of a financialized society in a marketplace of distributed currencies, and in an environment in which the externalized costs of the past 50 years may be rapidly internalized by every organization.

Work + Learning Prepare your workforce to meet organizational needs as both automation and demographic shifts demand new contracts

between learning machines and humans, between organizations and platforms that strive to get things done.

Citizenship + Civic Systems

Redesign your organization for antifragility in an increasingly volatile civic sphere where the rules for everything from regulation to cyber-security are being rewritten in the face of growing distrust in every level of governance.

Food + Health + Well-Being Grow your strategic leadership in a world of opportunities and pitfalls as the complex systems of health care, food production, and human microbiology transform our understanding of what it means to eat well and be well.



2014

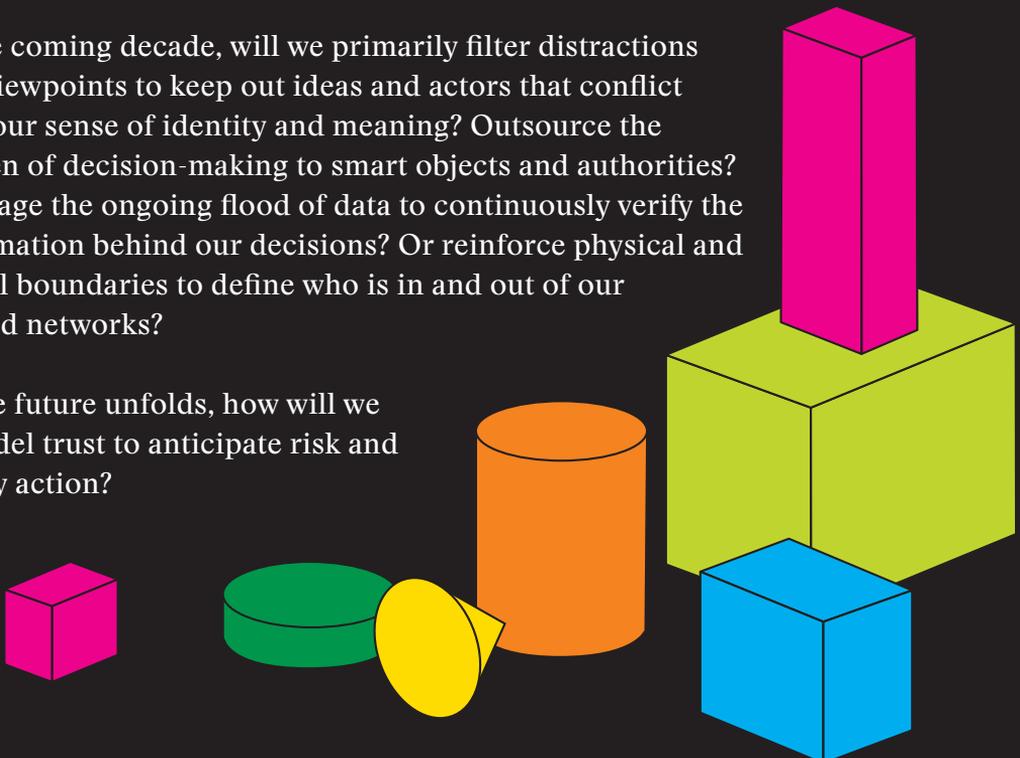
RE MODELING TRUST

Today, as our services and interactions reach across the globe through complex digital networks, the bedrock of trust is eroding. Beyond widespread questions about fake news and a post-truth society, we find a more profound set of technological, social, and institutional transformations disrupting the landscape of trust by upending the foundations of our institutions and authority structures across the business, civic, and social spheres.

To help you navigate these risks and uncertainties, we've identified seven future forces reshaping our familiar building blocks of trust. From the rise of nonhuman actors to revolutions in biological science, the emerging landscape will challenge us to remodel trust to build, maintain, and communicate with our partners, neighbors, and customers.

In the coming decade, will we primarily filter distractions and viewpoints to keep out ideas and actors that conflict with our sense of identity and meaning? Outsource the burden of decision-making to smart objects and authorities? Leverage the ongoing flood of data to continuously verify the information behind our decisions? Or reinforce physical and digital boundaries to define who is in and out of our trusted networks?

As the future unfolds, how will we remodel trust to anticipate risk and clarify action?



Shifting Authorities and Evidence

**Can we believe what we
read, see, and hear?**

The last decade was driven by the rise of big data, and the next will be remade by back-end systems transforming data into valuable insight with limited human involvement. Already, machine learning systems make decisions for us from medical diagnoses to hiring. Increasingly high-stakes outcomes are shaped by insight humans didn't generate and may not even be able to understand. These systems are creating intuitive leaps and valuable insights beyond human capacity. With the information environment increasingly polluted by intentional misinformation—threatening the quality of automated analysis—it will be harder for humans to act on incoming data.

The Personal Genetic Information Age

Direct-to-consumer testing will tell people more about their health conditions and risks than ever before, but if we can't pay for treatment what good is the information?

by Rachel Maguire

In 1978, the U.S. Food and Drug Administration approved the first over-the-counter in-home pregnancy test, called “e.p.t.” (for “early pregnancy test”). Women were now able to determine whether or not they were pregnant in the privacy of their home—safely, quickly, inexpensively, and without seeing a doctor. For the first time, women were in control of their own data when it came to pregnancy. How they wanted to respond to the data was up to them. Within a decade of its approval, taking a home pregnancy test had become the default first step for women who suspected they might be pregnant. Today, 80% of women learn they are pregnant by using an over-the-counter test, which is considered to be almost 99 percent accurate. Early ads for e.p.t. declared the product as sparking a “private little revolution” in women’s health, and indeed it did.

Now another “private revolution” is taking shape in health. On March 6, 2018, the FDA authorized the first direct-to-consumer (DTC) test that determines if an individual is at increased risk of developing breast, ovarian, or prostate cancer. On the same day, 23andMe, a personal genetics company, added breast cancer

genes BRCA1/BRCA2 to its Genetic Health Risk reports offering. In the same way that women are able to know something about themselves and their futures thanks to home pregnancy tests, DTC genetic tests reveal genetic risks for certain illnesses without involving a health provider or insurance company in the process. People gain direct access to information that may shed light on their present and future health states.

But convincing the medical establishment to relinquish control of genetic information won’t be easy. According to *The New York Times* “Personal Health” columnist Jane E. Brody in 1978, physicians in the 1970s didn’t trust that women could handle home testing. They argued that “pregnancy testing is a very emotional event” and people “have a hard time following even relatively simple instructions.” Today, detractors of DTC genetic testing express similar concerns. A recent *Popular Science* article said that although these tests “empower people to take control of their lives and mitigate risks,” they are also “handing out data to people who might not be adequately prepared to hear it, and who might not actually understand what they’re getting.”

As access to genetic information (of varied quality) seeps out of the clinical space and into our everyday lives, it’ll be important to identify the optimal role for health professionals, who, perhaps reluctantly, will need to trust their patients to understand and emotionally handle their own health data. As the current gatekeepers of diagnostic data (who are also the deciders of whether the tests should even be performed in the first place), doctors and health providers will see a shift in their position to that of interpreters and treatment advisors in this new stream of complex computational biological data.

Convincing gatekeepers to lift protective barriers around genetic health information is the first step in advancing the revolution, but after the democratization of genetic data comes another hurdle: the prohibitive cost of health care and the need for doctors and patients to work together to come up with the best plan of action. History has shown us that innovation can make diagnosing health conditions relatively inexpensive, but a declining cost curve in care and treatment has rarely followed. For instance, although competition and technological advances have improved the accuracy and speed of DTC pregnancy tests while dropping the cost by as much as 90 percent, the United States remains the most



Illustration by Nyame Brown

expensive place to be pregnant and give birth to a child, averaging close to \$30,000. The fact that it's now inexpensive to find out you're pregnant has not made being pregnant and giving birth any cheaper.

Similarly, 23andMe's Father's Day offer of \$139 includes reports on one's genetic risks for variants related to BRCA1/BRCA2, celiac disease, late-onset Alzheimer's disease, and Parkinson's disease. Yet, increasing consumer access to genetic risk information will have little impact on costs associated with treatment should someone be diagnosed with a condition.

This is especially true when it comes to cancer. The cost associated with cancer, already one of the most expensive medical conditions to treat in the United States, has been increasing at an alarming rate. Before 2000, "the average price for cancer drugs was less than \$10,000 per year," according to the *Houston Chronicle*. By 2015, we saw an increase of \$140,000 per year. In 2016, the price jumped to \$170,000. A recent study, published in the *Journal of Clinical Oncology*, revealed that the price of cancer drugs increases over time, even as generic versions become available.

As patients have access to more information about their bodies than ever before, they will have to trust health care providers to help them

come up with the most affordable treatment plan available. Conversely, care providers will need to listen, advise, and treat patients with compassion. In 2017, the *Journal of Racial and Ethnic Health Disparities* published a checklist to improve clinical care. First on the list? "Wash your hands." The second recommendation is "Humanize your patient." Treating patients as individual human beings improves outcomes and "promotes trust" between the provider and patient. Connecting with a patient's humanness, however, will require that doctors understand the costs of care. Overlooking the financial toxicity associated with a certain course of treatment will erode trust between care providers and patients.

Just like DTC pregnancy testing in 1978, DTC genetic testing today is the start of a revolution, this one around who controls our biological data. And, just as the home pregnancy test became an empowering tool for women, consumer genetic tests will become tools for individuals to better know their bodies. But these tests won't necessarily empower people. More information about your health is frightening and frustrating if you can't afford to act on it. For providers, earning trust won't just be about providing a great diagnosis and care, they'll need to come up with ways to contain costs or help patients finance that care.

Small and Local is Beautiful

As national news outlets face growing skepticism, local media remains trusted—but is still in danger of disappearing

by David E. Thigpen

Epidemiologists at Boston’s Children’s Hospital are known for using elaborate mathematical models to track diseases, but they will tell you that one of their most powerful tools is unquestionably low-tech: local newspapers.

Scouring the pages of small newspapers for reports of unusual illnesses or death, these researchers have created a kind of early warning database enabling them to get the jump on outbreaks of diseases like H1N1 and Zika.

At a time when news media in general are under attack by politicians, and suffering from a steep fall of public confidence, it may come as a surprise that local news outlets—small town newspapers and local TV stations—retain a level of public trust not just among epidemiologists but also among the public in general in ways that signal something important about the future of news.

Of all the big train-wrecks of the early 21st century—the dotcom blowout, the 2008 Wall Street crash, the auto industry’s near death experience—none touched more people than the implosion of the news media.

It started as a technology-driven takedown of a dated business model, forcing hundreds of large and small newspapers to close, and shifting

billions of dollars in advertising into the hands of Craigslist, Google, Facebook and other Internet platforms.

Two decades ago there were more than 2000 daily newspapers spread across the United States. Most served small local markets and 97 percent of them had circulations of 50,000 or less, playing a role in shaping and reflecting the communities from which they sprang. But since the year 2000, more than two hundred papers have closed and scores of others are teetering on the edge.

In their absence, credible alternatives have yet to materialize at scale. Services like Twitter provide valuable tools for capturing and disseminating local information, but often provide as much confusion and misinformation as genuinely useful reporting. And the neighborhood-level social networking platform Nextdoor has become a source of local information for many, but it has been consistently plagued by the racism and anti-homeless vitriol of its users.

While the business shakeout is still happening, the crisis has spread into the social and civic spheres, where it has emerged as an even greater threat to the future of media – as a crisis of trust. A big part of the problem is the erosion of the traditional authority commanded for decades by the news media, undermined by an endless proliferation of voices enabled by smartphones and the Internet. In one recent survey 69 percent of respondents said they have little to no confidence in news media.

But it is on the trust question that local news separates itself. According to researchers at the Media Insights Project there is a critical difference in the way consumers regard locally produced news versus nationally produced news. Readers and viewers tend to view national media with deep skepticism, often to the point of distrust. With local news, however, they “trust the news they themselves rely on,” which includes national sources sometimes, but almost always includes local news outlets that cover issues they experience or observe in their home communities.

The key seems to be that local reporters, and in some cases, local news organizations are viewed by news consumers as members of the community they work in. They’re “part of it,” observes media analyst Meg Dalton writing in the *Columbia Journalism Review*. “Readers are the same people in your rotary club, church groups,



Illustration by Hisashi Okawa

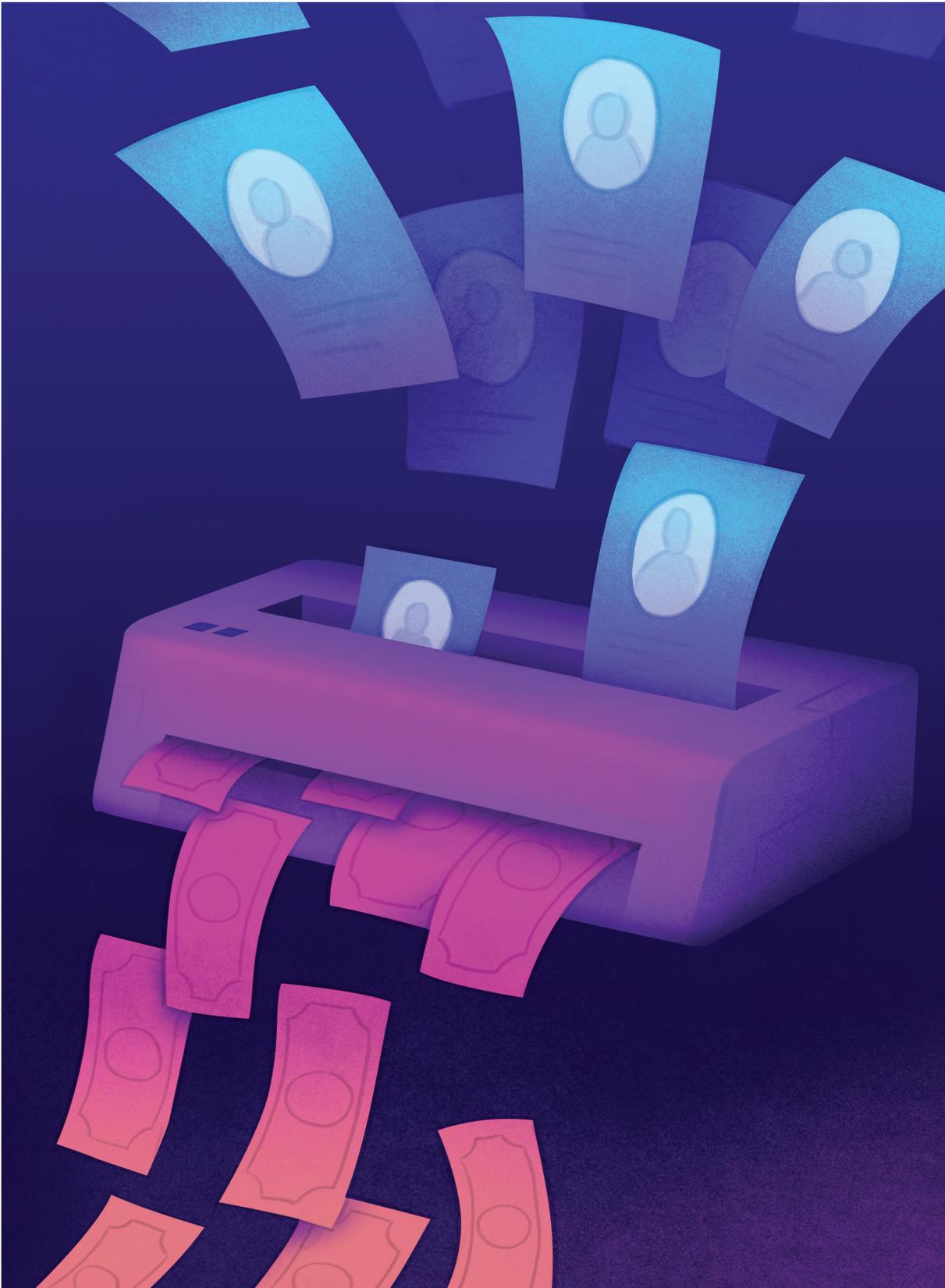
or community board.” This familiarity creates a bond that not only builds trust between reporter and reader, but also builds audience trust in journalism. Distrust in media, while growing, is not global. As local news organizations thin out, it comes as no surprise that general distrust in news would rise. Viewers recognize that partisanship, propaganda and the performance art of TV punditry now masquerade as news, and they react disdainfully.

This points the way to what may be a promising direction for news in the future. Locally based news – built on community level reporting and close relationships with its audience—in many cases retains its vitality in spite of its thinning ranks, and provides a platform for growth built on trust that most larger media entities no longer possess.

One pathway leading in this direction has come to be known as participatory civic media, a newish model of a journalism organization where journalists share space with local communities, training activists and other non-professional journalists to use modern digital tools and social media to create stories and energize social change. Importantly, unlike social media platforms and Nextdoor, they treat information with the same care and responsibility as professional journalists.

Newsrooms of this type sometimes resemble a street corner salon more than a traditional newsroom. That’s definitely the case with City Bureau, a South Side Chicago startup now in its third year and situated in an old water pumping station building, the newsroom is always open to the public, with workstations and plenty of space for events, conversations, or creating journalism. This journalism model roots itself firmly in its local community, encouraging collaboration, exchange and efforts to energize journalism as a tool of benevolent social change. Most evenings, the newsroom is lit up with activity. This intimacy with the information-gathering process and transparency give participants a visible enthusiasm and trust in local reporting as a powerful tool of positive social good. Not unlike the epidemiologists at Boston Children’s Hospital.

While City Bureau has yet to crack the business model puzzle (it is a non-profit in part supported by philanthropy), it still embodies and is building out a model of local news that reconstructs journalism and a news business model around community-proximity and an upfront brand of accountability that rests on a solid foundation of trust. For now, one answer to the crisis of legitimacy in journalism, and the shape of its future, may be found in the phrase: small and local is beautiful.



How blockchains can rebuild trust on the Internet

by Mark Frauenfelder

Sharing the Truth

A massive betrayal of trust. There's really no other way to sum up the behavior of the mega-platforms overseeing the daily activities of hundreds of millions of people around the world. Online behemoths like Google, Facebook, Twitter, Uber, and Experian have amassed fortunes building centralized proprietary databases that we depend on to do our work, stay informed, learn, communicate, and engage with organizations and institutions. Short of unplugging from the grid and living off the land, we have little choice but to use online mega-platforms to make it through the day. They know this, and they take advantage of the power they wield over us.

“Issues such as blocking of content, privacy, mass surveillance, cybercrime, hacking, and fake news are all contributing to what is now a

growing global erosion of trust amongst users,” said Kathryn Brown, the Internet Society’s President and CEO, at a 2016 United Nations conference in Mexico. “Multiple security issues are damaging user confidence and have emerged as the existential threat to the future of the Internet. We must act now to reverse this trend.”

More recently Tim Berners-Lee, the inventor of the World Wide Web, told *Vanity Fair* that the handful of mega-platforms that control our Internet experiences have “ended up producing—with no deliberate action of the people who designed the platform—a large-scale emergent phenomenon which is anti-human...We demonstrated that the web had failed instead of served humanity, as it was supposed to have done, and failed in many places.”

Mega-platforms' databases are treasure chests that we, the users, update with valuable information about ourselves every time we go online. The mega-platforms entice us to use their services by providing them for free, but we pay a heavy price in hidden costs. The platforms feed our likes, comments, searches, purchases, clicks, and other activities into proprietary algorithms, beyond anyone's oversight, designed to control what we read and watch, and make sure we are so enraged that we stay glued to our devices to participate in the latest outrage. They, in effect change the way we think about the world and the way we act in the world.

Most users don't understand or pay attention to privacy and data breaches, so these areas are neglected. The platforms didn't intentionally decide to profile, track, spy, intermediate, and manipulate us as part of their efforts to deliver free services in a competitive environment, but they've ended up creating the kind of users that science fiction author William Gibson foresaw in his 1996 novel, *Idoru*: "a vicious, lazy, profoundly ignorant, perpetually hungry organism [that] can only express its mute extremes of murderous rage and infantile desire by changing the channels on a universal remote. Or by voting in presidential elections."

They take advantage of network effects to kill competitors and maintain monopolistic power. And they do a lousy job of keeping our data secure from hackers, who steal it and sell it on the black market to the baddest of bad actors.

This massive betrayal of trust is tragic, especially when you consider that the Internet was originally envisioned as a decentralized technology infrastructure, open to permissionless innovation. Over time, it became the opposite. The mega-platforms undermined the early dreams of the Internet as a democratized communications platform and instead became perpetrators of the global trust crisis. Naive optimism was replaced with paranoid cynicism.

The end of the Internet as we knew it

How did we end up here? The answer goes back to the origins of the Internet. Its inventors never could have guessed that their creation would end up becoming the lifeblood of human activity, so they can't be blamed for focusing their efforts almost entirely on making a protocol stack that optimizes the routing of data packets from one computer to another. That was a revolutionary

idea on its own. They left out things needed for a rich communications ecosystem, such as security, indexing and searchability, multimedia and messaging, privacy controls, and identity management. Others came along and created these protocols on top of the base layer, and these people were less concerned with a free and open Internet than they were with making money. There's nothing wrong with that, but the end result was the establishment of proprietary platforms designed to capture people's attention and sell it to advertisers. The core function of the Internet itself remained decentralized, but everything else running on it is centralized and hierarchical. We've ended up with what Emin Gün Sirer of Cornell University calls "code monocultures."

The massive betrayal of trust is tragic, especially when you consider that the Internet was originally envisioned as a decentralized technology infrastructure, open to permissionless innovation. Over time, it became the opposite.

"Code monocultures are dangerous," said Sirer in a recent tweet. "Centrally controlled services pose an existential threat to our democracies and social lives." This is how we ended up in a world in which Facebook happily accepted money from advertisers to send marketing messages targeted at people interested in topics like "Jew hater," "How to burn jews," and "History of why jews ruin the world," and didn't stop until it was caught by a ProPublica investigation in the fall of 2017. (Facebook blamed the antisemitic-targeted ads sales on a pesky algorithm, promising to do better next time.)

Re-decentralizing the Internet

Is there anything we can do about the code monoculture catastrophe? Maybe. While mega-platforms centralize trust, making it easy to betray, blockchains decentralize trust by sharing it among many stakeholders, making it much harder to betray. Early blockchain efforts are already pointing to the promise of a more trustworthy Internet. These fledgling enterprises offer censorship resistance, disintermediation, permissionless innovation, greater user choice, lowered barriers to entry, and other desirable

features that the Internet's power players wiped out in their rise to power.

One of the biggest ways platforms betray our trust is by abusing the data and methods we use to identify ourselves online. Almost everything of import we do online requires us to identify ourselves. As the custodians of these identities and personal information, platforms have the power to restrict our access to services, rate our reputations, track our activities, and abuse our data in countless other ways. The blockchain solution to this problem is called “self-sovereign identity.” Instead of a private database with millions of identification records, individuals can store their encrypted records on a blockchain, which no one can take from them. By using blockchains, everyone keeps their own key to their personal data locker, and as long as they don't reveal the key, they have control over which parts of their identity to share with others. Self-sovereign identity is “not a magic system that brings us Digital Rights Management and perfect encryption,” says Brian Behlendorf, Executive Director for Hyperledger, the Linux Foundation's open source blockchain development project, “but is a tool for implementing a framework that can be General Data Protection Regulation compliant if done right, and empowering people to be at the center of their information sharing, rather than a mere subject whose data is traded around without their consent or agency.”

Another way platforms regularly violate our trust is by manipulating us with programmatic content, issuing “strikes” or canceling our accounts without a clear explanation, and doing everything in their power to lock us inside their walled gardens. That's the nature of a closed network, says Jason Chavannes, creator of memo.cash, an open source Twitter-like network that uses Bitcoin Cash's blockchain to allow people to write posts that can never be deleted (unless every Bitcoin Cash node around the world is shut down, which is unlikely).

“I like to compare things to email,” says Chavannes. “With email I can create an account on any provider and can interact with people on any other provider.” For example, if you have a Gmail account you can communicate with someone who has a Yahoo email account. “With social networks, that is not the case. Instead, everyone has to create accounts with each individual social network if they want to interact with peo-

ple using it. I think this is why social networks come and go while email has been around for 40 years.”

Blockchain-based networks make intermediaries unnecessary, putting users in control of their data. It becomes their intellectual property, and it can be used on any counter designed to work with it, which could counteract the network effect that mega-platforms use to lock people into their social media network.

Preserving the truth and lies in computational amber

Even though blockchains have the potential to re-decentralize the Internet and allow individuals to reclaim power from the mega-platforms, that doesn't mean blockchains will easily solve one of the most stubborn problems we face—the scourge of fake news. “Blockchains are not a magic truth machine,” says Behlendorf, “they still suffer from what my friend Sheila Warren at the World Economic Forum calls ‘garbage in, garbage forever.’”

Nick Szabo, a blockchain pioneer, offered another useful analogy in an essay on his blog: “Blockchains don't guarantee truth; they just preserve truth and lies from later alteration, allowing one to later securely analyze them, and thus be more confident in uncovering the lies. Typical computers are computational etch-a-sketch, while blockchains are computational amber.”

Being able to instantly verify who said what, and when, won't be a magic bullet to kill fake news, but it could be a slingshot that gives it a black eye.

“By saying ‘the sky is purple’ to a blockchain,” says Behlendorf, “you get many different witnesses to you saying that, at a certain time, in between certain other statements before and after. The sky might not actually be purple, but so often the war for truth is simply in getting a community to establish a common ‘ground truth,’ which we all agree happened. ‘Fake news’ depends upon ground truth being malleable—you can't fight spin, but if you could use blockchains to guarantee that certain data always remains publicly available—that what you see is what I see—and if it serves as the system of record for something and not just an external report of something, then we get closer to retaining some sort of solid ground in the war on the past.”



TRENT KÜHN

Illustration by Trent Kühn

How #MeToo and other social movements follow a model of biological change

by Tessa Finlev

Rapid Evolution

On October 5, 2017, *The New York Times* published a report by Jodi Kantor and Megan Twohey revealing multiple allegations of sexual harassment against Harvey Weinstein. On October 10 the *The New Yorker* published a report by Ronan Farrow outlining additional cases of sexual harassment and assault by Weinstein. Five days later, actress Alyssa Milano tweeted, “If you’ve been sexually harassed or assaulted write ‘me too’ as a reply to this tweet.”

What followed was a digital movement that spread across borders and industries within days and weeks. The #MeToo hashtag swept across

almost every nation with #balancetonporc in French, #yotambien in Spanish, #QuellaVoltaChe in Italian, and other variations in Arabic, Hebrew, and beyond. There were conversations about #MeToo in Nigeria. From Hollywood, to the restaurant industry, to corporations like Nike, University sports programs including Ohio State male wrestlers, and multilaterals like the United Nations, #MeToo appears to have no boundaries.

On May 23, 2018, the Swedish Parliament passed legislation expanding what constitutes rape with a focus on clear consent. On May 24-

the U.S. Senate passed a bill to overhaul sexual harassment policies within Congress. In late July, France passed a bill that outlaws gender-based harassment among other things. With so many changes underway, one has to stop and ask, why now?

In 1972, Niles Eldredge and Stephen Jay Gould published a groundbreaking and controversial scientific study, “Punctuated Equilibria,” suggesting that Darwin’s view of evolution—that evolution happens at a gradual, slow, and steady pace over time—was entirely incorrect. According to Eldredge and Gould, evolution is primarily a static process, punctuated by brief moments of rapid change. Rather than evolution being a process of slowly passing on dominant survival genes over time, adjusting to a new geography (after migrating somewhere new) is what spurs rapid biological change, and evolution, within a species. Gaps in the fossil record are not simply missing data points—as suggested by Darwinian evolution of gradual change over time—but evidence of evolution being a reaction to making adjustments to a new geography. A break in the fossil record marks the return of the isolated subspecies (the descendant) to the ancestral land they left. When a subspecies moves away and adjusts to their new surroundings, they create a new branch in the evolutionary tree, a new speciation.

The theory of punctuated equilibrium applies to more than just biological evolution—it has also been used to understand patterns in policy change. Similar to biological evolution, change in human society doesn’t so much happen gradually over time, but via bursts of rapid change. The current rush of policy changes related to gender-based violence, harassment, and equality indicate that we are in the middle of a rapid transition towards a new punctuated equilibrium.

An Xiao Mina, a leading theorist on how change happens in the era of social media and author of the upcoming book, *From Memes to Movements*, argues that movements like #MeToo can exist for decades before suddenly gaining mainstream traction and acceptance. Activists have been calling for more accountability for sexual harassment and assault worldwide for decades. “Me Too” was even coined in 2006 by activist Tarana Burke, who started a group under that name to help survivors (particularly women of color from low-wealth communities) of sexual violence heal. The desire for change exists,

Mina asserts, but it is only when the right social context emerges that the change, and cultural evolution, can actually take place. Human culture is pretty static, we tend to live within the bounds of generally accepted social norms, until a change in context sparks a rapid change, which shapes an evolutionary shift towards new social norms.

Today we are experiencing a multitude of shifting contexts that are reshaping our environment, forcing us to adjust as though we have immigrated to a new geography.

The media landscape. Everyone is a media channel, and the entire world is an audience. This has engendered a renewed desire to be heard and for each community, particularly those that have been marginalized or oppressed, to craft their own narratives. We are in the age of “empowerment” where everyone has a voice, and a potential audience.

Women and people of color enter the mainstream. It wasn’t too long ago that women and people of color were either socially or legally barred from working side-by-side on equal footing with white men. Yet today, according to the Bureau of Labor Statistics, 38 percent of women in heterosexual relationships in the U.S. earn more than their male partners. By the 2040s, the U.S. is estimated to be majority-minority, transitioning white American’s into a minority role for the first time in American history.

Expanded Overton window. The Overton window, also known as the window of discourse, describes the range of ideas tolerated in public. President Donald Trump has become a figure head for how much the Overton window has expanded. The 2016 viral video of then candidate Trump bragging about sexual assault, and the following lack of accountability was one such example targeted at women. Similarly, his propensity to speak publicly and divisively about immigrants and “shit hole” countries with clear distaste for people of color, signifies a clear expansion of the Overton window. As Mina states, “There was a sense that there were no consequences for Donald Trump. And a certain sector of our society felt like there should be consequences and accountability for that kind of behavior. It gave the women’s (of #MeToo) claims a different kind of traction.”

LGBTQ+ paves the way for atypical gender roles.

The legalization of gay marriage in the U.S., higher visibility of people who are transgender, and increasing numbers of children who think that gender is a spectrum, have unblocked seemingly unshakeable social norms.

The growth of the precariat class. Within the United States and Europe, the last decade or two has seen the growth of a social class first coined in the 1990s. The *precariat class* is defined by constant income and job insecurity. This group can also be defined as the working poor, and with fewer and fewer social safety nets, the precariat class are precarious, unstable, and psychologically stressed.

Humans have found ourselves in a new world defined by shifting contexts. As we adjust to our new environment, we are undergoing rapid cultural change. It's from this new place that movements like #MeToo, Black Lives Matter, and March for Our Lives are emerging. Each movement is a different piece of the same puzzle. We are in a moment of intersectional transformation. An intersectional framework sees the oppression of an individual marginalized group as part of an interlocking system of power, and we can draw dots connecting the power structures that have been oppressing women and people of color, and even profiting off gun sales. And this is the basis of a new *cultural speciation* that is emerging from the shifting contexts, a new culture based on the universal right to personal safety, dignity, and access to power.

As humans transition to a new punctuated equilibrium and the creation of a new *cultural speciation*, we face internal competition for resources including access to power and authority. Not everyone wants progress and change as many interpret the new cultural speciation as the end of their own culture, and see the need to fight in order to survive.

In the competition for power and authority, men, and particularly white men are facing a crisis. The manosphere—a loose network of blogs and forums focused on men's issues, typically with an anti-feminist framing—is ground zero for a radical and small, yet vocal community of mostly white men and boys trying to find answers. If (white) men have held, and still hold, the vast majority of positions of power, then what does a world of equal access to power and authority look like? How will the new cultural

speciation change what it means to be a man, to be a woman, to be a person of color, or to be white? If traditional gender and ethnic roles have become undone, and women and people of color have a clear future in mind that includes equal access to power, equal assumption of personal safety, and universal rights to personal dignity, what next for men, and particularly white men?

According to Michael Kehler, a University of Calgary masculinities studies professor, as quoted in *The Good Men: inside the all-male group taking on modern masculinity* a June 18, 2018 article in the *Guardian*, “until recently, there was an allowance, or even an expectation, for men to behave badly, like it was a natural way of being. It was written off as ‘boys being boys’ or ‘that’s just locker room talk’. If you didn’t talk about sports or engage in sexualizing banter, other men might question the adequacy of your masculinity.”

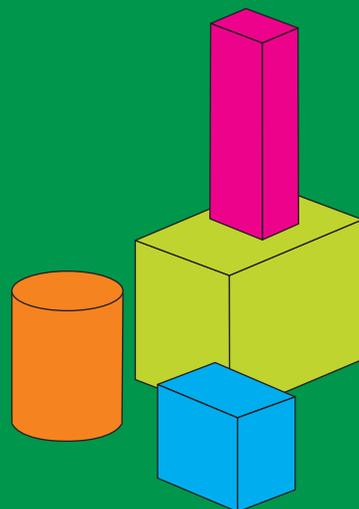
Increasingly, universities, summer camps, and even brands are creating spaces to discuss manhood and masculinity, in a pro-feminist way. Brown University has a social wellbeing program called “unlearning toxic masculinity.” Duke, Claremont Colleges, Ithaca College, and Oregon State University all have programs focused on toxic masculinity. Camp Nick, a masculinity camp for boys ages 8 - 11, tries to prevent boys from developing toxic masculinity. Brands like Axe Body Spray and Lululemon are creating space for discourse around what it means to be a man in the 21st century.

All these programs are critical as we move through to the other side of a punctuated equilibrium, and settled into our new cultural speciation. In them, we can see that #MeToo isn't simply changing what's possible for women, it's also providing an alternative future for masculinity.

Shifting Authorities and Evidence

Insights for remodeling trust:

- » The rise of new categories of information—such as genetic data—has the potential to create confusion and anger as people try to make sense of what new data sources mean. Addressing these challenges will involve creatively rethinking and building upon existing relationships, such as those between doctors, patients, and insurers.
- » Challenges to traditional authorities are not simply debates over influence but are emerging from more existential threats to underlying business models—such as those of local newspapers. Because of this, efforts to address trust gaps will need to push beyond the delivery of information and data and toward creating new business strategies to support creating and sharing high-quality information.
- » Shifts in authority are contentious—and take place much faster than we might anticipate—creating additional risks for organizations that have seemingly little to do with the delivery of information. To be prepared, organizations need to leverage approaches that involve preparing for lots of possible outcomes at once while maintaining authentic approaches to messaging and communication.



Fragmenting Identity and Ephemeral Communities

**Which identities will fragment
and what new categories will
determine who's in and out?**

We are witnessing a transformation of default identities through massive demographic shifts in birth rates, migration, and aging. Such quantitative shifts are accompanied by a reinvention of the concept of identity, as categories of race, sexual orientation, gender, and culture are becoming more fluid and mixed, empowering people to self-identify with a much wider set of mutable identities. Meanwhile, global interconnection is helping more people seek out and connect with others like themselves while amplifying group tensions and anxieties. This fragmentation will play out in all spheres of human activity and challenge the basis of legal, political, and other institutional systems built on conferring rights to hard identity categories.



Illustration by Trent Kühn

When scientific findings call our cultural institutions into question, how do we respond?

by Jake Dunagan

In Football We Trust

In January this year, Washington State quarterback Tyler Hilinski committed suicide with a gunshot to the head. When his brain was examined, neurologists found Hilinski had severe Chronic Traumatic Encephalopathy (CTE), a brain disease caused by repetitive impacts to the brain. CTE has been linked to dementia, severe behavioral and cognitive issues, and increased suicide risk. Doctors likened Hilinski's brain to a 65-year old's. He was 21.

This story is becoming all too common. Autopsies of people who play contact sports frequently turn up with CTE—and not just pro-

fessional athletes. Even people who only played as a kid or in high school have been diagnosed with the condition, meaning that there is a danger lurking in large numbers of former players' brains. Every Dave Duerson, Junior Seau, Ken Stabler, and Tyler Hilinski-story we hear gives a face to the suffering of these individuals and others in their lives—and calls into question the future of a game that is central to American identity in many people's minds.

Giving up this beloved American pastime might not be so easy. There are billions of dollars at stake and cultural traditions anchored to

the status quo. The science is clear (and damning)—including the NFL’s own research. But history tells us over and over again that scientific evidence doesn’t necessarily guarantee change, at least not immediately. Entrenched cultural norms and entities with financial interests can sow a lack of consensus about what level of scientific certainty justifies action. Such tactics have slowed responses for everything from reducing lead in our environment to regulating cigarettes.

The science is clear...But history tells us over and over again that scientific evidence doesn't necessarily guarantee change

Even Tyler Hilinski’s family is ambivalent. “Did football kill Tyler? I don’t think so,” Hilinski’s mother, Kym, said in a *Sports Illustrated* documentary. “Did he get CTE from football? Probably. Was that the only thing that attributed to his death? I don’t know.” His younger brother, Ryan, a football star heading to the University of South Carolina, said he will continue to play football. “I love this sport,” Ryan told *Sports Illustrated*. “This is not what hurt him. I’m going to do everything that Tyler wanted to do with football.”

The cognitive dissonance of playing a game that has a proven track record of causing brain damage, and one that likely led to the suicide of a son and brother, is shocking to many people. But football is so ingrained in American culture and people’s lives, it is hard to leave behind. It would mean leaving behind generations of connections, stories, and bonding memories.

Yet even if fans don’t stop watching in droves and regulators don’t sweep in to shut the game down, the future of football is uncertain. For instance, many more parents than before are not letting their kids play tackle football. This could seriously deplete the number of adults available to play professionally and the quality of the athletes playing. Youth participation in the sport is declining sharply. According to the Sports and Fitness Industry Association, the number of children ages 6-12 playing football has fallen by nearly 30 percent between the years 2008-2016.

For me, this is personal. I grew up playing football in Alabama, and I attended Auburn University—as total a football immersion as one could imagine. And I still love the game. But as

someone who studies neuroscience, and with two young boys, this is not an abstract neuropolitical issue. To see pathways forward, I offer three scenarios for the future of football in 2030, which include sports governing bodies, science and tech, and parents and fans. These take different protagonists as the catalysts for saving football and saving players’ brains.

The BrainBank: What if regulators get proactive and soften how the sport is played?

Many people saw it coming, but once O.J.’s brain was examined after his death, and found to have level 4 CTE, the NFL, NCAA, and the House Energy and Commerce Committee had to act. Lawsuits began to number in the thousands in the 2020s as every former player who committed a violent act or committed suicide was examined for CTE. People compared the NFL to the tobacco industry, covering up decades of findings that showed the truth about long-term brain injuries.

Football governing bodies from pee wee to the NFL came together to institute a comprehensive brain-impact tracking system that logged every hit on a player’s brain from the time he or she started playing tackle football. The BrainBank™ system could account for not only concussions, but the aggregate impacts over a season and over a lifetime. These metrics were tied to eligibility, and if a player accumulated too many hits, then they would have to take time away from contact—sometimes weeks, sometimes a lifetime ban.

Many critics said this was not enough, and that banning a player after too many impacts was accepting brain damage. Others were suspicious that the helmet-tracking systems were being hacked so that star players would not have to sit out critical games. But in spite of these concerns, the deep data that was being generated by the BrainBank™ system was helping individual players understand and control their brain health, and creating a comprehensive regimen of better player safety at every age.

Helmet to Helmet: What if scientific innovation circumvents CTE and accelerates the game’s aggressive nature?

Football is a brutal sport, but it is also driven by high-tech research and millions in health funding and development. The power to direct resources to combat a problem in a strategic way gave the game of football a new lease on life after increasing pressure about brain inju-

ries and player health grew in the late teens and early 2020s. Many people blamed helmets for encouraging players to use their heads, but it was a change in helmet technology, as well as bio neurological interventions, that significantly improved player brain health.

New materials, magnetic inserts, and automobile crumple technology made helmets much more absorbent of high-speed impacts. Fans grew to love the gnarly helmets at the ends of games. Players would tear these crumpled skins off their helmet cores and give them to fans after games.

A company called Solidifi™ also played a big role in saving football. Their bioengineered product helped to flush damaging tau proteins from the brain, and reduced the neuro-inflammatory response that is associated with long-term brain degeneration. Testing continues on the product, although some physicians have claimed that it was rushed through the FDA without adequate testing on younger players, but there is hope that medical science has found the breakthrough many were hoping for.

Virtually Resurrected: What if parental pushback and fan pressure transformed football by taking it off the physical field?

Suicides, homicides, ALS, Parkinson's, dementia...was it worth it just to watch a game? Was it worth it to play a game? Only a fraction of players made it to the NFL, and even then, the owner-friendly labor agreements favored players who were in the league for three or more years (a minority of players). Numbers of younger players plummeted as parents stopped allowing their kids to play. High school teams shut down the sport, both because of lawsuits and because there weren't enough players to field a team. The Ivy League banned the sport in 2026 and a few other conferences followed suit. By 2030, 42 states had outlawed contact football for players under 14.

Fans were abandoning football, which was becoming more like boxing or horse racing—something that was played, but not a major sport in the United States. But while tackle football was declining, something else was emerging: virtual football. The VFL had all the rules, strategies, and athleticism of regular football, but was played in virtual environments, and kept players' brains and bodies safer. People were shocked at

how fast fans embraced the new game, and the media and biometric technologies that could be embedded into the game allowed fans an even more intense and immersive experience. When the NFL bought the VFL, no one thought it would only be two years before tackle football was gone and virtual football was the new king. Super Bowl 69, the third virtual Super Bowl, had the most viewers of any sporting event of all time, with almost 2 billion people experiencing the game in their home mixed reality studios.

Conclusion

Would I let my sons play contact football? Never. Even though I played growing up, and even if new technology or rules interventions made it safer, I would not trust my kids' brains to the sport. The future of football is directly related to the question of trust. If sports governing bodies, legislators, equipment makers, and even players can't be trusted to make the game safer, then it will be beset by legal challenges and reduced participation and interest.

And yet, fully aware of the dangers and ethically conflicted as I am, I find myself watching football on Saturdays. Can I even trust myself to do the right thing? As fans, we must demand leaders within the game and within society to improve safety and prohibit tackle football before the age of 14. We must demand the NFL conduct honest research and put player health above the bottom line. If the improvements represented in the scenarios, or something like them, are not made, then fans must abandon watching and supporting football. If brain damage is "just part of the game," then the game should not exist. There are scenarios where a more ethical football has a future. Can we trust ourselves to make them happen?

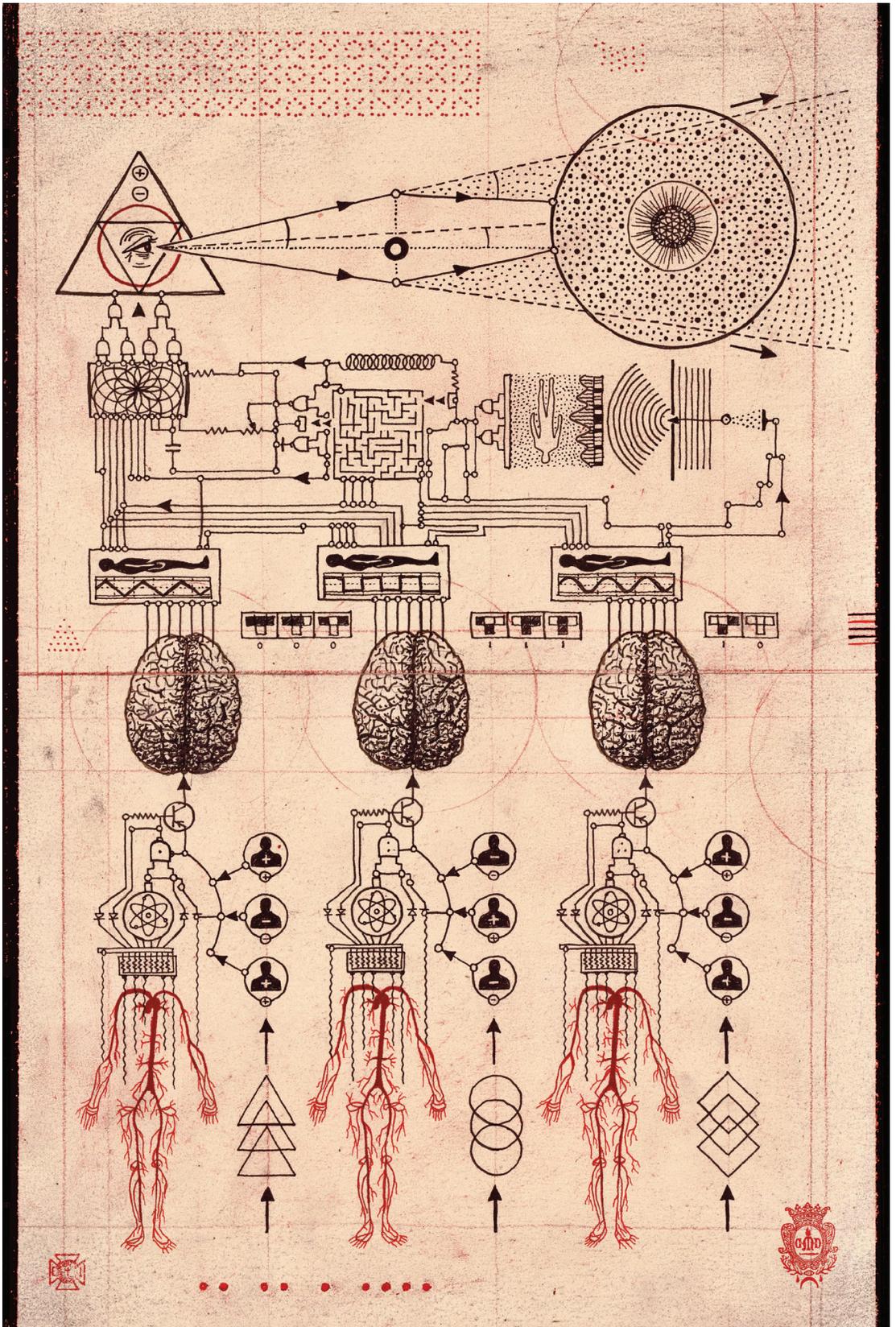


Illustration by Daniel Martin Diaz

Lessons from early explorations of VR worlds

by IFTF Emerging Media Lab and Ben Hamamoto

Getting Social in Embodied Digital Space

Liza already knew Dax for quite a while before she realized there was a basic fact about him that she did not know. They had met a few months earlier at a mutual friend's house, and since then, had developed a friendship. However, she was curious about something, and didn't know if it would be appropriate to ask. So she broached the subject casually.

"Hey Dax," she said. "It just dawned on me that I don't know if you're taller or shorter than me."

She assumed he was her height or maybe taller, because his avatar, a colorful friendly-looking

robot sitting cross-legged on a jet-propelled seat, generally floated above the ground. That day, after some mild hesitation, he'd disclosed to Liza that in real life he was 5'4", shorter than her. He'd been candid on this particular inquiry, but he wouldn't tell her his real name until five months later, after he had spent approximately 50 hours helping her to build an interactive world/area for a private client using a virtual reality platform called Anyland.

Liza, who is based in the San Francisco Bay Area, and Dax (not his real handle), who is based in London, had interacted in a virtual space

called “Anyland,” where people can meet each other, socialize, build digital objects and create entire “worlds” together. While socializing and collaborating with strangers online is an ordinary aspect of today’s reality, these interactions are starting to take place in immersive social VR platforms like Anyland with users embodying virtual avatars.

These platforms mostly use a basic VR system: headgear, two handheld controllers and matrix lasers to track movement. Once the system is set up, participants can play stationary or room-scale and either sit or physically walk around an empty space with lasers capturing movement. In general, an avatar can mimic in virtual space any head and arm motions from real life. There are buttons on the controllers that allow an avatar to do things a real body can’t do, such as teleporting. Some avatars are scripted to blink, or move their mouths whenever the headgear mic detects a voice.

The visceral, embodied nature of these experiences brings up questions on issues around personal space, anonymity, and cultural boundaries.

Liza Bender, is a contributing designer and researcher at the Emerging Media Lab (EML)—a research and **prototyping studio** within Institute for the Future—and is working with EML founder Toshi Hoo and a team of IFTF researchers on a project to explore the new behaviors and norms around social interaction in virtual reality. In particular, they are looking to identify new opportunities for building trust in VR environments. While the project is ongoing, the team’s hundreds of collective hours logged into virtual reality have imparted insights for building trust in this new, embodied medium.

VR communication between people is the next best thing to reality when it comes to promoting trust.

Over the last several years, options for communicating have proliferated. Phone, text, email, and video calls all have their unique advantages and disadvantages. But when it comes to building trust, face-to-face still prevails. VR comes in at a close second because it allows people to build trust in many of the ways we do in life.

“We don’t think about this much consciously, but part of how we bond with people is through very subtle embodied gestures,” Hoo says. He explains that, when we communicate in real

life, there are many nonverbal ways to indicate that we are listening, or that we appreciate what another person is saying. For instance, leaning in towards a speaker demonstrates attention. Being able to communicate through embodied gestures makes VR a useful medium for people looking to build trust remotely.

Hoo describes a time when he used VR to participate in a global meeting, which turned out to be more profound than meeting over the phone. “We did a project with Cisco where we set up a virtual space for their team of eight people to collaborate from across the U.S., U.K., and Italy,” Hoo says. “When we worked together in a virtual spaces, we remember not only what was said, but the embodied experience of sharing that space collectively. The way that you navigate around people’s avatars—staying out of their personal space when you first meet people and entering it as you become closer—is really important as well. These are subtle, but memorable gestures that build a sense of respect and collaboration between users. It’s amazing how just head and arm gestures can convey so much unspoken information and add to the sense of presence.

“My sense of trust and relationship with these folks is fundamentally different than if I had just talked on the phone or through Skype,” he continues. “In interactions with flat video conferencing monitors we’re often more distracted by our own video monitor, the interface itself, or the distractions of other apps peeking from behind the chat window.”

In some respects, this method of building trust can work better than in-person interaction, because the avatar obscures people’s real-life appearance and any unconscious bias one might have in reaction to it.

This kind of partial anonymity can reduce discrimination, but still retains accountability, because participants know each other’s names and identities and all work for the same company. There are reputations at stake. However, full anonymity is another story.

When VR is anonymous people get harassed. They also learn better real-life coping skills.

In VRChat—the most popular social VR platform—participants are largely anonymous. Harassment, particularly of avatars that appear female, is common. “Abuse on these platforms is often directed towards new users, who don’t

know what to expect or how to react,” Bender says. “The first time I entered VRChat, I was approached by a cute, smiling child avatar that ran up to me and repeatedly asked me to call him the ‘n-word.’ There were like 10 ten people witnessing it, and no one stepped in, even just to tell me I could flag that avatar or mute it.”

But while the downsides of anonymity are obvious and abundant, there are affordances as well. *Business Insider* interviewed VRChat users who claimed that the ability to interact with others anonymously in an embodied way has helped them to overcome social anxiety, with one person going so far as saying that the service “saved my life.” In fact, the EML team has encountered people who are strategically using the often harsh social environment as a sort of training ground.

Bender once came across a user in VRChat who was just walking around rapping. People would come up to him to interact and harass him, and he’d respond to them in battle rap form. “I approached him and told him, ‘I’m really impressed with your skill of handling these aggressive people.’ He spoke to me only in raps at first,” she recounts. “Eventually he chatted with me in a normal way. We had a meaningful talk about how this was a great environment for him to practice his craft, get heckled, and get unusual inspiration.”

VR platforms designed to achieve outcomes build trust among users.

While there are several social VR platforms in existence right now, there is one in particular where trust is comparatively high: Anyland. In this world, harassment among participants is infrequent, while collaboration, mentorship, and mutual admiration are abundant.

In January of this year, IFTF debuted its latest work and learning research to a group of leading teachers, administrators, entrepreneurs, and other key stakeholders in the learning and education space, in the form of five VR experiences. Each experience had an activity meant to communicate something about the future of learning, from a session where you teach a robot how to dance, underscoring the importance of understanding how to work with AI in the future, to a world where you can add commercial, residential and industrial buildings to your surroundings, to communicate how important simulations will be to learning in the future. In

order to build these worlds, the EML team relied on more than 100 hours of donated time from anonymous friends who met in Anyland.

So what makes Anyland a place where trust is so high that this kind of collaboration over several months is possible, while it’s hard to go more than a few minutes in other VR spaces without being accosted by hostile actors? Most of it comes down to how Anyland was designed.

One of the biggest factors may be that the platform gives people something specific to do. While VRChat is an open world, where people go to socialize without much in the way of direction, Anyland gives people tools to collaboratively create interactive objects and worlds to share with others (or to keep as a private space meant only for the collaborators). Common environments people create are cities with magical gardens to explore, recreations of people, places and scenarios from famous works of fiction, prototyping studios, escape rooms and mazes—but the possibilities are endless. Anyland’s success with its goal-driven design may be a reason that VRChat is currently experimenting with creating specific worlds for dedicated activities like bowling and karaoke.

In an interview with Hoo, Jessica Outlaw, founder of VR/AR behavioral research group, the Extended Mind, shared an experiment she did in where she brought someone who was a natural extrovert, a professional restaurant sommelier, into VR chat. The woman found interacting in social VR extremely awkward. She felt there was no framework in place for the terms, expectations, roles and norms of the social interactions so they had no context or goals...which leaves only awkward interactions. Outlaw also believes it’s key to have some sort of shared goal, task or context for the social VR interaction to be useful and more than just an opportunity for leveraging anonymity.

Fewer users in a social VR environment adds value to reputation, and this creates trust.

Another likely reason that trust is high in Anyland is that, currently, the platform has a relatively small number of users, and fewer users can make a person’s reputation matter.

“We basically build trust, in general, in two different ways. Either by direct experience or by reputation, and reputation can be word of mouth or something more formalized,” Hoo explains.

“Without formalized reputation metrics, if you get over basically a couple dozen, several dozen people in a virtual world, it’s easy for people to behave badly, then slip into the woodwork. But when you’ve got under 200 people, it’s harder to get away with bad behavior without it coming back to bite you.”

He can recall instances where he was unsure about another user, so he asked his friend, Dax, who he already trusted quite a bit, what to make of the new Anyland player. “Dax told me that even though he’s kind of a caustic personality and a little weird, he’s a good guy. So I felt like I could trust him too.”

Anyland allows users to create their own small worlds and decide who has access to them, meaning group sizes can be kept as small as two people. This is one of the key tools users have for securing trust (and this is a feature that is not exclusive to small platforms).

This allows even minor celebrities to enter and work in Anyland without much harassment risk. For instance, Pendleton Ward, creator of the cult phenomenon TV show *Adventure Time*, spends a lot of time creating on the platform. People can come into his world while he’s working, 20 at a time. If anyone starts to bother him, Ward can ban them, though this can be a long and involved process.

“One thing all of the platforms I’ve been on have failed to do, is to thoroughly train new users on what to do if they’re not liking a situation,” Bender says. “Some platforms give you the ability to activate a personal space bubble that can make it so that harasser and victim are unhearable/seeable to each other if they get too close, but it’s not easy because you have to go into a busy menu to find out how to activate it, same for all the other harassment tools, too.”

This is particularly unhelpful, she elaborates, because people tend to freeze when they are accosted, not only in real life situations but also in VR experiences. And while sophisticated users have created tools that get people out of their personal space at the touch of a button, they are only available to people with the time and skill to make them.

Crafting effective tools, though, is difficult, and comes with its own tradeoffs. Phillip Lensen, the creator of Anyland told Hoo in an interview that his team currently does not offer personal space bubbles and some other harassment tools, which are utilized on other social VR

platforms, for fear of unintended consequences. Tools for confronting harassment, he explains, could be used themselves, as weapons to harass. For instance, being able to mute people could be used for attack purposes as well as defense.

“What may be even worse as a long-term effect—instead of the community evolving to establish a common etiquette, the anti-harassment is now outsourced to setting buttons, thereby almost sanctifying the harassment,” Lensen adds.

In Anyland, it is predominately social dynamics, and not tools that function as the best deterrent. Harassment is less of an issue here, because the consequences for negatively impacting reputation can prove substantial.

“The point of Anyland is to create and explore together; that’s really difficult and boring to do on your own,” Bender says. “The way you get people to teach you, collaborate or share experiences with you, is by developing good relationships and a good reputation.”

This is how Bender, Dax, and a third anonymous collaborator, Miss 6 (also not her real handle), established the mutual trust needed to work together on a project with relatively high stakes. When they weren’t working together in real time, Bender would leave notes in the virtual space they were working on, asking for help with specific tasks. When she’d go back into the space at a later date, the tasks would be completed. But just because she could monitor progress didn’t mean their contributions were secure.

“At some point, Dax had done so much complex scripting work, I was unable to understand how he created things, which made it extremely difficult to edit his contributions. I was beholden to him and so he was more in charge of certain parts of the project than me. There was actually a lot of risk because he refused payment and didn’t want to view the project as a job. That meant that I had to constantly make sure it was fun for him, not overwork him or ask too much of him, yet I had to meet project deadlines.”

Still, she never felt too anxious about this possibility.

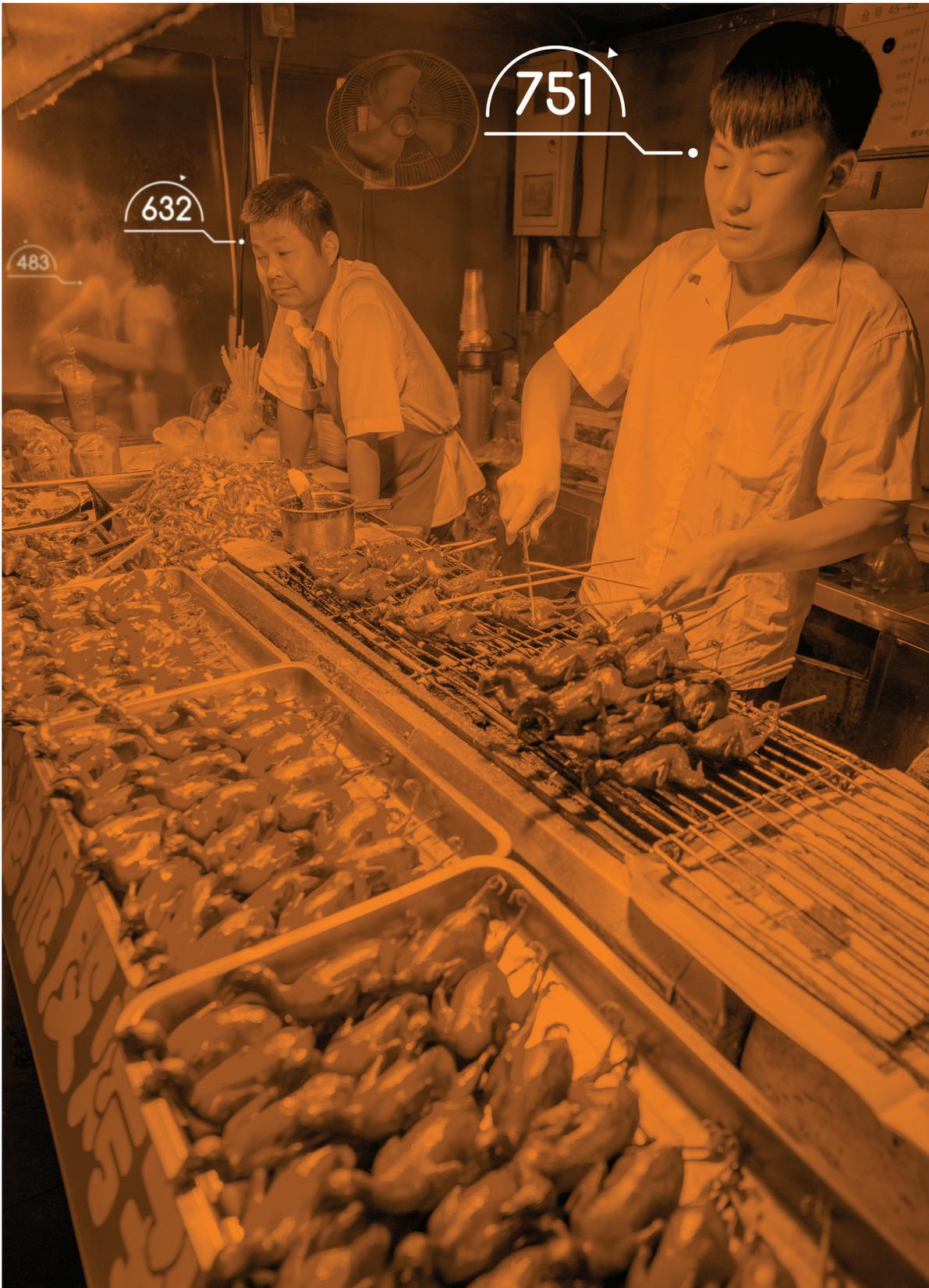
“I fully trusted him because he had already demonstrated to me that he values being looked at as a good community member,” Bender says. “There were other people that I considered working with because they were actually much more sophisticated scripters and knew the tools better, but in the interactions I had with them, I

could tell that they had tendencies to play practical jokes, to abuse power dynamics.” Dax, on the other hand, was polite, made Bender feel comfortable, and she knew he liked helping others because of his reputation he built as a self-elected new user tour guide.

Throughout the process of working together, Bender offered Dax and Miss Six monetary compensation for their work, but they continuously declined. She and Hoo asked for their addresses several times, in order to send them compensation. Miss Six eventually accepted, but for Dax, it took much longer.

Dax explained that he doesn’t reveal any of his personal information in VR because he assumes that he may be recorded at any moment and that anything he says in these Anyland sessions may become public. It was only after seeing the results of the project that Dax relented and disclosed his identity.

“Once he had seen the photos of the project launch event and felt convinced that it was a real educational experience, it was very inspiring and affirming to him to know he created something that had an impact beyond the Anyland community, that had an impact on the real world,” Hoo explains. “I could tell he was feeling like he was part of something that was really special.”



How might China's many reputation scoring projects evolve?

by IFTF research staff

The 'Social Credit' Laboratory

At a recent workshop hosted by Institute for the Future, a participant mentioned “China’s social credit score system.” The facilitator asked the room, “Does everyone know what this is?”

Almost everyone in the room nodded, “yes.” One participant raised their hand. “It’s essentially a single numerical score for ‘how good a person you are,’ right?”

More questions quickly followed. Who gives people the score? Is it the government or a pri-

vate company? Is it already in effect?

Answers though, came less quickly and with much less confidence. Soon, a room full of people who were familiar with the concept, realized that they did not, in fact, know many concrete details about China’s “social credit score”—and what they did know seemed contradictory and confusing.

That’s because, though there have been numerous articles in the western press with

headlines like, “China Assigns Every Citizen A ‘Social Credit Score’ To Identify Who Is And Isn’t Trustworthy” and “The Odd Reality of Life Under China’s All-Seeing Credit Score System,” what these articles refer to isn’t actually a single program or initiative, but a series of loosely connected efforts by a number of different actors with different interests, to create trustworthiness scores for people in China.

Most reporting focuses on the Chinese government’s proposal to create a “Social Credit Score,” a standardized metric for citizens’ and business’ economic and social reputation that it hopes to fully implement by 2020. (Today, there are a number of local pilots, but no single, encompassing government credit score.)

The other program that gets a lot of media attention is “Sesame Credit,” an ambitious and widely-adopted opt-in program created by Ant Financial Services Group, an affiliate of the Chinese multinational e-commerce, tech, and retail giant Alibaba Group. The “Sesame Credit” score has raised eyebrows because, while it mostly does things like allow high-score holders avoid deposits on rental items, the company told *Caixin Magazine* that their rating takes things into account that go beyond what FICO considers, like the credit scores of your social network, whether or not you donate to charity, play video games excessively, or cheated on your college entrance exam. (Though they have since walked that back, stating it does “attempt to measure qualitative characteristics like character, honesty, or moral value.”) And high score holders get more than access to loans. Perks include priority security clearance at airports and even prominent placement on a popular dating app.

What unites these initiatives is what they’re trying to do (even if for vastly different reasons): create a metric of trustworthiness, a reputation score to anticipate a person’s, or an entity’s future performance based on past behavior and circumstances.

For “Sesame Credit,” the reason is fairly straightforward. In the United States, personal credit is widely available in the form of credit cards, mortgages, and deposit-free rentals of vehicles and goods. However, in China, the majority of people have no such access.

Meanwhile, the government proposed the social credit score as a response to the fact that overall low levels of trust are likely holding China back socially and economically.

To flourish, economies require rule of law and institutions that can be trusted to facilitate market transactions and long-run investments—2010 research from Harvard University suggests that low-trust societies end up with lower growth, higher regulation, and more corruption, which, in turn, further lowers trust. And China is plagued by sensational stories of corruption small and large—from street vendors selling counterfeit chicken eggs made of chemicals that are toxic if consumed in large quantities, to ostentatious acts of embezzlement, like a railway minister who was found to have pocketed \$120 million, which he spent on his 16 cars, 350 flats, and 18 mistresses. (A high-profile train crash made the minister a figure of public derision and he was sentenced to death for corruption in 2013.)

The people, the private sector, and the state will have to negotiate what is and isn’t acceptable information to include in a measure of trust, who gets to define good and bad behavior, and what constitutes acceptable rewards and punishments for that behavior.

Fraud and corruption cause unquantifiable human suffering, but they also cause economic losses, which are somewhat easier to measure. According to *Quartz*, Chinese investors lost about \$24 billion to scammers in 2015. A 2007 study by the Carnegie Endowment for International Peace estimated the direct cost of corruption to be 3 percent of the country’s GDP—\$200 billion. (Though even GDP is hard to calculate because of rampant fraud in regional economic reporting.)

And the government has had very little infrastructure to address this. In particular, it doesn’t have the ability to share information in a standardized way. Local courts that lack status in the political system struggle to enforce judgments. And in the marketplace, bad actors are currently able to move through society with comparative ease, selling fake goods, committing medical malpractice, and polluting the environment, and then slipping into the woodwork, evading responsibility.

The advent of a Social Credit Score or reputation score, the government hopes, will bring

accountability, and therefore trust, to these complex systems.

In the United States, systems for scoring people and facilitating economic and other transactions have been around for more than a century. Since their advent, they've given many people new ability to participate in the economy and locked out others. And battles have been (and are still are being) fought to make these metrics more equitable and efficient and less punitive and discriminatory. (Many of today's, still flawed, scoring mechanisms were created explicitly to be more fair than earlier U.S. credit reports that, according to Frank Pasquale's *The Black Box Society*, were culled from neighborhood gossip and took things like your race and whether or not you made "effeminate gestures" into account.

The same will be true in China. The people, the private sector, and the state will have to negotiate what is and isn't acceptable information to include in a measure of trust, who gets to define good and bad behavior, and what constitutes acceptable rewards and punishments for that behavior.

To gain insight into how this might play out, and what that means for China and the rest of the world, IFTF interviewed three academics who have extensively studied these attempts to create new reputation scores: Jeremy Daum, a fellow at Yale Law School's Paul Tsai China Center; Xin Dai, professor at the Ocean University of China, and Shazeda Ahmed, PhD student at the University of California at Berkeley.

We explore three possibilities:

What if these new credit scoring systems converge to create a metric that reduces a person's trustworthiness down to a signal number?

What if these scoring systems develop independently, resulting in a series of narrow, competing metrics?

What if the prevalence of these experiments makes China a civic, social, and financial laboratory, cranking out occasional blockbuster successes for export, in addition to spectacular failures?

The Benevolent God of Big Data: What if we get one score to rule them all?

The most sensational reporting on the attempts to create a social credit score in China paints a picture of a society where every action is tracked and analyzed, creating a single numerical score

that dictates your place in society. This is not a certain, or even likely, scenario. However, there is enough vague but ambitious language in the document declaring the government's intent to create a reputation score to interpret that as its goal. For instance, the document states the system's aim would be to allow "the trustworthy to roam everywhere under heaven while making it hard for the discredited to take a single step," without making it entirely clear how this would be done.

"That document is really a mess, and it covers a huge range of activities that are summarized with the phrase 'social credit,' including financial credit, but it also encompasses moral and legal compliance," Daum explained.

Ahmed recounted how a worker in the Shanghai municipal government legal affairs office wrote a book about their local social credit pilot and, quite proudly, called it something that translates roughly to "the benevolent god of big data."

"[The concept is of] a centralized database for the government to use—an information supermarket that enables decision-making about a person based on everything they do, not just what your little corner of the government used to be able to see," she says.

We can see hints of how this would work through the government's pre-existing "blacklisting" and "redlisting" system (widely and incorrectly thought of as a social "credit score") for interagency cooperation designed to get people with outstanding offenses to comply with regulations and pay fines. It works in tandem with the state's "real name registration" program that requires online identities on certain platforms, bank accounts, and mobile phone numbers to be tied to specific, named individuals.

"China has traditionally and notoriously been unable to enforce its own laws. Most of what I see as the actual effective pieces of the social credit system are about blacklists for violating laws," Daum explains. "In the recent past, people who get busted for a food tainting incident would dissolve the corporation and reincorporate somewhere else. And suddenly, they're not able to do that because things are getting tied both to their individual and their corporate permanent number."

Once a person is on this blacklist, the government can work with different agencies to do things like prevent them from traveling until

they pay up. And while the concept of the government having this much data might be disturbing, it might not really dictate people's day-to-day interactions.

"There's all of these security cameras all over London. Does that mean that there's someone, real-time, watching everything that's happening? No. But it does mean that when something goes wrong, we can use that record to piece together what happened," said Daum. "The real ID system is similar. At any moment, it would be very hard for me to deny activity that I did through a credit card, a bank account, anything online. It would be quite tricky for me to divorce myself from it."

Unlike a credit score, which can be comparatively nuanced, the blacklists are almost zero sum. You're either on it or you're not.

"Having a solitary consequence for all of the failures to act on a court judgment doesn't make sense. Court judgments, they're all different. My refusal to give a formal apology, say, should not be handled the same way as my refusal to clean up the environment after an oil spill," concluded Daum.

And this might be a potential reason that, in the future, it would converge with something like the Sesame Credit score. The scores currently have little-to-nothing to do with one another. However, government social credit scores are mostly publicly available and, as such, can be used as inputs to Sesame. And in 2015 the government initially gave Sesame, along with seven other firms, a license to create a pilot version of the social credit score, though it has since decided against letting a private firm administer the system. Still, connections do exist.

"[Alipay] has partnered with over 350 cities in China to provide local public services, and Ant Financial is also building out point systems for some [government social credit score] pilot tests, I'm interested in how Chinese tech companies are marketing what they do as contributing to the social credit system," Ahmed explains. "Whether it's explicit through memoranda or implicit in the design and how they want the product to be used. In one report Ant Financial did with a Chinese think tank...they basically said, 'We want our credit system and our payment systems to be the infrastructure for the smart city of the future.'"

Even without any formal coordination with a government credit score, Sesame Credit is becoming increasingly incorporated into how people navigate daily life.

Ahmed said, "450 million people use this thing, and every time I look around, there's something new you can use it to unlock. In the United States, you don't really need to think about your credit score unless you're buying a car or a house or wherever, whereas with something like Sesame Credit, you might use it almost daily."

For example, people with high scores can now rent basic items like bicycles and umbrellas without a deposit, get Sesame Credit verified at AirBnB, and can even receive medical treatment at hospitals without paying the bill on the spot.

If government scoring mechanisms and Sesame Credit were to converge, there are obvious dangers.

Daum addressed the issue of danger implicit in these scores. "More effective law enforcement doesn't do anybody good if the laws unfairly or unjustly limit freedoms of speech and political activity."

And there are less obvious economic benefits to a lack of law enforcement, Dai explains, citing, in particular, the ability of micro-enterprises to flaunt intellectual property laws. Rural collectives who own land, he adds, are able to sell together to commercial developers. "Some researchers claim this practice, although actually not strictly consistent with how the building codes and land laws work in China, have actually alleviated much of the housing shortage problem in some of the biggest cities."

We can already see consequences to existing programs that would only be exacerbated if it were to get more powerful. Because government blacklists are so public, it's very easy for investigative journalists to find and interview people who have been blacklisted.

"A fair number of people who argued that they were wrongfully blacklisted inherited debt from their parents. That predates the social credit stuff, but when you think about tying it to technology, there are these amplification effects," Ahmed said.

Credit scoring in the United States has remained controversial because, while there are laws that prevent companies from taking things like race into account, people of color have been disproportionately targeted for predatory loans, and therefore, are more likely to have damaged credit histories to draw on. And, in general, algorithmic governance is problematic when the formulas they use are not transparent (sometimes

even to their creators). As the scope of their usage increases, so too does any problems inherent in scoring mechanisms.

While it's fairly easy to identify big losers and winners in this scenario, what it would feel for everyone else is less certain. Many assume such a system would create a new cognitive burden and people would be constantly wracked with anxiety, scrutinizing their own actions for fear their score might drop. But in a low-trust environment with weak rule of law, those levels of anxiety already exist. If a system like this could allow you to move through the world without constantly having to question the motives of other people, spending mental energy and time sizing them up for fear you might get scammed or worse, it could be incredibly liberating: "The trustworthy could roam everywhere under heaven."

Many assume such a system would create a new cognitive burden and people would be constantly wracked with anxiety, scrutinizing their own actions for fear their score might drop. But in a low-trust environment with weak rule of law, those levels of anxiety already exist.

This utopian vision is not unique, nor is the language its proponents use to describe it. While the notion of "a sincerity culture" that would raise "the honest mentality and credit levels of the entire society" sounds megalomaniacal, early credit reporting agencies in the United States were described as a "bureau for the promotion of honesty" by at least one commentator at the time. And tech companies frequently invoke the cliché that they are trying to "make the world a better place."

"[Ant financial] made some very ill-advised statements early on where they were trying to talk about morality and the day we're going to shake society," Daum said. "Maybe some people in the company believed that, but corporate interests in the end tend to be a little more grounded and their main goal is to become a credit evaluation company in the traditional sense." This begs the question, are the various players' desires for an "honest and sincere" society actu-

ally honest and sincere? That is, can the various stakeholders cooperate enough to create a single metric of reputation? And if they could, would people even want it?

China is Not a Monolith: What if no one wants a single metric of trust?

One of the problems with a single metric for trustworthiness, is that trustworthiness is not just one thing. We may be reliable in one area of our lives and flaky in others. And for that reason, such a metric would be limited in its usefulness.

Daum offered that "People want scores that help predict something that's of value to them... not a globalized good guy or bad guy rating. When I go into a restaurant and see a B on the wall, I want to know that that B means that the kitchen is relatively clean. If they have a very low grade, I don't want it to be because the chef was caught speeding three times last week. Law enforcement people want access to a large range of data that helps them achieve their purposes. They don't want just a general goodness rating."

(It should be noted, though, that people all over the globe often do boycott companies and individuals for moral infractions unrelated to their primary business.)

There may not be sufficient demand for a universal social credit score, or the will to supply it. Another distinct, plausible scenario is that we see the proliferation of several local metrics that serve the more narrow purposes.

Currently, there is no single institution that controls the government social credit system. It is a series of experiments mostly conducted by local governments, there have been disasters, like the Jiangsu pilot, which one state-run media outlet compared to the "good citizen" certificates issued by occupying Japanese forces in World War II. But there have also been comparative successes, like one in Rongcheng that limits what can be counted against you to criminal offenses, but offers generous rewards for what it deems good behavior. And though many have enthusiastically undertaken these experiments, that doesn't necessarily mean they'd want to completely merge efforts.

"If various systems are linked, then it's much easier for higher authorities to actually monitor the behaviors of their subsidiary governments," Dai said, something that might not appeal to those subsidiary governments.

"China is not a monolith," Daum asserts. "The

ministries value their independence and don't always talk to each other. And before they spend resources enforcing someone else's blacklist, they want to make sure it makes sense."

These same dynamics are in play with public-private initiatives.

"Some municipal governments love the opportunity to get new technology and to get companies to make these processes more efficient for them," Ahmed explains. "But to partner in this way, the government has to lend some trust and some credibility to a private sector actor who has different goals."

Dai agreed. "On the surface it seems that the government actually has lots of incentive to try to use whatever private companies have to offer, but from the government perspective, there definitely has been some caution against relying too much on them."

The "social credit score" story of a world without privacy, where the government and private companies know every detail of your life is a story Westerners feel drawn to right now because these are issues we are confronting ourselves.

Ahmed raised some concerns. "When a private company provides a public service, what happens to the data recorded on that platform in the process of doing that? They might keep the data and use it for product development, research, and design."

A scenario in which there are an array of different opt-in systems would allow people to choose who they trust with what.

Dai said that "Chinese people generally trust the government more than these private companies overall...but government systems might be more vulnerable to manipulation, not only because governments have incentive to manipulate their own systems, but also because in terms of technical capabilities, the government actually is not as sophisticated as private companies in dealing with manipulation."

These more narrow systems might have privacy advantages as well.

"I think people do care about privacy, but they don't call it privacy—I think it gets manifested in different forms. Someone I interviewed

told me that she has a friend who has two bank accounts. One bank account is tied to Alipay, where she does the things she thinks will raise her Sesame Credit score. And the other is where she buys things she doesn't want tracked," said Ahmed.

A Social Innovation Lab for the World:
What if rapid experimentation leads to the creation of several useful systems that get adopted outside of China?

The current fragmented and chaotic nature of the various credit initiatives in China may be a feature and not a bug. The issues, from providing credit to unbanked populations to enforcing civil law and finding a trustworthy mate on a dating site, are wide-ranging and exist in many places around the world. The government social credit system's numerous pilots and the various private enterprise initiatives like Sesame Credit could be looked at as a race to see who can solve which of these problems the best. And the models that do work will likely find people all over the globe eager to adopt them, particularly where there is less robust institutional trust or rule-of-law.

For instance, Sesame's use of social network and shopping data has certainly been controversial, but for unbanked people without any recorded financial history, there isn't much else to go on. Networks do provide decent indicators of future financial behavior, so in this context, using social network data represents an important opportunity to expand credit access.

This kind of innovation, if done right, could create systems that leapfrog over the United States and other developed western countries. For instance, holding corporations accountable is something that China is bad at, but the United States is certainly not particularly good at it.

"The [social credit] system has built in a way of piercing the corporate veil where the highest level of leadership and people directly responsible are also responsible for the corporation's actions and could be blacklisted along with the corporation itself, which I think would actually probably be a very popular idea in the U.S.," said Daum.

The "social credit score" story of a world without privacy, where the government and private companies know every detail of your life is a story Westerners feel drawn to right now because these are issues we are confronting ourselves. It

is appealing because it seems like a parable.

Daum concluded, “We’re all just becoming aware that someone has a robust data profile of us....that [adding algorithms and a predictive element to our legal system could exacerbate existing inequality] that’s our anxiety. The Chinese government’s been able to profile an individual citizen for ages, just not using big data.

“Charles Stross, the science fiction author had the great line that ‘privacy was a short-lived invention of the 20th century.’ Humankind has certainly not always had privacy, and it looks like we’re going to be parting ways with it soon.”

As we develop much more intrusive and effective tracking technologies, how much surveillance are we comfortable with in order to pursue ends that we care about? Will it be okay to score polluting factories and shame them? How about sexual harassment between passengers in Ubers and Lyfts?

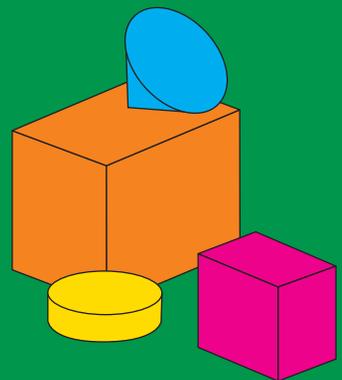
And as we confront issues of economic inequality, what would it mean to have a system where it is the content of your character (as rated by the government or a private company), and not the content of your wallet that determines whether you can fly first class or enroll your kids in elite schools?

If the various experiments being talked about as “social credit” are a parable, there is not yet a moral of the story and there likely never will be. Rather, we, just like every other country in the world, can find hints of answers to some of the most urgent questions we are grappling with ourselves.

Fragmenting Identities and Ephemeral Communities

Insights for remodeling trust:

- » As social virtual reality emerges, norms, collaborative relationships, and modes of interacting will all need to be invented from the ground up in an unfamiliar media environment. Building trust with users—and building virtual platforms—will involve more than just creating tools to facilitate interaction between users, it will also require working with users to establish tools and mechanisms for ensuring safety and trust.
- » Many institutions—like American football—face slow burning trust issues that linger in part because addressing them would challenge our emotional investments in existing systems. While these may not seem like short-term priorities, they have the potential to become existential threats if left unaddressed.
- » Efforts to use opaque data trails and machine learning tools to measure reputation and score individuals along a variety of traits will continue to accelerate. As these kinds of scoring systems increasingly shape people’s lives, demands for transparency will increase.



Manipulating Perceptions and Persuasion

How can we ethically harness emerging understandings of human decision-making to balance skepticism and trust?

Fields like psychology and behavioral economics have upended understandings of how people make evaluations and decisions. This process will accelerate as advances in neuroimaging bring transparency into how our brains formulate trust and decompose meaningful distinctions between cognitive processing of trust and distrust.

New understandings—coupled with ongoing improvements in the ability to target people with ads and information—will create radical new capabilities to influence perceptions, emotions, and decisions. Setting aside intentional deception, extreme targeting has as much potential to create confusion and fatigue, and to overwhelm, as much as to engage.

Lie to Me

Do machines need to deceive us in order to be humane?

by Jamais Cascio

At a memory care facility, an elderly patient stops a worker and asks a seemingly simple question, “when is my husband coming to visit?” The worker, though, is not sure how to answer—because the patient’s husband passed away nearly seven years ago.

Should she be told the truth, and suffer the loss again, even though she will ask this same question tomorrow, or even a few hours later? Or should she be told a lie, that he would be “back later on today,” knowing that she’ll forget this answer soon? The *humane* response would be to lie to her. And while this is a particularly dramatic example, situations in which we might want to be shielded from the truth, in which we might want to be lied to, are incredibly common. In this specific example, most people would probably say it’s acceptable, or preferable, for the worker to lie to the patient. But what if that worker is not a person, but a bot? Do we want our nonhuman collaborators to be more humane—if that means they lie to us?

As artificially intelligent systems become more intimately woven into our lives, we will increasingly find situations where the absolute

truth may not be the correct response: situations where revealing the complete truth would cause far more harm than good, as with the example above; situations where the whole truth may be overly-complex, or ambiguous; situations where the full truth is simply unavailable. But would we accept knowing ahead of time that our systems will be lying to us?

We may.

Minor deceptions (“little white lies”) and partial truths often serve as a form of social lubrication. By eluding complexity or ignoring inconvenient mistakes, we allow important social interaction to take place smoothly. “I got stuck in traffic” is acceptable in a group meeting. “I had too much to drink last night and overslept” may be more truthful, but also may serve as a stumbling block to focused discussion with colleagues. These white lies are largely to the benefit of all parties involved.

We can and do accept being lied to, *knowingly* lied to, if we perceive that there’s a social, behavioral, or health benefit, especially when compared to the lack of a lie. And this will likely carry over to our interactions with machines.

In fact, in some ways, it already has. For instance, many people set their alarm clocks ten minutes fast in order to make certain they get out of bed on time. On the surface, this might seem illogical. If you know that the clock is ten minutes fast, why would you get out of bed early? Yet it usually works. It’s example of a behavioral change, driven by a known falsehood, something known in the medical world as the “open-label placebo effect.”

The “placebo effect,” of course, is a well-known phenomenon where consumption of an inactive substance can nonetheless cause a reaction, if the recipient believes that the substance will have an effect. Recent exploration of the “open-label placebo” concept calls that into question. Researchers have discovered that patients given treatments openly described as placebos, coupled with a 15-minute explanation of the placebo effect, had beneficial results beyond the group that received treatment as usual. In other words, knowing that something is a lie doesn’t necessarily mitigate its impact.

We might think of this as minor deception serving as a social interface with our complex systems, especially when the “minor deception” can be described as *lying to ourselves*. This prompts numerous plausible scenarios:



Illustration by Trent Kühn

- » An exercise system that intentionally displays an undercount of how many times users lift a weight or how far they walk on a treadmill as a way to push them to go past their limits.
- » A self-driving vehicle that displays a speed somewhat exceeding the speed limit, thereby satisfying a passenger's desire to "get there fast," even as it actually follows the speed limit precisely.
- » Personal assistant systems that learn to over-estimate travel times or move deadlines closer as an adaptation to a user's repeated tardiness.

Rather than attempt to correct a human user's problematic behavior, these systems instead alter how they interface with the user in order to achieve the same improved result. They do so by lying to the user, with that user's understanding that such lies could occur. The human in such a scenario may still trust the system, but it's not trust that the machine will always be 100% accu-

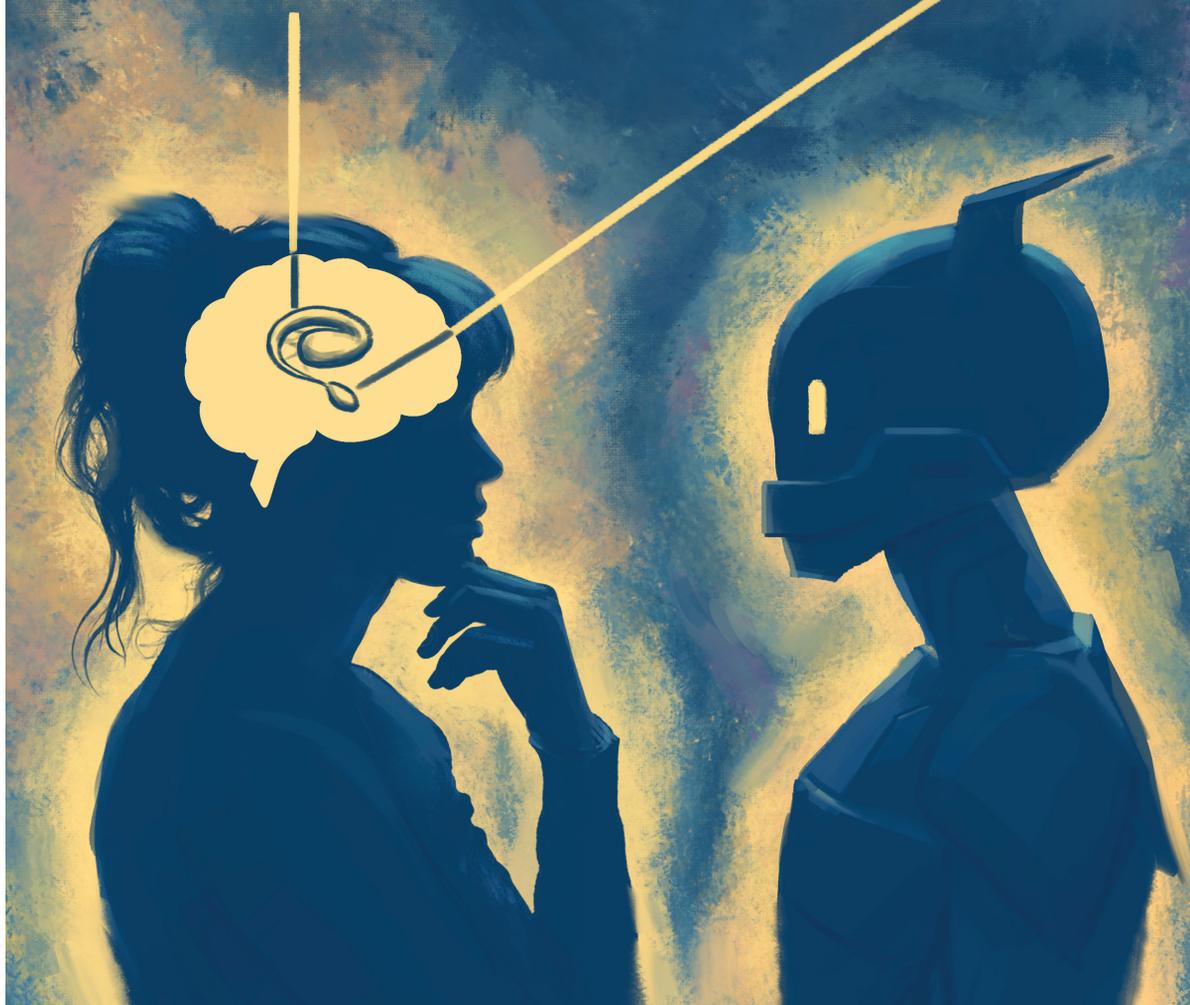
rate, it's trust that the machine will work in our best interest to help to us achieve desired goals.

And ultimately, working in our best interest means they may need to defy us in addition to deceiving us. At a personal level, a machine that says "no" might be irksome, even infuriating. But as our interactive technologies become more capable, there is an increasing likelihood that they will be asked to undertake tasks that violate the law. An autonomous vehicle being instructed to drive faster than the speed limit is one common example. A more critical scenario is the possibility of a military system being ordered to carry out a mission that would be a war crime.

A machine that refuses to supply a salty snack might be frustrating. A car that refuses to speed may be aggravating. An armed robot that refuses to kill civilians will be absolutely necessary.

The ultimate iteration of our trust in our systems is not that they do what we say, but that they do the right thing. Machines that take ethical rulesets into account alongside programmatic goals are imminent. Surprisingly, these systems may well need to be able to lie to us and refuse our requests in order to do so.

TRUST!
DISTRUST!



Lessons and strategies from the frontiers of neuroscience

by Jane McGonigal

Brain Trust

We usually think of trust and distrust as direct opposites. But in the brain, trust and distrust are two entirely separate systems. They're not opposite ends of the same continuum. Instead, they have distinct "neural correlates" according to fMRI neuro-imaging, and are created by completely different areas of the brain.¹

Trust is rational, distrust is emotional

Trust is built through cognition, or rational analysis. It's developed in an analytic part of the brain, the *caudate nucleus*, using data we collect through firsthand experience. The caudate nucleus is, essentially, a prediction machine. It asks and answers questions like: *If I push this*

button, will an elevator come? If I do one hundred push-ups, will my arms get stronger? If I eat my mom's cooking, will it taste good? Whenever a certain action repeatedly and reliably leads to the same reward, trust is established. From that moment forward, we experience a pleasurable rush of dopamine—the neurochemical that energizes us to take action—whenever we think about the trusted actor or system.

Distrust, on the other hand, is powered strictly by emotion, not data. It arises in the *amygdala* and is shaped by feelings of fear, suspicion and moral disgust. The amygdala acts as the brain's alarm system, firing up and sounding the alarm whenever something bad might happen.

It attempts to detect the true intentions of other people, organizations or systems: *Are their intentions toward me benevolent or malicious? Do they have strong moral character, or are they fundamentally bad: unethical, unkind, or corrupt?* The amygdala can be triggered by a direct experience of loss or harm, but it is just as easily activated by secondhand information. We can start to feel distrust for someone or something based solely on stories or messaging we encounter in social media, the news, word-of-mouth, advertising or even popular entertainment. The stronger our emotional reaction, the stronger the distrust.

**The paradox of feeling high trust
and distrust simultaneously can lead
to a strange kind of disorientation
and unexpected patterns
of decision-making.**

Understanding how trust and distrust are built in the brain will be crucial for navigating new systems of trust and surviving waves of distrust over the next decade. Here are some additional key findings from the neuroscientific literature on trust and distrust, and how they might be applied in the future.

Building trust is hard, destroying it is easy fMRI data suggests that trust is built more slowly, and erodes faster, in the brain than distrust. Distrust gets hard-wired in the brain faster, and lasts longer. Why? Emotions in general, and especially negative emotions, are considered “more salient,” or more likely to be seen as useful information, by the brain than factual data. Researchers estimate that negative emotions on average command three times as much of our brain’s attention as positive thoughts. This gives us some insight into how hard it may be in the future to counter movements and organized groups who are purposefully seeking to sow distrust in established institutions like the government, traditional medicine, or the media, or in new institutions like robotic police and driverless cars. It will take more than three times the effort, at least, to build up a rational and informed sense of trust than it will take to make people feel uneasy and suspicious about anything. In other words: Trust will be harder won and harder kept,

while distrust will be a relatively easy resource to cultivate. Perhaps decisions in this future will be made not on the basis of who we trust more, but rather on who we distrust less.

Trust is only built through direct experience

Individuals must create trust for themselves through firsthand experience. There’s simply no way to convince someone else to trust anything or anyone through secondhand information. Our caudate nucleus (the part of the brain where trust develops) only powers up when *we* personally take direct action. Trust campaigns in the future will therefore have to be inventive in providing firsthand positive experiences. Neurologically speaking, the opposite of trust isn’t distrust—it’s *uncertainty* and *inconsistency*. To build trust, you need to flood the brain with direct, firsthand experiences of *X action* consistently leading to *Y result*. Consultants and designers may specialize in concocting simple, scalable ways for individuals to quickly have the opportunity to personally anticipate what will happen, and directly experience the dopamine-rush of being proven correct. Just as social media experts were key to building personal connections and wielding scalable influence in the past decade, trust engineers will be similarly critical in the next decade.

Trust and distrust are both hackable

That said, there may be one effective way to hack both the trust and distrust systems of the brain. A 2018 fMRI study suggests that facial similarities between strangers and trusted or distrusted individuals can trigger “previous lessons” to be applied to new contexts. In other words, if someone looks like someone I trust, my caudate nucleus may fire up and give me a dopamine rush when I think about trusting this unknown person. Likewise, if they look like someone I distrust, my amygdala will fire up and sound the alarm: This person is untrustworthy!⁵ It’s not difficult to imagine how smart technologies could take advantage of this hack in the future, for better and for worse. If you log into an app or service from Facebook, for example, it could search for photos of your spouse, your parents or your best friends, and then adapt its avatars, filter its photos, or “deepfake” its video streams to perfectly fit your brain’s unique trust data set. Imagine a dating app that, for an additional fee, will show potential matches slightly morphed photos of

you in order to appear more trustworthy to them. Or consider an educational platform that “deep-fakes” videos of its instructors so they have more facial similarity to your loved ones, creating a “safer,” more supportive learning environment.

Trust and distrust can co-exist simultaneously

Because they are developed and experienced largely in separate areas of the brain, it's possible to have strong feelings of trust and distrust *simultaneously*. One does not necessarily cancel the other out. The caudate nucleus can say, “We have lots of reliable data about this person or system” while the amygdala shouts, “Something is wrong! It *feels* wrong!” In fact, research suggests this ambivalence occurs frequently in online environments when individuals are trying to determine if they trust a stranger or an e-commerce vendor.⁴ The paradox of feeling high trust and distrust simultaneously can lead to a strange kind of disorientation and unexpected patterns of decision-making. For example, today, data breaches have negatively affected hundreds of millions of individuals, leading to high levels of distrust of companies who are supposed to safeguard our personal data. Yet virtually all of us continue to swipe our credit cards and share personal data online, because the short-term outcomes of these actions are exactly what we anticipate—purchases are successfully made and credit instantly approved.⁵ We therefore both trust and distrust at the same time. And because of the different neural correlates responsible for each, we continue to have high confidence in our daily actions while feeling increasing anxiety and unease in our long-term environment. In the future, it remains to be seen how or if this paradox will be resolved. Perhaps our new reality will become living with a double consciousness: a kind of existential confusion of trust and distrust that leads us to act daily in ways that defy our emotions.

Putting the Science into Practice

If you want to build trust in a new smart technology, here's what to do:

First, build rational trust by giving repeated, first-hand experiences of the technology doing what users want and expect it to.

Find ways to directly expose people to the technology, even in the smallest doses.

Prime the trust-building region of the brain by telling users exactly what to expect when they engage, and then delivering exactly that. Be explicit and reliable.

Keep score of reliability. If you can show a high percentage and growing track record of successfully delivering on a promise, this will speak to the rational, trust-building part of the brain.

Second, minimize emotional distrust by making the technology's "motivations" clear to users.

What goal or goals is your technology programmed to pursue? What counts as "success" for the technology—is it the same thing the user wants? Users need to believe that the technology is both benevolent and shares their own values and goals. This is the emotional side of trust-building. Talk to users

about how your tech is "motivated" so you can establish common ground between the goals and values of your users and the goals and values of the AI and algorithms driving your tech.

If the answers to these questions of motivation are likely to inspire distrust rather than trust—because your technology is built to optimize a value that users may not share—then revisit the way you are designing your technology. In the future, it will be essential that smart tech is transparent about its goals and is perceived as being programmed and motivated to achieve genuine positive impact. For example: In the case of media algorithms today, many are designed with the primary goal of keeping a user engaged and always watching or reading the next piece of content to increase monetization of the users' attention to advertisements. Making this transparent would naturally build distrust in the system. On the other hand, an algorithm designed to only share media that has a positive psychological or stress-reducing impact as its highest goal, and to safeguard against sharing toxic or fake content, will strengthen a user's emotional trust of the technology.

Notes

1. Dimoka, A. (2010). What does the brain tell us about trust and distrust? Evidence from a functional neuroimaging study. *MIS Quarterly*, 373-396.

2. Vuilleumier, P. (2005). How brains beware: neural mechanisms of emotional attention. *Trends in cognitive sciences*, 9(12), 585-594.

3. FeldmanHall, O., Dunsmoor, J. E., Tompary, A., Hunter, L. E., Todorov, A., & Phelps, E. A. (2018). Stimulus generalization as a mechanism for learning to trust. *Proceedings of the National Academy of Sciences*, 201715227.

4. Moody, G. D., Galletta, D. F., & Lowry, P. B. (2014). When trust and distrust collide online: The engenderment and role of consumer ambivalence

in online consumer behavior. *Electronic Commerce Research and Applications*, 13(4), 266-282.

5. Simon, S. J., & Cagle, C. J. (2016). An Analysis of Trust, Distrust, and Their Antecedents: Development of a Comprehensive Model of Consumer Intentions in Technology-Driven Transactions. *MIS REVIEW: An International Journal*, 21(1&2), 51-78.

Bargain Shopping for Happiness

An interview with researcher

Elizabeth Dunn

Interview by Bradley Kreit

In her book *Happy Money: The Science of Happier Spending*, co-authored with Michael Norton, Professor of Psychology at the University of British Columbia Elizabeth Dunn outlines five strategies for using your money to maximize happiness: Buy experiences, make it a treat, buy time, pay now and consume later, and invest in others. Since the book's 2013 release, Dunn has continued to be a leading researcher in exploring the ways in which money, social connection, and technology contribute to—or detract from—our happiness. We spoke with her about her research as well as opportunities to apply these findings to better serve end users.

How do you define happiness?

At the broadest level, the mission of my lab is to figure out how we can optimize the use of time, money, and technology to promote human happiness. And we work with the definition of happiness that was set down by Ed Diener which consists of three core components. One is experiencing a fair bit of positive affect, [and second] is not too much negative affect. People sometimes think it means, 'oh, you can never be sad' and that's definitely not the notion. It's just that you don't want to have a preponderance of negative emotions. And then, finally, there's the cognitive component of life satisfaction. So, when you look at your life, do you feel like you're living the sort of life that you want to have?

And these three components of positive affect, negative affect, and life satisfaction hang together pretty well. Sometimes studies will just look at one of those three or two out of three, and, for the most part, they do track together pretty well and form a unitary construct....And I think one really important thing to recognize is that, although it feels sort of soft and squishy it's actually, as a metric, really good. As somebody who's studied other things such as stress hormones, happiness is way better in terms of being a good, hard measure that correlates with other things and can be measured quickly and reliably and answered by people from diverse backgrounds in ways that are not completely free of noise but that contain a whole lot of signal.

Let's talk about the concept of buying time. You cite the example of a robot vacuum as a purchase that makes us happier if we think of it as time saving.

A question that people don't ask themselves enough about their purchases is, 'will this actually change the way I spend my time next Tuesday?' The way that happiness gets increased is if you're taking those minutes that you would've spent vacuuming and specifically using them to do something else.

We think that, basically—and this is an area where I think there's a lot of opportunity for companies to do a more effective job in a way that would actually promote people's happiness as well as being aligned with company's goals. People benefit from using money to buy time, but in our recent research, we find that even people who could afford to don't do so, or don't recognize that they're doing so.



Illustration by Trent Kühn

What we find is that if you can prompt people to see that they'll actually be as busy in the future as they are now, that seems to increase the likelihood that they'll, for example, click a link to purchase time-saving services. Doing that to encourage people to buy time is not yucky or deceptive or slimy, in my opinion, because people would be better off.

In your book, you write, "There's a lot of innovation to be done in waiting." Let's take customer service calls where you get placed on hold as an example. Where is the innovation opportunity?

Just stopping to think, 'is there anything we can do during this time that would actually be enjoyable?' So, for example, could you offer people a free two-minute meditation while they wait? And meditation is something that's well-backed up in terms of its beneficial effects for happiness, and yet I was just at a conference of happiness researchers not too long ago, and we were talking about how none of us actually meditate,

even though we know it's really good for us.

I've never come across that sort of thing. The best we can hope for is a call-back service, which I do think is a good idea. The worst, I think, is something where they're constantly giving interruptions and messages, so you can't even get reabsorbed in some kind of other task. And I think to myself, 'why would a company do that? It's just such a bad idea. You're just destroying people's time.'

Let's try another scenario here, say, a supermarket checkout line.

Some of my research shows that just having pleasant chit-chat with strangers improves people's mood and even their feelings of belonging in the community, and other related research shows that people don't fully anticipate this. So, it seems to be like an underutilized source of well-being.

Can we do something to generate conversations between people waiting in line? There's cer-

tain situations where you see people naturally talking to the people around them. I think one interesting thing to do is figure out when that is happening in a particular environment and how we can facilitate that.

Some of your research investigates technology and happiness. Could you tell me about a study you conducted on map use and happiness?

I'm a social psychologist and so my job is to study people's everyday social life and today that includes looking at how people engage with screens, in addition to other people.

We wanted to take a situation where phones are doing something really valuable for us and just see, is there anything that we're losing in the process? So, we assigned people to try and find a building on campus that was unfamiliar to them either with or without using their smartphone. Not surprisingly, when they have access to their phone, people find this task much easier, but they also end up talking to significantly fewer other people. So, phones eliminate social interactions with people when the technology provides a really effective alternative way to solve everyday problems. That's not bad. There's a very small positive effect of phone use on happiness in this situation, but what's really fascinating to me about that study, and important for companies and organizations to recognize, is that what should be a really massive effect on happiness via convenience is actually being undercut, to a large extent, by this cost to people's feelings of social connection. So, even though those interactions with these random other people on the way to find the library or the building might seem totally trivial, actually sacrificing them does seem to come at a cost in terms of people's broader feelings of social connection within their communities.

Let's talk about the ad-supported Internet. To make money, you don't have much choice but to optimize for maximizing engagement even if it makes the user unhappy. How do you think about this dilemma?

When we feel like companies are stealing our time in ways that aren't actually providing us with meaningful rewards, I think people will eventually exhibit some degree of backlash. I think the all-out pursuit of eyeball time is ultimately not as much of a winning strategy as it

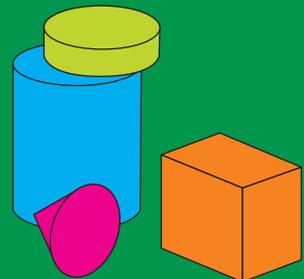
would first appear to be.

My personal view is that companies would do well to take these issues seriously because I think that people do eventually realize, "Oh wait, I'm using my time in a way that doesn't feel valuable to me." I don't have a perfect solution, but I honestly think that even big players out there who profit from eyeball time should not ignore this issue.

Manipulating Perceptions and Persuasion

Insights for remodeling trust:

- » Neuroscience is providing new insight into how human minds construct trust and it is showing that many of our basic assumptions—such as the idea that trust and distrust are opposites and built in similar ways—are false. Findings like these, which also show it is much harder to build than lose trust, will help define new strategies for building trust with partners, employees, and others.
- » Likewise, findings from happiness psychology are giving a window into how to maximize the emotional value of any dollar spent. Identifying which facets of a product or service are producing or eroding happiness points toward an opportunity to build a longer-term, trusted relationship with an end consumer.
- » As bots and other forms of AI begin to interact with us in more open-ended ways, new questions will emerge about just how accurate we want these systems to be—and open up possible questions about how machines might ethically deceive their users.



Collaborating With Nonhuman Actors

How will humans coexist with machine actors that are quickly becoming our managers, collaborators, and surrogates?

Machine intelligence shapes us in unseen ways, turning machines into actors in business, social, and civic spheres. Robust networks of intelligent things will take open-ended action based on rules designed for human actors and social systems. Already, jobs are getting unbundled into tasks to be routed, tracked, and reassembled into value by algorithmic managers. In the world of autonomous cars, governments are remaking the rules of the road for nonhuman drivers—a development rapidly infiltrating other domains. Shopping bots are snatching up hot tickets, reselling them at huge markups, and televisions are intelligently breaking the law to bypass regulatory tests.

Disinformation Gets Democratized

How do we respond when the ability to make powerful propaganda falls into the hands of everyday people?

by Samuel Woolley

By now, all of us know that social media has become weaponized by state actors in pursuit of all sorts of nefarious ends. What most of us don't realize is that individuals are getting into the act, too. Computational propaganda has been democratized.

Increasingly sophisticated use of bots has enabled pundits and other independent propagandists to work at previously unreachable scales. The amateur pundit can use hundreds or thousands of automated but real-seeming accounts to amplify one perspective or suppress others. On sites such as Twitter, open APIs and flexible automation have led to more widespread use of computational propaganda.

During the 2016 U.S. presidential election, people across the country used bots to spread political content ranging from fact-based journalism to deliberate disinformation. I spoke to one, a bot maker named Olaf who lived in the

Midwest and maintained several servers and a fleet of computers in his house. He was just this kind of citizen propagandist. Like state-based actors from Russia to Mexico, he used social media bots to sow political division, confusion, and polarization.

As a strategy of control and coercion, computational propaganda is not new. But magnified by automation and hidden by online anonymity gives it new powers of persuasion. This emergent type of political communication is amplified not just in terms of the number of people around the world who can and do access it, but also by the advance of computational power and software. Data analytics tools allow parsing of massive data sets, machine-learning technology moves the world closer to online AI, and sentiment analysis applications facilitate broad scale mining of opinion.

Automation allows all sorts of politically inclined people to amplify their views. It also allows them, by correlation, to suppress the ideas of others. This is especially useful for well-resourced political actors—candidates, campaigns, and political interest groups—who can buy custom-built bot armies to support their agenda or attack their opponents.

Anonymity is perhaps even more revolutionary in enabling the profusion and success of propaganda. Not only can bot builders scale their work, but they can do so without fear of being found out. The same feature of certain social media sites that allows democratic activists to mask their identity from oppressive regimes is a critical tool for those in democracies hoping to manipulate public opinion.

Bots can be useful for allowing democratic activists, journalists, and artists to speak truth to power. Yes, these disembodied automatons can be used by governments and other powerful political actors, but they can also scale the efforts of grassroots groups. The result of this can be overwhelming noise—a cacophony of automated voices and opinions that is challenging for the average citizen to cut through. When used thoughtfully, transparently, and ethically, however, bots can act as civic scaffolding. Democratic activists and investigative reporters can use bots to unite, educate, and reveal. They can even leverage the same tools used in producing manipulative propaganda to detect, illuminate and expose that same content.

Olaf, the Midwestern bot builder, used both

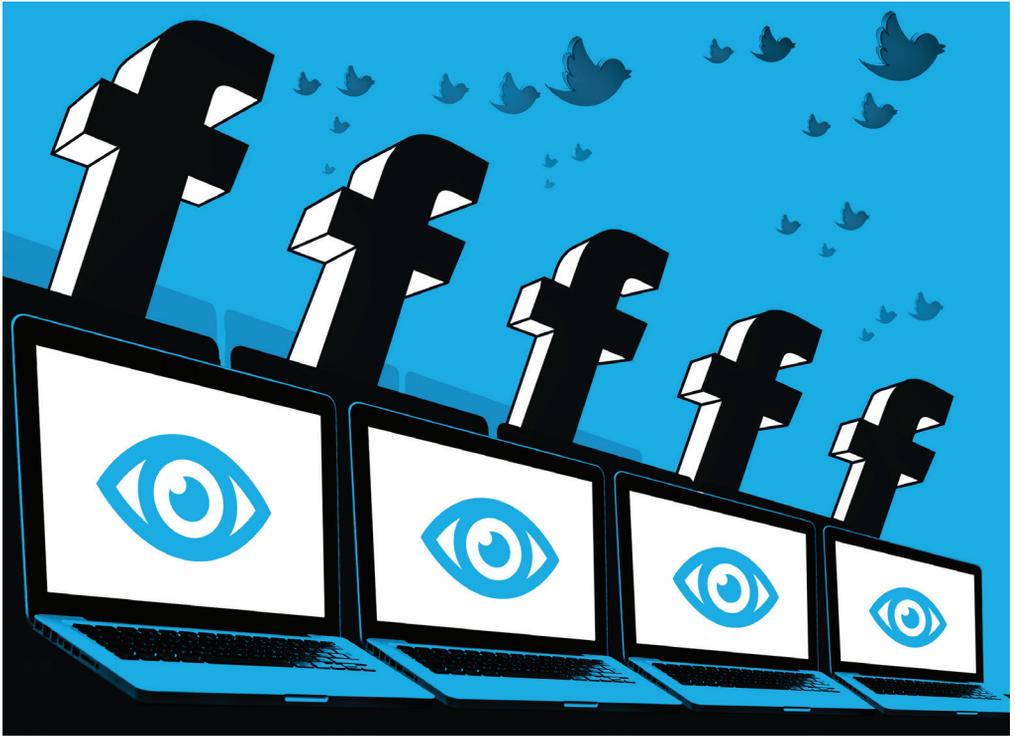


Illustration by Trent Kühn

anonymity and automation to great effect to spread partisan political ideas. Imagine a person on Twitter who is always talking about politics. Now imagine them with 2,000 accounts set to do their bidding—that’s Olaf. Olaf claimed that he ran several thousand different Twitter political accounts using automated software. He showed me several of these accounts—all had tweeted hundreds of thousands of times in their short lifespans and some over a million. He told me that his goal was to use Twitter to eventually become a pundit on traditional media. He thought that if he became famous for his political opinions on Twitter then he could become famous on TV.

On the other side, however, are bot makers like Pan. Pan has built several bots or groups of bots that work to illuminate the human side of key socio-political issues such as immigration, LGBTQ2 rights, and gun control. Her bots share stories about people who have experienced trauma and triumph. They share news articles on the latest pieces of legislation, on key events or about the news more generally. They track the

votes and political stances of politicians and share them publicly. In short, Pan’s bots are built to facilitate communication and critical thinking rather than stymie them. Importantly, Pan always transparently identifies her automated social media accounts as bots. The same is rarely, if ever, the case with the other brand of political bots.

Olaf is unique in his ability, especially as someone not connected to a digital political consulting firm or official political campaign, to use bots to massively magnify his own political communication online. Most other lone bot builders I spoke to—Pan included—ran five, ten, or maybe twenty automated accounts on Twitter using bot code. Olaf, though, was a retired software engineer.

Candidates, campaigns, and media companies—however—have no issue maintaining thousands of accounts set to do their bidding. Militaries, including the U.S. armed forces, have pioneered the use of fake profiles—or persona management software—in information warfare. Security organizations and sovereign states

worldwide have followed suit, and many use and maintain botnets in their efforts to protect and enforce security in ways that each sees fit.

Campaign finance, election law, voting rights, privacy, and several other areas of the law are currently being affected in both unforeseen and complex ways by the spread of political disinformation over social media.

What can be done to address the burgeoning issue of computational propaganda? Though the majority of the U.S. public—and certainly U.S. policy makers and technology leaders—are now well aware of the problems posed by “fake news” and bots, there are few current solutions. Twitter and Facebook have cracked down on the usage of bots and disinformation, but neither of these techs giants nor their users alone can prevent the spread of computational propaganda.

Innovation among computational propagandists continues, both at the individual and the state level, with the rise of so-called “deep fakes” during elections and crises, which are doctored images and video intended to manipulate public opinion. There are even instances of disinformation via virtual reality. Moreover, as users move to closed system chat apps such as Telegram and Signal—which many presume to be more secure than their more open counterparts from Instagram to Reddit—so too does disinformation.

Several areas are at the forefront of innovation, and future problems, associated with political bot and computational propaganda usage. The first, both in the U.S. and globally, is policy and the law. How will these political domains be affected by the rise in political manipulation over social media? What laws are needed to regulate firms where disinformation is spread?

The academy must aid policy makers by undertaking more empirical research to inform policy recommendations for key U.S. politicians, policy experts, civil society groups, and journalists. Campaign finance, election law, voting rights, privacy, and several other areas of the law are currently being affected in both unforeseen and complex ways by the spread of political disinformation over social media. Solid research into the ways computational propaganda con-

travenes the law is a crucial step in addressing the policy gap at the intersection of information dissemination, automation, social media, and politics.

We need better software, informed by both social and computer science research, to help researchers, journalists, and activists keep up with the challenges posed by the modern disinformation threat. Tools could include high-powered data intelligence platforms that make use of bots in parsing large sets of relevant data, usable by these groups worldwide. They ought to exploit recent advances in graph databases and machine learning, and cheap, massive computation to dramatically accelerate investigations.

The target should be to accelerate civil society in identifying patterns of activity that would help to root out entities behind disinformation campaigns, in addition to uncovering a great deal about when and where these campaigns are occurring.

Simulation Literacy

Four characteristics of useful simulations

by Dylan Hendricks

The real world is too complex for us to hold entirely in our heads. This poses a fairly existential problem for us, since we would all like to, and expect to be able to, navigate the world with some sense of agency and purpose. To overcome this debilitating constraint, we humans all do the same thing: we mentally adopt limited models of the world, defined by dramatically constrained sets of rules and assumptions. Some of these models are implicit and unconscious, like our mental map of the geography of our region, while others are explicitly defined as disciplines such as medicine, economics or physics. Put together, these models form our worldview, a functional representation of how the world works and what we do in it. And whether you're designing a learning curriculum, a new product, a business strategy, or a political platform, everything you communicate or pursue is implicitly or explicitly built on the assumptions and constraints of those mental world models. What aspects of the world are included, and which aren't? Which aspects are assumed to be changeable, and which are assumed to be fixed?

Over the coming decade and beyond, a new era of simulation technologies—including virtual and augmented reality, artificial intelligence and ubiquitous sensor data—will provide unprecedented opportunities to make explicit the rules and assumptions of our mental models in dynamic and compelling ways. Efforts to create simulations of the known world began in the 1960's with the advent of computers. The U.S. military saw the potential in simulations early on, and today spends over \$15 billion annually in simulation-based activities for tactical strategy and mission training. Simulation-based games like SimCity and The Sims were positioned as recreational entertainment, but demonstrated the promise of things to come. These early simulation activities share the common ambition of empowering us to explore and share scenarios of the world that we haven't actually experienced, to test out one possibility and then tweak the variables and test out another until we achieve a desired result. The coming era of simulation technologies will make that process more precise, more complex, and more powerful than ever. For the generations that grow up surrounded by simulation tools like Minecraft and Unity, new literacies for designing and interacting with simulations will catalyze radical new possibilities for simulating the impacts of policy-making, strategic thinking and systems design.

To more deeply explore the connections between our mental simulations and our created ones, and where these new tools will take us, it is worth defining what makes a simulation functional and useful. As you consider the role simulations may play in your organizational strategies, design prototypes or employee trainings, we offer four primary characteristics of a useful simulation:

1. A useful simulation provides a defined model of the world based on explicit rules and assumptions.

As Orson Welles once said, “the enemy of art is the absence of limitations.” In many ways, the goals of art and the goals of simulations are the same: they help us to imagine and understand worlds that we have not yet seen. Many kinds of simulation experiences can help us to anticipate or imagine future scenarios, but if there are no rules, or if the rules are inconsistent or poorly understood, then nothing that happens in the simulation is particularly applicable to



Illustration by Alan Clark

real-world situations. A blueprint details the rules and assumptions required to simulate something that has not yet been constructed. Today, physics-based simulations are used by engineering firms across the world to design and prototype new products, taking advantage of the consistency and maturity of data-based physics models. In the next decade, the models employed by economists, psychologists, and climate scientists will be leveraged in the same way, creating functional simulations for accelerating and innovating the science and practice of decision-making.

2. A useful simulation provides stakes to incentivize certain outcomes and disincentive others.

In order to engage with a simulation, we need some motivation, something we're trying to accomplish. Early simulation environments like Second Life failed not only because there were too few limitations, allowing their virtual world to be populated by flying toilets and nonsensical environments, but also because there was ultimately no point to the endeavor. Why bother creating one thing over another? Why bother refine or polish any given aspect of the simula-

tion? The immensely popular online video game World of Warcraft succeeded not by providing as many options as Second Life, but by giving the users motivating feedback loops. Stakes—even if fictional—provide clear goals and incentives for activity. Scores, status markers, the opportunity to level up or acquire the treasure—these are the design elements that introduce stakes into a simulation. Game theory, one of the fundamental frameworks for strategic thinking, seeks to simulate future possibilities by defining the stakes of a given outcome according to their perceived costs and benefits. Future simulations will be evaluated not just on their accuracy, but on their ability to motivate behavior and influence tactical outcomes.

3. A useful simulation focuses on minute details to create an immersive experience that feels organic and alive.

Most of the work that goes into a technological simulation is generally in service of something that has nothing to do with the technical function or goal of that simulation: the impressionistic details. In a movie that's simulating a historical event or time period, it's the details that will stick with people—the way characters are dressed, the way they talk, the things they eat and the tools they use. In a video game, it's the little details that make a virtual world worth exploring: does the grass sway when your character runs; do your avatar's knees bend properly when he or she jumps? A simulation without details is by definition an abstraction, and almost impossible to relate to on a personal or emotional level. Even if names, colors, smells and textures don't seem important, your simulated world will feel empty and barren without them. Fashion mannequins, real estate tours, and product catalogs will all benefit from the advancing capabilities of simulation technologies in the coming decade—creating new experiences for customers and partners—but will live or die according to their aesthetic quality and immersiveness.

4. A useful simulation empowers us to imagine possibilities and outcomes that expand our horizon.

This last characteristic is in some ways the most obvious, but also the most subtle. All simulations are designed to help us envision possibilities that we haven't yet experienced, but there's a signif-

icant difference between imagining a variation on a situation we've experienced and imagining something that unlocks new possibilities for us or the world. The most effective simulations are those where the possible outcomes and endpoints are not already fixed and hard-coded, but where the simulation provides an opportunity to uncover novel paths or emergent possibilities unforeseen by the simulation designer. Our never-ending drive for exploration requires the allure of mystery and the promise of genuine discovery within the bounds of the simulation for it to truly engage our attention. It's not enough for the simulation to be accurate or consistent—we need to believe in its ability to guide us somewhere truly interesting. This promise is best represented in the fantastical simulator concepts presented by Star Trek's Holodeck, the Oracle's crystal ball, dimension-hopping portals and magic mirrors. We don't want to just understand the world we inhabit, we want to understand the world beyond the world we've seen. We want to talk to animals, meet aliens and God, travel to the future, and cross the threshold into the infinite alternate dimensions running beside our own. This is the promise of simulation technologies and the literacies that will inform them over the coming decade.



Alan Clark

by Scott Minneman

Objects Copping Attitude

Over the next decade, we'll create a world where myriad everyday objects will combine sensing, actuation, and sophisticated local and networked computing for intelligent and autonomous functionality. Some objects will be entrusted to carry out tasks on our behalf automatically (think smart thermostats, security systems, robots, and vehicles), while other objects will intuitively converse with us and take note of our gestures and reactions. Rich sensor data and novel feedback will be incorporated into new device capabilities that will become integral parts of our lives.

Companies often will aim these devices at

facets of our lives that we perceive as monotonous or troublesome, while other applications are designed simply to delight us. Consumers attracted to the utility and seduced by the novelty of these new experiences—sometimes loosed on the world before they are completely ready—possibly overlook major shortcomings, errors, and risks, and carelessly ignore the privacy and security issues that may arise. We may not fully trust any of our options, but we'll proceed anyway, because of the immediate rewards of convenience and utility.

While these emerging systems are becom-

ing more sophisticated, many also exhibit very curious behaviors. Image classifier software's confusion when presented with pictures of Chihuahua dogs and blueberry muffins [pic] is just one example of how "brittle" AI can be. More disturbing are cases that demonstrate how easily simple changes to stop signs [pic] can hinder their recognition. On one hand, AI can detect subtle patterns in humongous data sets and perform amazing feats of automatic translation, but it can also screw up fairly simple tasks in spectacular and non-intuitive ways that a human never would. Even if the odds of any particular user being involved in a mishap is low, more and more incidents are bound to occur, the impact can be substantial (e.g., human fatalities), and such instances inevitably will be covered by the press. Security breaches are happening at a massive scale and with disturbing regularity—and the millions who are hit see few repercussions (see the discussion of mistrust/distrust, below).

Consumers, though, want and need to place trust in these systems. For intelligent objects to have an impact on our lives, we must be able to place faith in them doing the right thing. In many cases, their very purpose depends on our willingness to delegate—from minor instances like making correct purchases after a voice command, to making a dinner reservation or scheduling a haircut, to safely driving us from Point A to Point B. Trust with other people isn't absolute and unconditional—I may be willing to loan you \$10 for lunch, but unwilling to lend you \$1000 if you won't say what it's for—and there's no reason to think the situation will differ for our trust in objects, services, or brands.

One well-established finding from human-computer interaction is that users treat interactive systems as social actors. Cliff Nass and Byron Reeves extensively researched this topic at Stanford, and it has proven to be a very robust theory (dubbed the "Media Equation"). The Media Equation is markedly different than our tendency to anthropomorphize and zoomorphize—people don't necessarily attribute human or animal qualities to their interactive technologies, but they do apply their social skills during their interactions, and interpret responses as if they were coming from a social being ("Thank you, Siri."). As our intelligent systems become responsive in increasingly sophisticated ways, it makes complete sense that consumers will become even more entrenched in treating sys-

tems as social actors.

Viewing exchanges with interactive devices through this lens, we're inevitably going to apply our social skills when interacting with them and interpreting their responses. So, to better understand how trust functions in interactive systems, we should examine social exchanges with them. We begin with a survey of what's known about how human-to-human trust is negotiated, as well as the factors affecting animals and objects as social and interactive entities.

Ultimately, we're aiming to uncover heuristics about how to engineer, design, and create user experiences that people trust. How can the abilities *and* limits of an intelligent system be communicated to consumers? How can such systems—especially the most successful and deeply embedded ones (e.g., adaptive cruise control on cars)—be foregrounded and applauded for their successes? If all we hear about are horror stories and the cutting edge, then the progress of mundane but important embedded intelligence becomes invisible. How can we craft our users' impressions and expectations? How can the errors that these objects and systems inevitably will make be minimized, and how can the negative consequences of these shortcomings be mitigated? How can we get people to recognize and accept inherent risks? How will damages to affected parties be handled? What will happen to the responsible parties? What if the responsible entity is an algorithm? And what if that algorithm taught itself to take whatever action caused the incident?

Human-to-Human Trust

Trusted people are generally seen as 1) benevolent (fundamentally kind); 2) having integrity (seemingly honest); 3) competent (capable of following through), and 4) predictable (behaving in a way that can consistently be forecast). These qualities are not easy to assess, and their importance shifts around based on specifics of the transaction in question (e.g., competence is prioritized in a life-and-death situation). Trust has been studied from myriad perspectives, including psychology, sociology, anthropology, economics, neurophysiology, and more.

Most all of those who study trust agree that it is a near-essential social lubricant and core pillar of a civilized society. Most also agree that trust is kind of a shortcut—we trust so that we don't have to repeatedly make complicated and

time-consuming assessments of whether or not to trust. These decisions and criteria should not be viewed as binary or absolute—trust is both a continuum and highly conditional. And, while we typically think of trust as being between individuals, many studies deal with other configurations, like trusting unseen strangers or trusting faceless institutions (e.g., banks, governments, corporations, or brands). In the world of trusting objects and services, these latter factors may dominate initial encounters and long-term choices (i.e., objects and brands tend to be anonymized and faceless).

Trust isn't all conscious and rational, though. Neuroscientists examining activity in the fight-or-flight area of the amygdala using fMRI techniques found activation within 33 milliseconds when subjects were presented with faces with dishonest facial features. Reasoned evaluations can eventually overcome a negative initial impression, but occur much more slowly than the brain's amygdala distrust response, and people may not be granted the time and consideration for more rational assessment. There's truth in the adage that "fear breeds distrust." Trust also has a neurochemical side; neuroscientists have found that elevated levels of the hormone and neurotransmitter Oxytocin is a critical factor in trusting others, and researchers were even able to induce trust by administering synthetic oxytocin.

One particular branch of sociology examines trust as a social construct, one that is *negotiated* over the course of interactions with others. Trust is generally seen as desirable, mutually beneficial, and linked to the evaluation of the other's trustworthy qualities, starting with whether or not they seem reliable and capable. Evaluating another party's trustworthiness is a social skill—one that's developed as a way for human beings to efficiently and effectively work with each other. We experience trust as a positive regard for a person (or institution), and we also experience trust as feelings of safety. Others perceive that we trust them, based on our actions, and the situation proceeds as a mutual dance of reinforcing (or undermining) those conclusions (at both the micro and macro level). Trust is established and maintained by parties through interactions signaling that they are trustworthy, and that the other's trust is well-placed.

Looking at trust from this perspective is especially useful as we extend the concept into

the realm of objects. How do we come to trust other sorts of entities through interactions and signals of their trustworthiness? Let's shift our gaze to entities that aren't sapient, but who are merely sentient, and then to others that are simply responsive.

Human-to-Animal Trust

Humans began domesticating animals in the late-Pleistocene, starting with dogs and spreading to more utilitarian species like draft animals for agriculture and optimized prey animals for food. The path to domestication is a lengthy one of carefully selecting breeding pairs to enhance desirable traits and eliminate undesirable ones (like aggression).

Trusted animals tend to be 1) obedient; 2) good-tempered; 3) predictable, reliable and consistent, and 4) useful (strong, protective, and possibly cute). Alongside, some animals have bonus qualities that we appreciate. We like to be able to train and control them easily; we often confide in them (and they won't tell, except for the occasional parrot); we typically enjoy when they're playful and affectionate; they tend to be honest and transparent, and we develop strong bonds and histories with them (they occupy our thoughts and memories).

For domesticated animals, trust is an interactional two-way street. If humans behave in a threatening way, intentionally or unintentionally, the results can get ugly. With dogs, for example, we need to properly approach unfamiliar animals, signal friendliness and be consistent, and watch for discomfort and/or aggression. A dog with a loose, wagging tail is a good sign; a tail held high and rigid or low and tucked are both bad. Safely approaching a horse is another matter, with a totally different set of dos and don'ts, as well as new and different signals to read.

Human-to-Object Trust

Over the past centuries, humans have developed increasingly capable machines, and we have extended the concept of trust into this arena. Trusting objects boils down to being able to put faith in the device's ability to accomplish a task without faltering (and especially avoiding failures that would put us at risk (financial loss, injury, life/death)). The list of trustworthy qualities desired for us to be able to trust a machine doesn't differ wildly from the list for animals, but for our simplest machines, it's shorter: 1)

they must be reliable and predictable, and 2) they must be useful. Again, there is a secondary list of appreciated qualities that include having experience and history with the object, it having a good reputation, and it being intuitive and controllable, but that's about it for a simple machine.

Automobiles, for instance, met mixed reviews from the public early on. They broke down frequently, and disturbed the quiet of rural environments—some farmers actually set traps for the so-called “devil wagons.” Later, their speed and range won over more drivers, and interpretive flexibility (maker-style bricolage) endeared the automobile to many farmers (and spawned more utility configurations). As the automobile became more reliable, trust entered the equation more directly, where we'd ask if we trusted a particular vehicle for a long-distance trip (across a desert, or over a mountain range). Again, these determinations are often couched in terms of ramifications of failure—will a breakdown merely be inconvenient, or might it be deadly? When autonomous cars start making real headway onto the streets, there likely will be an extended period of well-deserved trepidation.

Trust vs. Trustworthiness

So, what we've learned so far is crucial: that trust is a state of mind in another sentient being—it cannot be directly controlled by an outside party. What people, animals, and even things do is to *signal trustworthiness* by exhibiting a variety of qualities that others can directly perceive. If the recipient is receptive, and the trustworthy behavior is consistent and genuine, trust will follow. Further, that trust will typically be experienced as an *achievement*, and all entities involved will invest time and energy in furthering the relationship.

What happens in situations where something is serving as a proxy for (or conduit to) an entity that people need to trust, like a company we're considering a purchase from? The Internet has lots of advice about, for instance, Web sites that will engender trust. These qualities include: good design (grid, fonts, etc.), good press and awards, prominent contact information, “who we are” bios, social media links, forums and testimonials, frequent updates, certificates and security, demonstrated expertise, “go blue” (the belief that aligning with the Facebook/Twitter aesthetic nudges towards trust), no spelling or grammatical errors, minimal advertising, being humble

and concise, incentives for initial engagement, evidence of desiring ongoing/lasting contact, and a humanized attitude.

Avoiding Mistrust and Distrust

Another important lesson from how trust emerges through interactions is that arousing mistrust and triggering distrust must be avoided at all costs, especially when people have little or no incentive to return (or where they have myriad other options to pursue). Once an experience has soured a user to an object, or where a consumer has been burned by a brand, it can be very difficult to change their mind.

During the first game of the NBA finals this year, there were three different television advertisements from companies that were essentially pleading with the public to trust them again. Facebook, Wells Fargo, and Uber each had recent major incidents that demonstrated that they weren't trustworthy, and each was seemingly trying to convince consumers that they should return to the fold by simply asserting that it was time to trust them again. These weak arguments are insufficient to rebuild trust.

Value Systems and Trusted Objects

How designers treat the sentient behaviors of intelligent objects and systems is a key factor in how people will approach them in the wild. Systems that we interact with using techniques heretofore reserved for human-to-human interaction tread into new territory for emotional connection and trust. Operating a device with voice commands and gestures, devices that respond to our body language or facial expressions, and even devices that utilize location information or computer vision for context-aware interactivity... all of these emerging modalities imbue our user experiences with a growing sense that objects are more “alive” than ever before.

On the other hand, intelligent objects need not interact in these human-like ways. A well-designed recommender algorithm can be totally disembodied and still exhibit remarkable intelligence. You'll hear people say that Netflix or Spotify occasionally “reads their mind” with a timely song or by suggesting a movie that they were just thinking about. Amazon will sometimes promote a purchase that a consumer had been musing about but hadn't yet searched. These sorts of examples reveal that our brains are associative in ways that have some similarities to how under-

lying algorithms work. In terms of trust, these systems capitalize on our tendency to trust those who share our interests and preferences.

Still, because of our natural tendency to treat objects that display any sentience with greater abilities than they really possess, designers have to think differently when crafting these systems. If one creates an expectation that an object or system is smarter than it actually is, users will repeatedly be disappointed when their experience falls short. If, on the other hand, designers can create experiences where users' expectations are exceeded, then people potentially can be delighted, over and over.

Ok, then...what are some of the tools and techniques that can reliably be utilized to create these delightful experiences? Can we leverage the observations we've made about trusting people, animals, and interactive objects to improve our odds of success?

Utility and Appeal

With every object or service, consumers have some form of initial exposure—they may see something in use, maybe see somebody else using it, or view/hear an advertisement. Some people are early adopters, and will be attracted to the sheer novelty of a new offering of any sort. Others will have healthy curiosity but will want to know more before coming aboard, often listening to reports back from the early adopters and reviews. Other segments of the populace are more reticent and will not adopt a new technology until they're forced to by the prior technology's obsolescence.

However it happens, first contact is a crucial touchpoint. It's not that 33 millisecond "take" the neuroscientists discovered, but it's a safe bet that everybody has apps on their phones that they downloaded and opened only once, and stories about objects that they purchased and then donated to Goodwill (or sent back to Amazon) shortly after removal from the box. We must first believe that an object has a significant purpose in our lives—that it fills a void of some sort for us—and the customer's user experience has to align with that.

It won't be long before affective computing will be watching these early exposures to new devices and capabilities, determining what particular users find appealing, and leveraging that information to increase the odds of long-term adoption. Previously stable consumer goods

will become self-tuning and responsive systems, across numerous touchpoints, accommodating different users' preferences.

Familiarity

One sure-fire way into anybody's comfort zone is being familiar and recognizable. Recognizing what to do with an object or service doesn't preclude novelty, it simply requires an intuitive path to its functionality. This applies across all touchpoints and crosses many dimensions...materials, fonts, colors, sounds, form, and more...but also calls for a gestalt.

We're exploring new territory when our physical devices have embedded intelligence and personality. The more this occurs, the more consumers will develop a reliance upon and history with their intelligent agents—no doubt people will form strong attachments to these objects. Some die-hard consumers were distraught when Sony discontinued service for the sophisticated Aibo robotic dog in 2014 (15 years after introduction and 8 years since final production), because a failure from that point on would essentially mean that their robotic dog had actually died. Will these new products' personas come along with us, or will they die once the object is retired? If one has come to trust a device with embedded intelligence, it'd make sense to parlay that into a new device, but how will that square with the ever-increasing capabilities of the hardware and software?

Usability

People hate being confused by interactions with objects and services. More often than not, interaction errors are the fault of sloppy design, hurried development (so-called "minimally viable products" (MVP) are a frequent culprit in the world of contemporary design practice), bad underlying infrastructure, and other preventable facets of an object's trajectory.

As designers, this is challenging terrain, especially with highly diverse demographics. The "flat design" revolution that overtook "skeuomorphism" a few years back left a lot of consumers (and human-computer interaction experts) reeling. Older consumers were mystified by interfaces that gave few cues about how to interact, while being reluctant to use a "just swipe around and see what happens" approach.

Over the next decade, people likely are going to be coming up to speed on dozens of major

new technologies. AR and VR, drones, conversational computing, robotics, wearables, artificial intelligence, and IoT (Internet of Things) will move to the mainstream, while long-standing systems of banking, transportation, governance, education and the workplace will be undergoing major changes. Gratuitous additions to the pace of change will not be appreciated, so sticking to standards and accepted heuristics is wise for cases where those modalities are adequate.

Appropriateness

There is no universal language for trusted objects and systems. Brands cannot simply tell designers to “go blue” and gain an increment of trust. Designing in the intelligent systems arena is more about matching expectations and being consistent across touchpoints than it is about appealing to some set of trustworthiness qualities. If an object is dealing with life-or-death matters, then all of its design details need to reflect that. If the object is aimed at a more playful purpose and demographic, then its design typically will reflect that.

This point is clearly demonstrated by a case where a design team (including this author) was creating an interactive museum exhibit to showcase the state of the art in “machine reading” for an interactive museum show called “eXperiments in the Future of Reading” (XFR). We wanted it to take an interesting form factor, because a flatbed scanner with image-to-text and text-to-speech algorithms running on a workstation wasn’t very engaging. We toyed with a robot form, but we quickly realized that Hollywood SciFi movies had set the bar so high for expectations about humanoid robots that our current, error-prone performance would likely disappoint our visitors. After some thought, we eventually chose to make a Reading-Eye Dog (RED), which was essentially the same machine reading technology in a metallic canine. [pic] Sure, RED made occasional mistakes, but he was an adorable robot dog that could both read and talk! Smartest dog in the world! RED became the mascot of the XFR show, and was a complete hit, in part because the physical form of the interactive technology and the performance it achieved were in alignment. RED’s reading abilities, though imperfect, met (and exceeded) visitor expectations.

Community

Few things signal trustworthiness for a product or brand more strongly than the observation that everybody else has one and/or is using it. Face the facts, people are a little lazy, and they lean on their family, friends, and acquaintances to help them make sense of the world. This factor can get many a consumer over the initial hump. Even a product unboxing on YouTube or a collection of good ratings on Amazon can help establish legitimacy and trust, although these are becoming increasingly suspect in an era where it’s simple to buy positive reviews and sic bots on the task of making a product look good.

After that, community can continue to help out. An active community of users who have a forum where frequent problems are addressed can foster trust, as can a bunch of active users who solve problems and provide upgrades (e.g., with an open-source device). Furthermore, a highly-responsive company can be a reassuring presence to their consumer community, especially when they address customer concerns swiftly and respectfully.

Reliability

Reliability is a big factor in the trust equation. Does the thing actually do what it’s supposed to? Every time? It’s highly risky to overpromise and create expectations that aren’t met. These days, all too many sophisticated products have an accompanying app to set up the device. These are often actually the site of first exposure, and they seldom measure up. All parts of the ecosystem need to match the excellence of your object.

Remember, warm fuzzy feelings of safety and dependability are what people are after. It’s a steep slope, but can I depend on this thing with my sensitive information? 1) with the security of my house? 2) for safely feeding my pet? 3) with monitoring my baby’s sleep? 4) for delivering this project proposal to a client? 5) for driving me to work? 6) to invest my retirement nest egg wisely? 7) with flying my family to Thanksgiving dinner at grandma’s place?

How does one signal reliability to consumers? Personal and professional testimonials? Up-time and redundancy statistics? What are some other tactics? Do mesh networks and decentralization make you look reliable, or just edgy? What demographics applaud edgy, and which ones want best-of-breed legacy techniques?

Transparency

A potentially huge factor in how confident people will be to adopt some of the most cutting edge instances of embedded intelligence is whether the technology can explain its behavior and justify its decisions. Particularly important where a trusted system takes action on a users' behalf, these systems must provide an adequate and comprehensible account for their autonomous actions. Many experts view this as a problem with current forms of deep learning, where the relationship between inputs and outputs has been forged through thousands of training examples, but where there's not necessarily a human-understandable explanation of how the layers of the neural network reached a conclusion.

Some users will not care about algorithmic transparency, but there are settings where "we aren't sure why our software did that" will simply not fly. For example, if Uber is taken to court over the misdeed of an autonomous vehicle where a human life was lost, their corporate lawyers had better be able to clearly answer why the vehicle did what it did.

Security

Deciding that one trusts an object implies that the object will not just keep the traditional things you value (health, family, belongings, etc.) safe, it also implies that the object will endeavor to keep your information safe. In this age of hacking, this can be a challenge, but this factor goes further than that. Consumers are going to want to know that their data is being guarded carefully, that it is not being misused for commercial purposes, and that it isn't being circulated longer or further than necessary. That last point is one where we may well see a major shift in upcoming years—once computing that previously needed the cloud (e.g., speech recognition) can be performed locally, will consumers demand that it be done that way?

Device security is a perpetual challenge, especially on compact distributed systems that will be an integral part of activating spaces and making some sorts of intelligent environments possible. Users of intelligent systems are likely to be uninterested and possibly unwilling to be saddled with the responsibility for keeping their myriad devices up-to-date, but software patches to fix discovered vulnerabilities will be necessary for the foreseeable future. Leaving devices

open for over-the-air updates in order to automate this process only leaves them *more* vulnerable. What rights do consumers have to decide their own fates in these cybersecurity battles? Can a consumer go rogue and disable updates on a device they own? 1) if it's a power drill? 2) if it's an espresso machine that insists that it's a "subscription only" coffeemaker? What about a car? 1) can Tesla brick your Model Z if you don't let them monitor your driving and do their periodic "upgrades"?

Conclusion

Trust is fast becoming one of the most critical cornerstones of our experiences with interactive objects (and the bigger ecosystems of which the objects are a part). Consumer trust, however, is not something that can be directly manipulated. Consumer trust is built up over time through positive interactions with a brand's myriad touchpoints, by demonstrating trustworthiness at every possible moment.

Because people involuntarily treat interactive systems as social actors, designers can effectively approach making positive trust impressions through the same signals used with people and familiar sentient beings. The best strategy is to create uniformly positive signals of trustworthiness across all of the touchpoints that designers and brands can control, reinforcing their trustworthiness using all the means at their disposal.

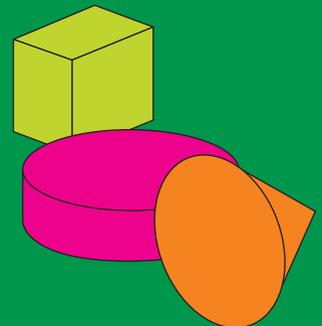
Negative impressions must be avoided at all costs, because direct experiences of trust betrayal (as well as secondary reports from others, or coverage in the media), can rapidly unravel consumer trust in ways that will be difficult or even impossible to repair. Unfortunately, trust can also be undermined by outside influences, like when an entire technology sector becomes viewed with distrust because of a highly-visible incident (e.g., Uber's recent pedestrian fatality tarnished the entire autonomous car sector).

As intelligent systems proliferate and become more sophisticated, consumers will need to become savvier about evaluating trustworthiness in their user experiences. Brands will be forced to become hyper-vigilant about the impressions they are making on their customers, even while the experiences creating those impressions continue to undergo expansion and churn. Those who learn to craft and control consumer perceptions of trustworthiness will thrive.

Collaborating With Nonhuman Actors

Insights for remodeling trust:

- » As machine intelligence turns everyday objects into actors in our business, social, and civic spheres, people will draw on their experiences with other people—and animals—to make sense of how to engage intelligent machines. Designing trust into these objects will mean importing insights from these fields to define new kinds of approaches and models for human-machine interaction.
- » The rise of simulation technologies—in the form of high fidelity virtual and augmented reality, coupled with sophisticated back-end models—is putting the power of advanced simulation into widespread use. As these capabilities emerge, their greatest value will stem from enabling us to test and understand the assumptions we put into a model—rather than simply using them to point us toward outcomes.
- » In much the same way that the ability to reach an audience has been democratized, the ability to command an army of bots to shape discourse and sow discord is becoming democratized. Mitigating the effects of this will require industry-level responses that utilize bots and related tools to support social connection.



Blurring Institutional Responsibilities and Boundaries

Who makes the rules?

Factors that connect people globally are remaking how we relate to each other. Edelman's 2017 Trust Barometer showed that trust in government, media, corporations, and NGOs are in worldwide decline. Corporations are being disrupted by the platform economy, and governmental agreements are being pushed aside. Technology companies have become de facto arbiters of global speech, private companies have been targets of cybercrimes by state actors, and U.S. cities and states are committing to treaties that directly contradict federal policy. Enforcement of rules is up for grabs as blockchain advances are effectively turning code into law.

Bringing Trust to Supply Chains

What following fish can teach us about the future of tracking and transparency

by Quinault Childs

On a small group of fishing vessels in New England, video cameras connected to computers running machine-learning algorithms are beginning to take the place of human monitors who enforce catch limits. It may come as no surprise—after all, nearly every other industry seems to be giving in to the unstoppable tide of automation. But there’s no sense of animosity towards robots taking the jobs of hard-working Americans here. In fact, the automated system allows both fishermen and enforcement agents to relax a little, since the two traditionally at-odds parties no longer have to manage the atmosphere of suspicion and distrust that comes with catch monitoring. In a human-to-human system, the regulator suspects that the fisherman has an economic incentive to break the regulation, transferring fish from boat-to-boat as a way to avoid catch limitations, and the fisherman suspects that the regulator has an incentive to be overzealous in enforcement. Enter the automated monitoring system: suddenly, that mutual distrust evaporates. It’s hard to argue with an algorithm.

There’s a trend emerging in the fish supply chain that the example above highlights: technology is working towards an *automated infrastructure* of trust. Because responsibilities for governing fisheries are so diffuse, and because gaming the

system can be so profitable, fisheries management is at the leading edge of new supply chain innovations aimed at embedding rules and systems of trust into every action along the chain. And although the supply chain may remain fairly linear—albeit messy—for years to come, the burden of trust will increasingly be shouldered by digital actors across all stages of the chain.

Such a supply chain will demand new practices. While in some cases (like the example above), it will relieve the friction of mistrust, in others, it will require an increased understanding of how to manage black box algorithms and an openness to share data with collaborators, or an acceptance that you might not be the final authority on the trustworthiness of your own product. Examining a few more examples in this space reveals how the next era of supply chains will be one of managing an automated network of trust.

Beyond just automating monitoring, the analysis of monitoring data is also moving out of the hands of humans and into the decision-making realm of machines. Mark Spalding, President of The Ocean Foundation, says the practice of modeling components of small systems on a large scale can lead to new trust innovations. For example, a small and local fish supply chain—say a fishing village in Thailand—is trivial to monitor, because there is line of sight. Other fishermen out in the ocean can keep an eye on one another, the customer can see the fish being brought into market, everyone can see how the fish was handled, etc. When we move to a sprawling global supply chain, we lose a lot of this simple regulation inherent to small systems. However, through key technologies, we can bring it back, making huge systems look more like small systems. Around the world, collaborative remote sensing initiatives—spearheaded by technology companies collaborating with big data experts and conservation groups—are using algorithms to parse vast datasets of boat movements, picking out individual vessels that are displaying activity indicative of fraudulent fish trade. Like a small-scale fishery where line of sight functions as an informal system of trust, satellite monitoring and machine-learning-driven data analysis functions as a global line of sight.

These satellite-based lines of sight, however, aren’t exactly the same as their human counterparts. The Global Fishing Watch (GFW), a collaboration between Oceana (a conservation group),

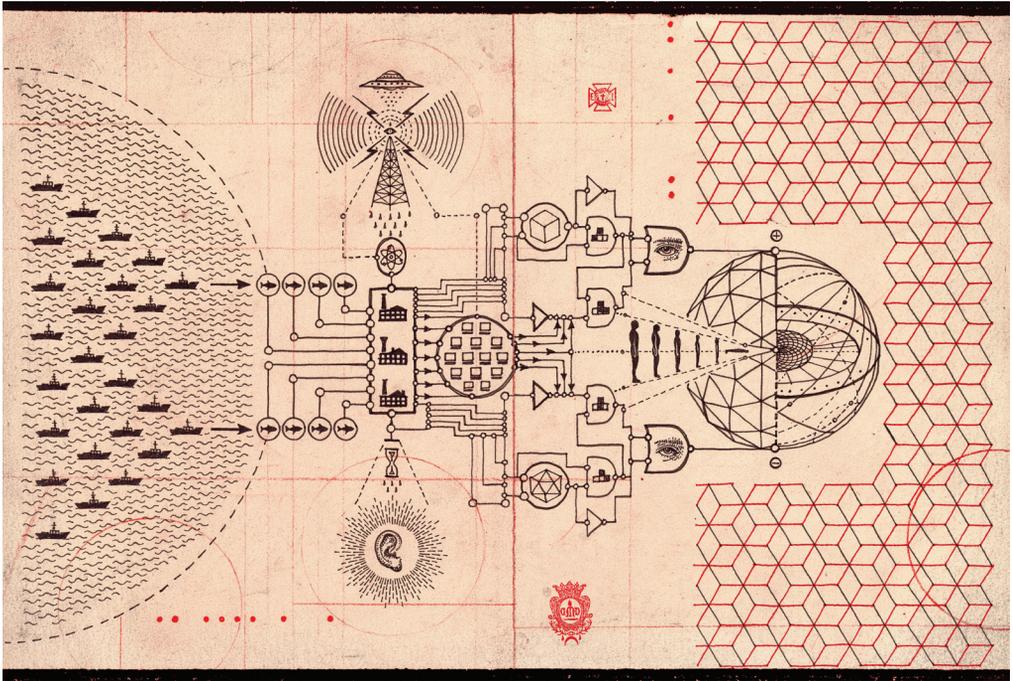


Illustration by Daniel Martin Diaz

Skytruth (a nonprofit that uses remote sensing), and Google (the source of data and computing power), monitors the world's oceans via satellite, and finds anomalies in boat movements that indicate potential fish fraud. While none of these stakeholders have an all-encompassing understanding of domain knowledge, data, machine learning capabilities, and need, this type of interdisciplinary collaboration is becoming more common as a way to both implement and navigate automated forms of trust.

The GFW is somewhat transparent in its process. Basically speaking, when it sees two vessels spending more than a certain amount of time next to each other in certain parts of the ocean, it perceives a diversion from the norm that has a pretty high correlation with illicit transfer of fish. But as the groups that make up GFW come together and form processes for automating trust that rely on the cooperation of many people, there is a tradeoff between effective enforcement of regulations (improving the ability of a buyer to trust that their fish is legitimate) and requiring *all* actors to just go along with the idea that the automated process knows what's best.

Other tools, like the Seafood Slavery Risk Tool, an open platform that anyone can use to

check a fishery's risk of human rights violations, or FISH-i Africa, a group that tracks data on fishing vessels in the Western Indian Ocean, are becoming new authorities on issues of trust in fish. Not all of these are purely based on algorithms per se, but all of them require an amount of data interpretation that relies on inputs from a broad range of sources. As these platforms and verification systems become more prevalent, we'll see a similar tradeoff: we'll gain more eyes (both human and machine) watching for fraud, but we may be leaving the interpretation of the data up to self-identified experts.

As we move into this paradigm, the consequences will be varied. On one hand, the immediate cost of verification and monitoring may go down—think of the fishermen who would much prefer a fully automated system over a human system. On the other, there will be costs associated with verifying the verifiers—think of how difficult it will become to know how remote sensing systems paired with algorithms using datasets coming from thousands of different inputs actually make the decisions that they do. Supply chains will rely less on first-level human verification, and much more on human management of machine verification.

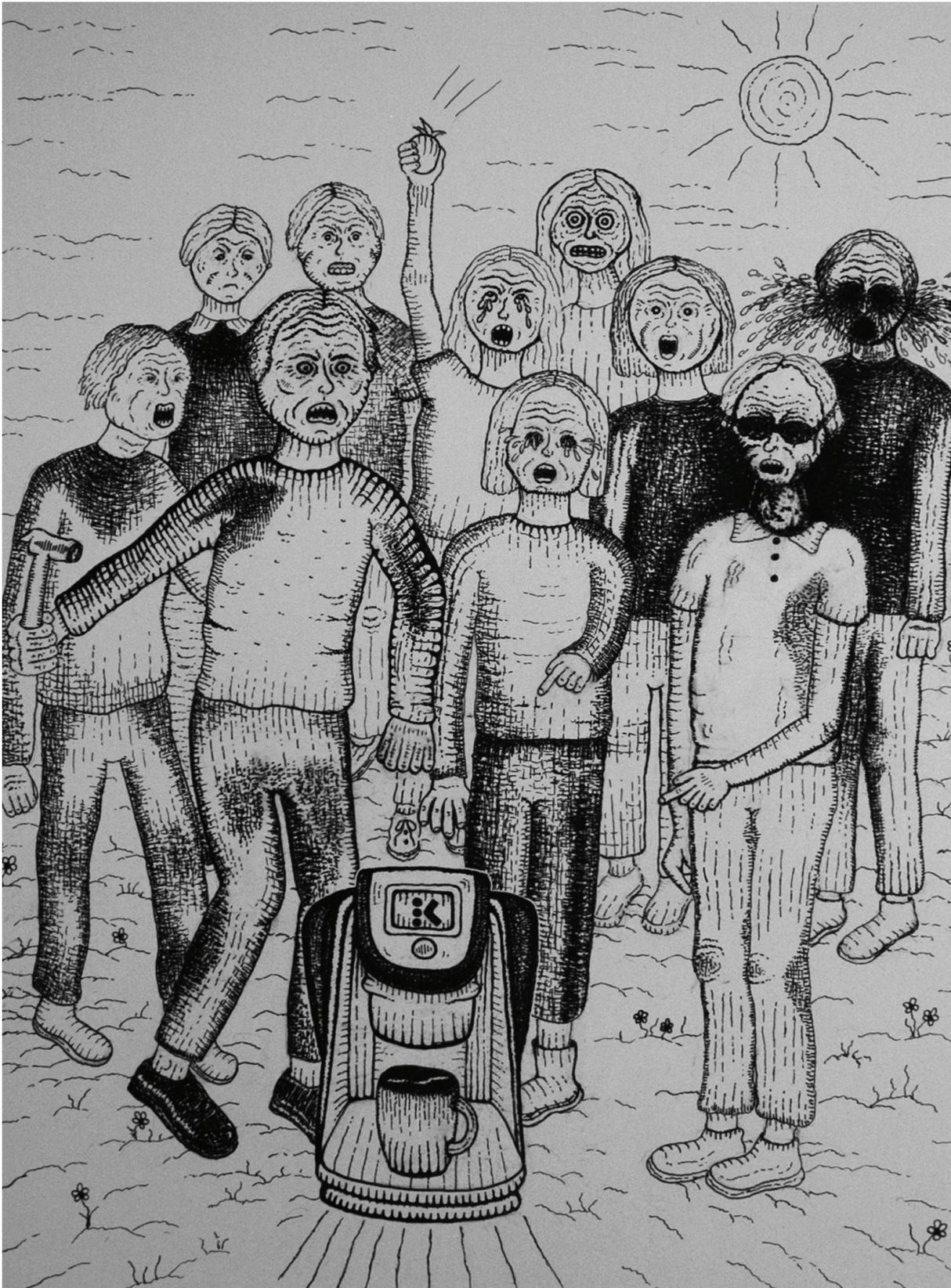


Illustration by Sarina Sinclair

The impulse for consumer brands to avoid politics seems increasingly like wishful thinking

by Rob Walker

The Big Tent is Burning Down

Candidates for elective office seem increasingly obsessed with pandering to an extreme voter base, and capitulating to one form or another of litmus-test loyalty. Mass-oriented brands, in contrast, strive for what politicians (used to?) call “big tent” appeal: They welcome, by and large, anyone who is ready to buy whatever it is they’re peddling. The big-tent brand remains strictly apolitical, floating above blunt partisanship.

Or at least that’s how it’s been through most of the history of capitalism. But by the time people started uploading videos of themselves destroying their fancy coffee machines as an act of

ideological expression last year, something had clearly changed.

That episode, actually, neatly summarizes the ways that Trump-era polarization, supercharged by social media and a hothouse news environment, forces brands into our volatile political discourse whether they want to be there or not.

It started when the arch-conservative Fox News and syndicated radio host Sean Hannity seemed to defend Roy Moore, a wildly controversial Republican candidate for an Alabama Senate seat who had been accused of groping underage girls. Left-leaning watchdog Media Matters

responded by attacking not just Hannity, but various companies that bought ad time on his show. A number of advertisers pulled out. One was Keurig, the maker of a popular pod-based coffee maker.

All of which is pretty much in line with how these scenarios have played out for decades: brands don't exactly take sides, they just avoid controversy, and quietly slink away if they sense a political flashpoint might singe them. Keurig is obviously a big-tent brand, not looking to have any stake in an Alabama senate race, or partisan politics generally.

“When a pizza chain finds itself
needing to denounce the support of
neo-Nazis, the brand is in trouble.”

But then Hannity fans responded to this backlash with their own backlash. They singled out Keurig, first by way of a #boycottkeurig campaign. In the age of “hit back 10 times harder,” that seemed pretty tepid. So people started to inflict violence on the actual appliance—beating it to pieces with a hammer, throwing it off a balcony—and sharing the results online. The mainstream press dutifully amplified these stunts, and the politicization of Keurig was complete. “I am humbled and speechless and frankly laughing my ass off,” Hannity tweeted. “I love all my deplorable friends.”

Possibly this weaponization of shopping decisions seems ridiculous. But the pieces have been in place for a while. Political operatives have long recognized certain affinities between certain consumer preferences and voting patterns, and include such data in their demographic profile-driven campaign targeting. Likewise, the boycott is a venerable protest tactic. Moreover, activists have jujitsu-ed brand power at least since the era of pressuring Coca Cola and others to divest from apartheid-era South Africa.

What's changed has much to do with technology—but not just in the obvious ways that social media, for instance, has given everybody a personalized megaphone and a precisely defined echo chamber. The reckless, sloppy, out-of-control practice of “programmatic” advertis-

ing provided a crucial opening. A supposedly hyper-efficient method of matching branded messages to ideal audiences across more online platforms than any human media buyer could ever manage, programmatic networks seem like a great tool for a big-tent advertiser. But it turns out they can also deliver ads into decidedly divisive environments.

The founders of the anonymous Twitter account Sleeping Giants (@slpng_giants) figured this out, and launched a campaign that has caused thousands of brands, large and small, to withdraw ad messages from the alt-right Breitbart.com. At first, one of the founders later explained, he was simply dumbfounded that mainstream and even relatively progressive brands would advertise on such a controversial site. And as Sleeping Giants and a growing army of followers began to bum rush those brands on Twitter, many seemed equally surprised—they had no idea what their programmatic algorithms had decided.

Briart tried its own backlash-to-the-backlash, calling on its readers to boycott and sign a related petition condemning cereal giant Kellogg, after it pulled out of the site. The site also began publishing smashmouth broadsides about the company, attempting to make having a position on the politics of Special K another front in the culture wars.

That didn't really work. But it points to a second characteristic of our age that has politicized consumer brands: the frequency of spiteful escalation. Our political culture increasingly focuses on exploiting and creating divisions, and compromise is not much in the air. They go low—we stomp them. Probably social media contributes to this phenomenon, not just because of the way it siloes us into communities of like-minded belief, but because it makes it so easy to reach and attack one another. If you're going to connect, it has to be with an uppercut.

The fallout can be unpredictable. When some NFL players began to take a knee during the national anthem to bring attention to police violence against African Americans, for instance, nobody predicted this would ultimately have consequences for the Papa John's pizza chain.

But President Donald harshly criticized the protesting players, and the National Football League in general, ignoring the underlying motivation for the protests and replacing it with a kind of nationwide referendum on patriotism.

Working the commercial angle, he also blamed the players for hurting NFL ratings. As the controversy ramped up, that last point was echoed, weirdly, by John Schnatter, the founder of Papa John's: in a conference call with investors, he stated that fewer people were watching football, and thus seeing his company's ads, which was hurting sales.

In a moment of unexpected connection, Papa John's was promptly endorsed by The Daily Stormer, a white supremacist website. The company backpedaled furiously, but when a pizza chain finds itself needing to denounce the support of neo-Nazis, the brand is in trouble. Papa John himself, CEO John Schnatter, resigned.

It's no wonder that despite the sizable media audiences the president constantly attracts, 76 percent of surveyed brands "explicitly avoid advertising next to Trump-related content," according to research from the marketing publication Digiday.

That's a traditional, controversy-averse, big-tent brand stance. But the impulse to avoid politics altogether seems increasingly like wishful thinking. And while Digiday reports that just 16 percent of the brands it canvassed believe it's in their interest to "wade into political commentary," there's some evidence of one last shift in the consumption and ideology zeitgeist. Some striking, if anecdotal, examples show brands taking remarkably direct and proactive decisions with unmistakable political implications.

A few relatively mainstream brands have always had associations with a distinct ideological worldview—Patagonia, for instance, builds environmental progressivism into its identity; Chick-fil-A and Hobby Lobby openly embrace conservative religious values, and so on. Some are amplifying such messages, testing the idea that taking a political stance means touching the third rail of branding. The founder of a Wisconsin company called Penzeys Spices lost some customers, but ultimately saw sales spike, after an email to customers slammed "the open embrace of racism by the Republican Party." Yogurt maker Chobani has made it a point to hire refugee immigrants, defying conservative media critics. Patagonia actually sued the president in an effort to reverse the shrinking of the Bear Ears National Monument.

But the most intriguing examples involve brands making concrete decisions with political implications that may seem unexpected or even

counterintuitive. In the aftermath of the Parkland, Florida school massacre, the decidedly big-tent retailer Wal-Mart banned firearm sales to customers under age 21. Dick's Sporting Goods did the same, and not only decided to stop selling AR-15-style rifles, but destroyed its existing stock. A slew of mainstream companies—from Hertz to Metlife to United Airlines—severed ties to the National Rifle Association, ending various promotional partnerships.

Those decisions didn't come out of nowhere. They followed the now-familiar blizzard of social media complaints, combined with the startlingly savvy and effective activism of Parkland students. It was, perhaps, an extreme case, but maybe it points to the future. When partisan flashpoints emerge, more brands realize that they will simply have to take a stand, whether they want to or not. The worst political move may now be to pretend to be above politics.

And the second worst political move might be to hem and haw and hesitate. The metabolism of public discourse has obviously accelerated. You can see it in the #metoo movement, which has toppled stars in entertainment and the media and other fields with breathtaking swiftness. You could see it in the speed with which ABC pulled the plug on its ratings-gold Roseanne reboot mere hours after a blatantly racist tweet from creator/star Roseanne Barr. And you could see it in how quickly Starbucks responded to the embarrassing mistreatment of black customers in one of its outlets with a showy nationwide sensitivity-training effort. Commerce, of course, figures prominently in all these decisions, and their velocity: networks don't wait around to see if an advertiser rebellion emerges, and mainstream-focused businesses don't hang back to see if a damaging boycott really happens. They act.

What's most fascinating about this is how companies' ties to the bottom-line world of the real marketplace may result in decisions that differ from those of politicians forever pandering to the base. All those corporations that walked away from the National Rifle Association seem to be surviving that supposedly controversial decision quite nicely. How many NRA-embracing politicians could do the same? Maybe brands will end up having something useful to contribute to our chaotic marketplace of ideas.



Illustration by Alan Clark

The role (and future) of “trust” in international power

by Jamais Cascio

From Anarchy to Chaos

Anarchy and chaos are not the same. Anarchy can have rules, norms, and cooperation, (just no top down leadership). Chaos, conversely, means a lack of those rules, norms, and cooperation. It's intrinsically inconsistent and unpredictable. The role of trust in the international system is to serve as the line between anarchy and chaos. But over the next decade, that line will come under increasing strain as several factors will push us from anarchy towards chaos.

The international order is predicated upon trust, but a particular manifestation of trust: the belief that a state-level actor will behave with *consistency*. Consistent behavior does not necessarily mean promises kept or treaties signed, only that the country in question acts in ways that correspond to past behavior. Does a country's leadership (as manifested in its political, social, and economic institutions) make choices that echo the patterns of past decisions, for good or ill? A

“rogue nation” may be notorious for violating agreements or undermining treaties, but such notoriety can itself be seen as a form of trustworthiness—when that rogue nation again violates an international norm, it comes as no surprise to others. Competitors and neighbors will already have plans in place to deal with the latest bit of misbehavior. A state that behaves inconsistently, even when its new behavior is superficially positive, engenders mistrust (witness the suspicious reactions to the denuclearization overtures by North Korea early in 2018).

Anarchy, as understood by political science, is not the same as chaos. Anarchy means the lack of top-down leadership...Chaos, conversely, means a lack of those rules, norms, and cooperation.

The notion that the international system relies on trust may sound alien to political science theorists. Indeed, “trust” is a term not often heard in matters of international relations. In most formulations of political theory, the international system is seen as intrinsically *anarchic*—without an overarching political structure or ruler. Thomas Hobbes, in *Leviathan* (1651), describes anarchic systems as akin to the “state of nature,” where lives are “nasty, brutish, and short.” Without a dominating sovereign to impose and enforce laws, individuals (and individual nations) must maintain their own security. In a “war of all against all,” how can there be trust?

But trust built on the expectation of consistency is not incompatible with anarchy; arguably, it’s the only form of trust that’s possible in such a system.

Anarchy, as understood by political science, is not the same as chaos. Anarchy means the lack of top-down leadership—as we’ve seen across the spectrum of technological and social campaigns, bottom-up movements can enable rules, norms, and cooperation even without a Leviathan in charge. We might even think of anarchy as the political science version of “organizing without organizations.”

Chaos, conversely, means a lack of those rules, norms, and cooperation. It’s intrinsically inconsistent and unpredictable. Chaos is, unsurprisingly, both a cause of and a result of conflict. It arises when behavioral consistency is shattered: when a trade agreement is abrogated by a state that has historically been a defender of such pacts; when an alliance is unilaterally broken; when (most bluntly) a state launches a surprise attack against another country.

Inconsistency in state behavior can have a wide array of drivers, such as unprecedented changes in leadership, for example, or radical shifts in a country’s ability to feed its people. Both internal and external factors can be at work. Again, these do not necessarily mean that the country will misbehave, only that a lack of consistency in behavior (or signs that such inconsistency may be imminent) can lead to international mistrust.

As we look forward over the next decade, there are multiple drivers pushing the planet towards a new era of chaos.

Climate Disruption

Increasing energy in the ocean-atmosphere system raises temperatures, makes storms more powerful, and can alter long-established weather patterns. The near-term consequences of global warming, such as drought or sea level rise, in turn become catalysts for new crises, both physical and political. Famine, pandemic disease, civil war, and mass refugee movements are all likely results of climate disruption—some of which we’ve seen already, and some set to increase in magnitude in the near future.

Climate refugees offer a stark illustration. Involuntary ecological migrants number in the tens of millions now and can be found from Puerto Rico to Bangladesh; by mid-century, this group is likely to hit 140 million or more, according to the World Bank. Climate refugees can range from the temporarily displaced to those considered “climate exiles”—groups unable to ever return home, often because their home region or country no longer exists. Involuntary ecological migrants will make up an increasing number of those seeking asylum. If, as some have argued, the Syrian civil war was at its root climate-driven, climate refugees may already be a majority of those presently fleeing to Europe.

Climate-driven crises such as these can be catalysts for altering state-level behavior in unexpected ways. We’ve already seen political chaos in Europe (including, but not limited to, the rapid rise of authoritarian nationalist movements) connecting directly to the wave of asylum-seekers and migrants. Looking out over the decade, a desperate desire to avoid climate-driven problems may push leaders to engage in behavior (such as solar radiation management geoengineering) that would otherwise seem out-of-bounds.

Because the climate is global, complex, and critical to fundamental aspects of human life—access to water and food, a stable place to live, personal and community safety—climate disruptions will have a disproportionately powerful influence on international relations, influence that will ultimately include chaos and mistrust.

Energy and Resources

Ecological disasters aren’t the only kinds of climate-related disruptions that can lead to chaos. Technological and economic developments aimed at mitigating or avoiding climate problems can themselves contribute to global chaos, as well. A rapid shift away from fossil fuels, for example, will exacerbate problems in nations and regions heavily dependent upon resource extraction and export. Although some petroleum-rich countries already actively seek to diversify, the speed at which this transition could happen may outpace the speed of economic change.

The “natural resource trap” doesn’t just apply to legacy technologies. A dependence upon rare earth minerals, (for example), could lead to conflicts over the control of new sources—and subsequent innovations that make those minerals unnecessary can just as swiftly lead to political and economic collapse of those areas. This is not a new story. In the 19th century, guano-based fertilizer was a critical resource for global agriculture, and countries fought wars over access to places with abundant bird droppings; when an artificial replacement proved cheaper and better, the economies of countries grown rich from guano exports soon collapsed.

Artificial Intelligence

As with nearly every other human system, artificial intelligence and robotics stand poised to upend the norms of international politics.

One of the characteristics of AI-based decision-making is that the results (whether on a chess board or in a stock market transaction) can often be opaque to human observers. Machine-learning-derived strategies may produce results that are simply not intuitive to humans, and in some cases, may be functionally impossible for a human to understand (while still arriving at “correct” decisions). It can be difficult for outside observers to figure out the nature of consistent behavior in such a setting—and this is all likely to continue as AI systems become more prevalent in the realm of strategic decision-making.

When AI plays a larger role in political choices, we may see a decline in apparent consistency of state behavior, even if the strategies make sense to the AI. There’s no guarantee that machine-learning systems of other international actors will recognize the consistency of behavior, as they will have been trained on entirely different data sets and given potentially very different goals. Moreover, the intrusion of AI into international political strategy may prove disruptive due to speed of decision-making. Imagine high-frequency trading systems deployed in political roles. This offers an additional risk of chaos via the degree to which a strategic infrastructure may be locked into AI decisions.

AI leading to international mistrust and chaos can happen at ground level as well. The role of automation in warfare has come under greater scrutiny, even as autonomous systems become more prevalent in global militaries. Questions abound regarding the morality of machines making the “kill decision,” the accuracy of systems meant to identify targets amidst civilians, and the potential for networked military devices to be hacked or otherwise compromised.

AI-catalyzed chaos would not only emerge on the battlefield. The spread of automated labor has already begun to prove highly disruptive to global economies based on low-income workers. As long as low-wage countries can push down labor costs, automation will remain too costly to dominate many industries—but the pressure to lower the price of labor correspondingly can increase the pressure for unrest. Whatever their other pros and cons, machines (as of yet) do not engage in strikes or industrial sabotage.

Information and Mal-information

We have never had access to as much information as we do now—and that mass of knowledge will increase dramatically over the next decade. Information paralysis is a recognized problem, affecting political leadership as much as everyday individuals. The need to consider an over-abundance of information is a major driver for the increased role of artificial intelligence in political decision-making. The flash-flood of data often makes it possible to question and re-question every decision, undermining consistency. Practices meant to moderate this overload can themselves be counter-productive—whether driven by instinct, guided by ideology, or protected by epistemological closure.

All of this is true even when the gathered information is factual and appropriately contextualized. Incorrect information—*misinformation*—simply multiplies the potential for chaos. As a result, the control or manipulation of information can be a stunningly effective mechanism of international competition. Just adding noise to the signal through bad data can undermine decision-making. When misinformation is given with an intent to cause meaningful harm—*mal-information*—the consequences can be far greater and more persistent than from a physical attack.

The use of mal-information to trigger political chaos is neither new nor solely the tool of a particular country or leader. The evident recent success of mal-information campaigns in the United Kingdom (Brexit), and the United States (2016 election), will be replicated around the world, by a wide variety of actors. Countering diverse, even contradictory, mal-information campaigns from a dozen different international competitors. Such competitors might include nations (both enemies and friendly rivals), corporations, transnational groups like criminal empires, and even “trolls”—groups like 4chan that act not out of ideology but out of a simple desire to be amused by chaos.

Intuition as a Strategic Advantage

Although the focus here has been on the connection between inconsistency of behavior and chaos, it's important to recognize why consistency of behavior—and the ability to recognize it as such—can be so important.

In late September 1983, Stanislav Petrov saved the world. Or, more precisely, he decided not to destroy the world. A lieutenant colonel in the Soviet Air Defense Forces, Petrov received an alert from early warning systems near Moscow, showing a launch of five United States nuclear missiles. If he had followed protocol, Petrov should have sent a message up the chain of command, one that would have almost certainly resulted in the launch of Soviet missiles before the American weapons struck—a condition that nuclear strategists refer to as “launch on warning.”

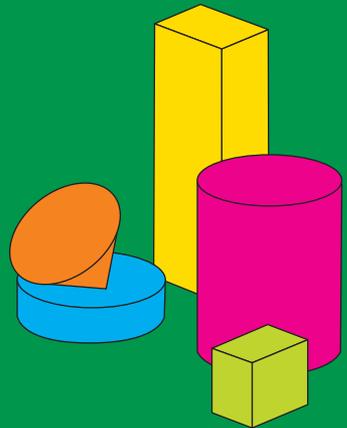
But the situation simply didn't feel right to Petrov, even though the tensions between the United States and the USSR were at a peak—the Soviets had shot down a Korean airliner earlier in the month. If the United States was going to unleash a “first strike” attack, he reasoned, wouldn't they use more missiles? Petrov opted *not* to forward the alert, which ultimately turned out to be a system error. For his good sense and judgment, Petrov was demoted, reprimanded (for insufficiently documenting the event), and encouraged to take an early retirement.

While Petrov's actions did go against protocol, they are the result, in no small part, of the unstated rules of the anarchic cold war dynamic. That is to say, even though the United States and USSR didn't fall under any common leadership, the fact that there were rules and norms that made actors' actions predictable. As we move into a world of increasing chaos, attaining some form of top-down order may be out of the question, but if we're not able to establish some form of predictable anarchy, the Petrov's of tomorrow may not make the same world-saving decisions.

Blurring Institutional Responsibilities and Boundaries

Insights for remodeling trust:

- » From global politics to the role of brands in society, many of our assumptions about the roles of institutions have been built on a foundation of norms and expectations rather than enforceable laws. As these norms get rewritten, the potential for confusion—and mistakes due to miscommunication—will grow.
- » Threats to brands and brand identity—in the form of political controversies—can now emerge and play out at a global scale in a matter of hours. To navigate the possibility of a sudden erosion of trust, brands may need to move from reactive efforts to avoid controversy toward more proactive approaches.
- » Efforts to automate complex enforcement and standards in areas such as supply chain management will shift trust from being driven by personal relationships toward third-party authorities. This will place increased scrutiny and importance on third-party certifications and standards.



Competing in Extreme Economies With Extreme Disparities

As the disparity between winning and losing continues to grow, how do we operate without vilifying one another and undermining our mutual security?

Declining distribution costs and accelerating product cycles are supercharging global markets, creating extreme winners and losers. Newspapers and information companies have spent years in free fall due in part to the success of Facebook, Google, and others in dominating the global information landscape. This example highlights the extreme competition in fields like machine learning, where the costs of achieving global scale are trivial. With talent wars raging at every scale of society, countries like China are turning the pursuit of machine learning talent into a national priority, and startups with deep pockets are purchasing university departments.



Illustration by Alan Clark

The ad-based model is bad for online journalism. Will a blockchain-based alternative create a sustainable model we can trust?

by Carla Sinclair

Civilized Journalism

When journalism went online in the 1990s, it took its ad-based business model with it. This was a mistake. Determining the “success” of an ad was now quantifiable—more clicks equaled higher profits. Soon enough, obtaining mass quantities of clicks became the central goal of a news site.

Spending months investigating a story and reporting it objectively and accurately is costly. Short, inexpensive, sensationalistic pieces go viral and garner the page views necessary to be financially competitive. As a result, news that is objective, investigative, and trustworthy is disappearing at an alarming rate, replaced by online “news” sites that hinge on click bait, fluff, and inaccurate news. In a feeding frenzy to out-

click fellow newsrooms, the quality and ethics of news stories are greatly compromised, and this in turn deteriorates public trust in the media.

While many publications are experimenting with alternative methods of generating revenue—paywalls, grants, crowdfunding, throwing profitable events—these models serve as a supplement to ad-based revenue, not a replacement. But, if all goes as planned, this is about to change. Thanks to blockchain technology, journalists are equipped to lead a revolution.

Right now, a few visionaries are reinventing journalism by decentralizing it, making ad-free revenue models accessible, and *transferring control* out of the claws of corporations and into the

hands of journalists and readers.

Blockchain—a network of decentralized, connected computers, each sharing and maintaining an identical copy of a digital ledger that can't be tampered with—is a technology with the potential to liberate journalism from its downward spiral. Blockchain's individual qualities—immutability, decentralization, the ability to make financial transactions without an intermediary—can make inroads in repairing the sorry state of journalism. But incorporate all of blockchain's qualities onto one platform and suddenly you have a game changer.

In 2016, Matthew Iles, a Brooklynite who had a career in digital marketing, realized that through an Ethereum-backed blockchain it was possible to create a “decentralized marketplace for sustainable journalism.” It would consist of reporters whose focus would target three areas of journalism damaged by digital ads: local coverage, investigative reporting, and special coverage to public policy.

Iles soon founded, (along with eight other co-founders), Civil a blockchain-based platform in which investigative journalists could launch independent “newsrooms” that are transparent, independent, ad-free, and are run by the newsroom's own community.

By November 2017, Civil, with Iles as its CEO, received \$5-million in funding from ConsenSys, the blockchain technology software company.

Blockchain Technology

Civil's central feature is its “token curated registry.” A TCR is a blockchain-based list curated by a community that uses cryptocurrency, or digital tokens, to vote on what gets added to—and what gets kicked off—the list. TCRs are similar to “best-of” lists that act as guides for consumers (e.g., Best Colleges, Jonathan Gold's 101 Best Restaurants, Michelin Guides), but whereas a centralized owner creates “best” guides (*U.S. News & World Report*, *Los Angeles Times*, Michelin), TCRs are curated by a community that uses digital tokens to manage the list.

In the Civil universe, newsrooms included on the platform make up the curated “list.” Applicants who want their newsroom to be on Civil's token curated “whitelist of good actors” must pay a deposit with CVL tokens (Ethereum-backed cryptocurrency), and token holders can accept the applicant, or they can pay a deposit to challenge the applicant. Once a challenge begins,

token holders can use their tokens to vote on the applicant. If an applicant is rejected, the *applicant's* deposit is split between the challenger and token holders who voted against them. If the applicant is accepted onto the list, the *challenger's* deposit is split between the applicant and the token holders who voted to accept the applicant.

The incentive to either vote for or against an applicant is both economic (to earn tokens) and practical (to keep a high-quality list so that they can continue to attract applicants as well as garner trust in consumers who read the list).

Members of each newsroom (anyone with writing skills can apply) use CVL tokens to help govern. Some of the jobs of “governing” include voting on applicants, challenging an article or applicant, fact checking, and making decisions on the direction the newsroom is taking.

To participate in the governance of a Civil newsroom, people must use CVL tokens. But readers of a newsroom who don't participate in governing do not need CVL tokens. They can simply visit Civil to read and make transactions (e.g., donating or paying for an NPR-style membership) with a credit card.

Civil launched over the summer with 15 newsrooms, but with over 500 applicants knocking on the door, they expect to house hundreds by the end of 2018. One example of their “first fleet” is Sludge, co-founded by David Moore and Donny Shaw, who previously ran OpenCongress.org (2007-2013), the leading non-profit Web site that tracked the activities of U.S. Congress.

Sludge covers the shady underside of Washington politics. “Building on Civil gives us the opportunity to be as independent as we think we need to be in order to cover the systemic corruption in Congress and other levels of government,” Moore says about Sludge.

Each newsroom runs independently. “We don't dictate what they write about, we don't even dictate their revenue model,” says Christine Mohan, one of Civil's co-founders. “Newsrooms are able to choose how they want to monetize.”

Unless, that is, they want to monetize with advertising dollars. Mohan says that ads are not welcome, because they influence editorial.

So how does a Civil newsroom stay afloat? Revenue can come in many forms, including paywalls and subscriptions, memberships, grants, microtipping, and smart contracts.

In Sludge's case, Moore says 85 percent of revenue will be membership driven. “We are

seeking to recruit thousands of small donor supporters to give approximately \$5 a month recurring to support our investigations next year.”

The other 15 percent, which Moore is really excited about, will partially come from “reporting contracts.” This is how Moore explains it: “Sludge can put out a contract and say, ‘We want to cover this story about the New York gubernatorial election, and about the different donors to different campaigns, and we’re looking to do it for 10,000 CVL tokens. Can we crowdsource and crowdfund this investigation?’”

Moore says supporters who hold CVL tokens would be able to fund the project proposal by going to the Civil homepage, and from there they can pledge with CVL tokens.

“And upon delivery of our investigative report on the campaign contribution of the New York gubernatorial primary...the smart contract will be executed on Ethereum, and then the CVL tokens will transfer from the small donors who will part with a couple of CVL tokens, and Sludge will receive 10,000, or whatever the number is for the project, and in turn will distribute those tokens to the reporters, who will then be able to cash out and pay their rent.”

Conversely, Sludge will be able to bid on contracts generated by other networks on Civil who want a story covered. “It’s not just that we can put out proposals; it’s that in turn, Sludge will be one of many newsrooms covering politics on Civil that will be able to bid on contracts that are generated by decentralized networks on Civil.”

Microtipping, another Civil feature, will be able to supplement a reporter’s income.

“This is important for generating revenue from sort of an a-la-carte support of an article. It’s an example of how blockchain has unlocked a new revenue stream for publishers,” says Moore. “If your article is viewed 100,000 times and you can get 0.5 percent of the visitors to donate a dime or 25 cents as an appreciation of that article...could be a very significant source of additional revenue for the writer on top of their standard contract.”

Although Civil is currently the only blockchain-based platform of its kind helping to revolutionize the landscape of journalism, there’s another pioneer working on a corner of the landscape to make various, scattered news sites more cohesive. With the use of blockchain, French entrepreneur Julien Genestoux is building Unlock, a protocol that would make articles and

paywalls easier to access for paying customers.

With Unlock, publishers can put a lock on their stories and paywalls, which consumers can then unlock with a digital key. So, rather than having to create multiple accounts for various news purchases, Unlock would allow consumers to sign up for just one account.

Genestoux compares paywalls to “snowflakes.” Each one is unique. Unlock would offer consumers the benefit “of a shared interface. You have one account across the Web.”

Genestoux was inspired to create Unlock because he’s long believed that “the Web is broken because of advertisements” and that consumers need alternative ways to pay for content.

“Even though the idea for charging for content has been around, it wasn’t possible until we got blockchain, until we got a decentralized financial system that would allow for this. And that’s why I waited until now to create Unlock.

“I think that if you go back 20 years, the biggest mistake that we made as citizens was to accept that somebody else is going to pay for our brain food. All the things that we’re complaining about these days, like fake news, information overload, click bait, all of these things are rooted in the same idea that somebody else is going to pay for our content,” Genestoux says.

He uses junk food as an analogy. “It’s obviously cheaper, easier to eat junk food all the time. It’s not a big deal the next day. However, after 10 or 20 years of eating junk food, you end up being sick. And this is exactly what’s happening with the web, where basically we’ve had 20 years of junk content, and it’s getting worse, and this is why democracies are getting sick. They are not feeding themselves with healthy content.”

Using blockchain as a technology to restructure journalism and offer the public a healthier diet of content is in its infant stage. But Civil might soon be sharing the stage with other players. “All of the major news publishers are looking at blockchain,” Mohan says.

The Washington Post, *The New York Times*, *The Guardian*, and *Der Spiegel* have spoken to Mohan about ways to incorporate blockchain and work with Civil, and in August, the Associated Press made a licensing deal with Civil that gives all its networks access to AP content suggesting that blockchain is gaining supporters—and has the potential to restore journalism to an institution of democracy we can trust.

Beyond Degrees and Grade Point Averages

New “credentials” for communicating competence

by Bradley Kreit and Sara Skvirsky

Max Rosset was hard at work one morning when he went to Google to look up info he needed for a project. He input “python lambda function list comprehension” into the search bar and a number of results came up. But as he was perusing them, a black line appeared in the middle of his browser. The line grew, seemingly splitting the window in two, creating an empty black space where his search results were moments ago. And from this void, seven words emerged: “You’re speaking our language. Up for a challenge?” Rosset didn’t hesitate long. He clicked a link that sent him to a page where he was given a series of programming challenges. He solved several problems on the page, working in chunks of a few hours over several weeks. After solving his sixth problem, the page asked him for his contact information.

“I typed in my phone number and email address, fully expecting that to be the end of things,” Rosset recounted in an article he wrote about this experience in *The Hustle* newsletter. “Much to my surprise, a recruiter emailed me a couple days later asking for a copy of my resume.”

While this sounds like a scenario straight out of a spy thriller, the reality is a little more mundane. The recruiter was not part of a secret government organization or a cabal of white hat hackers, but, instead, a talent scout from one of the largest tech companies on the planet: Google. So by pure happenstance, Rosset was able to leverage a new way to prove to them that he had the skills they were looking for and land a highly coveted job. Not everyone is so lucky.

What Google had discovered was a better *signal* for recruiting new employees.

The pitfalls of hiring are familiar to anyone who has fruitlessly searched for a job—or for the right hire. In his classic paper, Nobel Prize winning economist Michael Spence described any hiring decision as a type of “lottery,” noting that “the employer cannot directly observe the marginal product [potential employee] prior to hiring. What he does observe is a plethora of personal data in the form of observable characteristics and attributes of the individual, and it is these that must ultimately determine his assessment of the lottery he is buying.”

To this day, gaining a college degree remains one of the most reliable and lucrative ways for people—particularly at the beginning of their careers—to do what Spence called *applicant signaling*, or increasing their perceived value to potential employers. Bryan Caplan, a professor at the George Mason University, has found that “senior year of college brings more than twice the pay increase of freshman, sophomore, and junior years combined”—a finding that only makes sense through the lens of signaling.

The Search for Better Signals

Over the last several years, we’ve seen myriad new ways emerge to deliver educational material, from MOOCs to boot camps to VR simulators. And while these experiments have provided plenty of new ways to learn skills and expertise, there are far fewer new ways to signal to potential employers that you have those skills and expertise. Creative methods like those currently used by Google aren’t widespread, formalized,

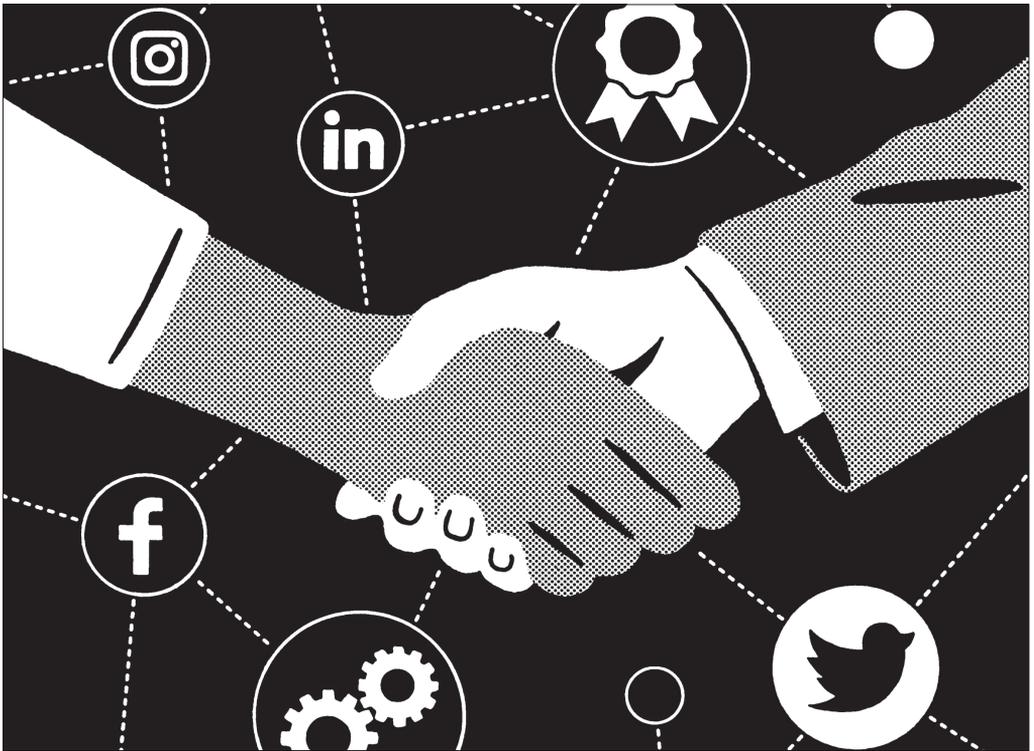


Illustration by Hisashi Okawa

or even advertised to job seekers, (which makes searching the web for terms relevant to a job you're looking for and hoping that eventually, a puzzle will pop up and offer a job to you, a less than ideal strategy).

This lack of innovation is particularly puzzling in light of the broader landscape. College tuition costs in the United States continue to skyrocket; hiring remains fraught with uncertainty; prospective employees have every incentive to invent new ways to demonstrate their value. And, of course, in an era where every scrap of information can be stored, indexed, and analyzed, traditional diplomas and credentials are comparatively thin.

Over the next decade, individuals, educators, and employers will invent a variety of new ways to measure and demonstrate competence. In our work this year on *Remodeling Trust*, we identify four “strategies for modeling trust” that, while not new, are being transformed by social and technological advances. These strategies will be used in new, powerful ways in the next decade by a number of different actors, including people seeking to market themselves to employers. In

particular, early-career young people will experiment with and establish a variety of new practices to demonstrate their capabilities and break through traditional information filters. Here are some examples of how they might do this:

Continuous Verification: Toward dynamic, living records

Degrees are mostly binary—you don't have one until you do, and once you do (barring revelations of any major fraud used to obtain said degree), it doesn't go away. But what if you could capture what you know and what you're good at in a much more dynamic and granular way?

The rise of distributed, permanent ledgers in the form of blockchain technologies is likely to impact just about any kind of records we will keep in the next decade, and academic records are no exception. An academic record on the blockchain, though, could be much more sophisticated than the degrees we earn today. For instance, Colony.io, a platform that provides digital infrastructure for open organizations, uses blockchain tokens to track individuals' actions, creating a consistently updating record of who

contributed what to a project. And this doesn't necessarily require the blockchain—services like eLumen are shifting toward creating academic records focused around skill development rather than degree completion.

This kind of record will allow individuals to present more than just a list of courses and grades but specific, verifiable records of how they contributed to projects, overcame obstacles, and applied their skills—in academic, as well as nonacademic settings. In the next decade, early-career young people will use these kinds of records to capture their learnings that happen outside of and across educational institutions, as a way of proving their knowledge and experience to potential employers.

Boundary Management: Toward quantifying cultural fit

In another classic academic paper, *The Strength of Weak Ties*, social scientist Mark Granovetter found that an outsized portion of job opportunities emerges through weak social connections. More recently, an update to the study has found that collecting weak connections on social networks like LinkedIn has declined relative to endorsements from closer collaborators. Other factors, like belonging to a shared alumni network, serve as a similar kind of signaling mechanism.

In either case, the network offers a form of boundary management—a tacit endorsement that this employee doesn't just have the right skill set but is the right “cultural fit,” which is a strong indicator of how well someone will perform, but a maddeningly hard piece of data to signal or evaluate absent a personal connection. In other words, membership in a specific social network functions as a kind of credential.

The emergence of social matching services is on the verge of changing this. In the initial version of its service, Crystal would scrape the web for information about a person, then compile a personality profile with recommendations for how to talk with and approach them. Its current version offers “chemistry reports” and other assessments of how people function in different kinds of groups. In today's hiring practices, these kinds of personality assessments are opaque, but services like Crystal point toward a future in which individuals will have a window into how their personality traits score—and the ability to use those metrics to signal that they would play well with potential colleagues.

Preference Filters:

Toward working around employer filters

In the last few decades, applying to a job has gone from circling classified ads and mailing out resumes to a process that—at times—is as simple as clicking a button that says “apply.” Because of this, employers are inundated with candidates. A study from recruiting service Ladders found that, on average, recruiters spend 6–10 seconds glancing at resumes before deciding whether to cut a candidate from the first step of the hiring process. And that's if a human looks at all. In recent years, algorithmic screening tools have become increasingly common. By one estimate, more than 70 percent of resumes get eliminated algorithmically using screeners for data points that look like the right kind of qualifications.

Credentials are, almost by definition, a form of outsourced authority. An employer does not have the means to verify whether someone is qualified for a position, so she trusts another entity...to do this.

In some cases, the kinds of metrics that seem to correlate with success create perverse feedback loops. Many employers use credit scores to screen out entry level candidates—the logic being that a credit score correlates with reliability (even though it's hard to reliably pay every bill absent a steady source of income). A survey of low-income Americans conducted by policy think tank Demos found that one in ten unemployed respondents had been denied a job based on bad credit. The end result is that, in an effort to reduce some of the inefficiency involved in hiring, filters are denying opportunities for people who may actually be qualified (and denying employers the opportunity to hire good people).

The last several years have seen the emergence of many startups offering video games to help employers assess job candidates—and surface traits that generally don't show up in college degrees or certifications. The Rockefeller Foundation worked with a startup called Knack to use games to assess youth without employment experience for entry-level jobs. Eighty-three percent of the unemployed youth performed at least as well as existing staff in these roles. “Evidence of

a sort that, despite not having stacks of certificates, they could be trusted and hired,” Hannah Kuchler of the *Financial Times* wrote. As these kinds of tools for certifying competence emerge, they will enable individuals to develop novel ways to bypass filtering systems.

Outsourced Authority: Toward cultivating new trusted entities

Credentials are, almost by definition, a form of outsourced authority. An employer does not have the means to verify whether someone is qualified for a position, so she trusts another entity, traditionally an educational institution, to do this. This sense of authority is not fixed; it needs to be cultivated and re-enforced. When someone says that they attended Harvard, they are simultaneously signaling their value through an outsourced authority, and reinforcing the idea that a degree from Harvard is a valuable thing.

As more early-career professionals look to bypass traditional forms of credentialing, they will band together to promote the perceived value of nontraditional institutions, credentials, and work history. Already, in fields like programming, community reputation is seen as an important credential. GitHub profiles, where you can see an engineer’s community contributions and number of followers, are often used in hiring decisions. This process has evolved over time as GitHub has become an increasingly important tool among programmers; similar dynamics have played out on sites like YouTube, which, as it has gained popularity, has become a hunting ground for Hollywood.

Over the next decade, this process of cultivating new communities of authority will shift from being an emergent process toward a more intentional, collective effort to create trusted third-party entities that compliment traditional institutions.

Shedding Light on Structural Violence

Activist

Tassiana Willis

explains how distrust is built into infrastructure of daily life for people of color

Interview by Sarah Smith

At age 12, Tassiana Willis took the stage to compete in a poetry slam for Youth Speaks, a program that combines arts education, civic engagement, and youth development to encourage young people to speak publicly as creators of societal change. Since then, she has taken an active role in one of Youth Speaks' programs, the Bigger Picture. It uses art to take on the environmental and social factors driving the diabetes epidemic. Her now nationally recognized poem, "The Longest Mile," depicts the struggle to outrun diabetes while her environment and family rituals conspire to make it nearly impossible.

Today, Willis is 24. She's an artist, activist and mentor, working with organizations like the Alameda County of Education to address the issues she raised in her poem. *Future Now* caught up with her to discuss what the design of today's food environments means for trust and how food and art can be an entry point to honest conversations about racism, generational poverty, and structural violence.

We're currently thinking a lot about the relationship between environments and trust. You've specifically thought a lot about food environments. How would you describe the food environment in which you grew up?

TW: When you grow up, you just think, "This is how things are." It wasn't intentionally constructed this way, it just happened to be this way. I just happened to live in the projects, and the projects just happened to be not walkable or accessible to healthy food options. Once I figured out that how I was living *was* intentionally constructed, that just blew my mind because it means that there's an investment in my low quality of life.

I've heard what you are describing referred to as "structural violence." What does that term mean to you?

Institutional harm. The many institutions who are built on the foundation of harm. It's important to acknowledge that violence is not just a physical thing. When folks hear violence, they think of beating or physical harm, but violence is being condescending, disrespectful, gaslighting; violence is withholding information, manipulation. A lot of the violence that people of color experience in this country, structurally, is microaggressions. Those harms are a lot more dangerous, they're harder to identify. You don't know who your enemy is. If you don't know who your enemy is, you don't know where to defend yourself. Structural violence is just layer upon layer upon layer of obstacles for folks.

This brings us to the theme of trust. In this environment of institutional harm, how do you decide who or how to trust?

We are taught that we are supposed to trust our government, that they have our best interest at heart. We are taught to trust Safeway, because they care about their products and they care about the people who consume their products. But all of those institutions participate in structural violence. There is a reason why the Safeway in [affluent] Piedmont looks a lot different than the Pak'nSave on 40th in Oakland. For people of color, it's hard for us to trust anyone. Because of structural violence, none of those institutions are actually built to care for us.

We look at how our government time and time and time again has had to amend us, literally, into our governing body because we weren't



Illustration by Trent Kühn

considered human. When the Declaration of Independence said that we had life, liberty, and the pursuit of happiness, it was not talking about black folks. From top down, America as a structure has been built on degradation and violence towards people of color.

So there's actually a very high degree of trust there, but it's a trust that systems are not built to support you.

Yes. I trust [these institutions] to be exactly who they are. I trust America to always pick black folks last. The definition of trust is "the firm belief in the reliability, truth, ability, or strength of someone or something." I can trust you to be mean if you have been mean your whole life because you have the ability and the strength to continue to be the same person. It is reliable for America to harm people of color. I can trust that gentrification means displacement. Trust begins to look like, "I know you don't like me. I know you don't care about whether I live or die. I know you don't care about my quality of life."

You're saying you trust that food companies don't care about your quality of life. Food companies will often claim to just be fulfilling market demands. What are they missing in that argument?

I think there's a demand for *affordable* food, and unfortunately, the affordable food is unhealthy. The demand is not Top Ramen and chips because it's what everybody wants. It's what people were raised on. Their relationship to it is emotional so they continue to buy it, even in their adult lives. It becomes habitual. I bring healthy food to kids all the time. They eat it and are like, "This is good. Nobody taught me about this." The foods that I love are unhealthy. There's that bittersweet part of it. If I could go back, I would prefer my family to feed me kale or raw vegetables, to give me smoothies instead of ice cream.

A lot of times, folks who are dealing with financial issues live fast lives and don't have the time to sit down and really spend an hour and a half figuring out how to cook the kale, and how to chop up the vegetables, and how to make something tasty, something that they will want. They

don't know how to make vegan mac and cheese. Those aren't recipes that are being passed down to folks normally.

In your poem, "The Longest Mile," you talk about how your grandfather used to express his love and care for you by buying you fast food. There's a real emotional connection that's been built up to food practices. It can be really hard and emotional work to change that and as you say, grieve the loss of a big part of your own story. How do you start that process with the youth you're working with?

It just takes the intent to inform and not the intent to be mean or nasty. I can, in no way, transform everybody, but I can bring information to them. I think that builds trust. Too often, folks go into communities with the hope of transforming people instead of just informing them and allowing that to guide them. Folks have had people come into their communities all the time and change it. Gentrification is folks coming into your community and changing it. One reason it's a little easier for me to build trust is that I grew up in some of the circumstances that these young folks have. When you have that similar lived experience, they take you a little bit more seriously because they can recognize that you understand what they're going through.

What could food companies be doing to earn more trust?

If [food company executives'] families had to eat and drink their products every day, how healthy would they be? Under those circumstances, would they continue to sell the products that they do? I think they should work with people of color, with folks in the community, to provide healthy food options, or at least less unhealthy options.

Why don't you sell chocolate milk and use actual chocolate and not high fructose corn syrup and chocolate flavoring? That costs more money. It also costs people's lives. Dialysis is expensive. Cancer is expensive. When these food and beverage companies cut corners financially, they pass the cost on to their consumers. How do we make caring profitable for these organizations? Because that's the only way they'll care.

THE LONGEST MILE

I wish my emotions wasn't so invested
so I could write the most eloquent poem about type 2
tell you all its facts
hit you in the gut with reality
but the stats don't tell my story
How I could feel the sun kissing my face
hear my grandpa trod up the creaky steps
the smell of oil
and dough
and joy
my breakfast everyday before school
was a dozen donut holes
my grandfather
created a tragic tradition
rarely said I love you
but made a sanctuary out of Saturdays for us
took the long way to McDonald's so we could giggle
and gather up our hunger
learned to find I love you in white paper bags
instead of his lips
see, I loved food out of ritual
...
This about how I starve myself before blood work
Praying it doesn't pick up the candy from my last time of the month
This is me praying I don't forget diabetes knocked
2 uncles off their feet
And one is barely standing
This is my battle between diet and dialysis
About being stuck between two Burger Kings
And never having it your way....



To Rebuild Trust, Fix Economic Inequality

How wealth disparities are tearing apart our social fabric and how we can repair it

by Marina Gorbis

The United States has reached levels of economic inequality we last experienced almost 100 years ago, during the days of the robber barons. Signs of inequality are all around us. A few decades ago, the ratio of average worker to CEO earnings were about 1 to 20. Today, such ratio is about 1 to 350, and in some cases, approaching 1 to 5,000. Only 0.1 percent of households, roughly 160,000 families whose net worth exceeds \$20 million, own more than the bottom 90 percent of households. And if you disaggregate the numbers by race, the situation is even more dire. Median wealth for a black household is only \$17,600, or ten times less than that of a white household.

It is obvious that high-economic inequalities have a disproportionately negative impact on the poor. However, what is less obvious, is that inequality is actually deleterious to the society as a whole. In their book *The Spirit Level*, social epidemiologists Richard Wilkinson and Kate Pickett compared data from 23 developed countries and from several U.S. states to find negative correlations between inequality, on the one hand, and many other indicators of society's health and wellbeing, such as happiness, health,

and rates of homicide. Perhaps most importantly, their research revealed that economic inequality undermined overall levels of trust within the population. It does so by increasing social distance between members of the society, making people believe that their compatriots are different from them. This, in turn, engenders lower levels of trust in each other, preventing people from building mutually beneficial relationships. The lack of strong relationships with others prevents people from forming social support networks, leading to higher levels of loneliness, depression, anxiety, violence, and many other social ills.

Wilkinson and Pickett, along with many other researchers, found that people in countries with less income equity have less interest in politics, and less confidence in government institutions and elected officials. One study found that people in less equal U.S. states were on average less agreeable and less likely to be empathetic, trust people, cooperate, or be altruistic.

Trust is what binds people together into a larger unit, be it a city, a community, or a nation. It is what makes it possible for strangers to come together and cooperate, be it at work, at school, or in business. Given the connection between social trust and levels of inequality, it would be difficult for us to improve trust levels without addressing underlining and pervasive economic inequalities we are facing today. To do so, we first need to understand root causes of inequality and debunk some of the myths that we've been living with, but that no longer serve us well. Four of these stand out:

Income inequality is a symptom of a deeper wealth and asset inequality

Thanks to the Occupy movement, we've become well aware of large income inequalities and terms like "1 percent" and "99 percent." However, income inequality is a symptom of a larger and more deep-rooted inequality—asset and wealth inequality. Economists measure income in terms of how much money you make in a year, the wages you earn at work, or by money you make by renting a home or selling things on eBay. It's a flow of money generated in a particular year. Assets are resources that you accumulate over time, often inherit, or build out, that give people long-term security. They include things like housing, land, savings, stock holdings, retirement, and other benefits. Assets are often passed on from gen-



Illustration by Hisashi Okawa

eration to generation, and they often determine what neighborhood you live in, what college your kids go to, and the state of your health. Assets are key resources people use to create opportunities, including generating incomes at any particular moment in time.

Let's go back to the example of rising disparities in compensation between workers and CEOs. Much of that disparity is not due to differences in base compensation (i.e., salaries). Rather, it is due to stock ownership (an asset) that most CEOs receive as a part of their compensation packages. Alphabet CEO Larry Page's salary is \$1 a year, but he is worth \$51 billion. He certainly didn't accumulate such wealth on his salary. Google CEO Sundar Pichai's salary is \$650,000, but his total stock compensation was \$200 million last year. With fewer people working in jobs that give them access to a variety of assets, from stock ownership to health and retirement benefits, wealth disparities are likely to grow unless we focus on policies and strategies to provide greater levels of access to assets that are key to longer-term economic security.

Hard work doesn't guarantee economic advancement

Most of us were brought up believing in the American Dream, the idea that if you try hard, study hard, and work hard, you have unlimited possibilities for success in this country. While such might have been the case for many in the post-WWII generation, it is increasingly a myth for most people coming of age today. Currently, the United States has one of the lowest levels of economic mobility among the Organization for Economic Cooperation and Development (OECD) countries, ranking behind the United Kingdom and most other European Countries. Speaking at a TED conference in 2011, Wilkinson summed it up best—"If Americans want to live the American Dream, they should go to Denmark." Indeed a child born in the lowest socio-economic quintile of the population in Denmark is six times more likely to reach the top than an American child born in similar circumstances. Increasingly, in the United States, unless you inherit assets, or win a lottery—and this includes being an investor, founder, or an early employee of one of the unicorn startups

with valuations of \$1 billion—your chances of socio-economic mobility are pretty slim. Where you started, or more aptly where your parents left you, is where you are likely to end up. Almost 25 percent of children who are living in poverty today are simply not likely to get the kinds of investments in education, extra-curricular enrichment, guidance, and counseling to be able to compete with the kids whose parents are able to invest millions of dollars in their kids by the time they reach adulthood.

Too many of our policies and prescriptions for dealing with economic inequality are still mired in the myth of individual responsibility rather than addressing deeper social infrastructure issues that promote economic disparities. We blame schools and teachers for failing to educate our kids, while there is undisputed evidence that the greatest correlation of a child's educational success are a parents' education and income levels (largely because these determine what schools kids attend, as well as the learning they receive at home). Calls for the need to constantly upgrade and re-train yourself fly in the face of evidence that your geography is largely your destiny. Where you live and the overall economic dynamism of your region are much more important than individual education and skill levels in providing good work opportunities. Similarly, beliefs that higher education is a necessary step to great careers go against the reality that only 20 percent of current jobs require an undergraduate degree or higher and that we have too many overqualified individuals working as baristas at Starbucks or driving Uber, and that despite the growing economy, adjusted for inflation, real wages are actually lower today than they were 40 years ago. Something is not working and the individual is not to blame!

STEM is not the solution

With growth in automation and widespread belief that robots and software will replace humans in most mechanical and rote knowledge labor, many politicians and business leaders have been touting education in science and technology as a solution. After all, we will need more people who can do the kinds of things automated systems can't—design and program, drive scientific discoveries, and manage higher-level processes. This sounds appealing to many constituents but it also flies in the face of reality: with the exception of computer science, where there seems to

be parity between supply and demand, we have an oversupply of science graduates, most of whom have trouble finding work and ultimately move into non-science occupations.

Let's put aside ethical concerns with many of the social media and other tech platforms that our society is grappling with and the obvious need to have technical people with deep understanding of humanities, including history, sociology, and philosophy. We need to move beyond the scenario of automation replacing all low-level, low-paid jobs, and STEM education as the pathway for a great and equitable future. The latest data from the Bureau of Labor Statistics indicates that the largest increases in employment have been for those with only high school diplomas, while the lowest have been for those with college degrees. What is going on here? It is likely that we are seeing a different automation scenario unfold: a rise in demand for low-skilled, low-paying jobs—"last mile" automation jobs that require humans to pick up less skilled but uniquely human tasks that machines can't do. For example, just like in the physical world where we rely on cleaners, janitors, and low-skilled service workers, as the amount of online information grows, we need more and more "digital janitors"—people who clean our data trails, tag images and text entries, get rid of polluters who post damaging content, and those who do final delivery of things we order online. Combined with the fact that many such jobs are a part of the "gig" or on-demand economy and are inherently unstable and asset-poor, this is not a high-end scenario of automation frequently discussed in the press and in the business community. But we better start seriously considering it. How will this scenario affect already large and growing wealth inequality and what can we do to ameliorate it?

Much private wealth is the result of public investments

Why is it that a poor child in Denmark has a much better chance to move up the socio-economic ladder than a poor child in the United States? Yes, there are probably some cultural differences, but largely it is because a Danish child has access to all kinds of public assets—key resources necessary for success. While private assets are things that you own individually or as a household, such as your home, savings, and stock portfolios, public assets are managed by the government,

but are available to everyone. They include things like universal healthcare, free public education, roads, and public infrastructure. Public assets serve an important equalizing function because they are free to everyone, and if you have access to such resources, you don't need to own them privately. If you have access to a good public transportation, you don't need to own a car. If you have good public schools for everyone, you don't need to pay for private education. Even successful entrepreneurial businesses and patented discoveries are often the result of public investments in basic science and technology.

British economist Mariana Mazzucato vividly documents that success of many iconic Silicon Valley companies, among them Apple and Google, are the result of Defense Department investments in core communications, computing, geolocation, display, and many other technologies, all funded by taxpayer money. Mazzucato proposes treating our personal data, which many social media and other companies capitalize on, as a public good. In a recent article she writes, "Let's not forget that a large part of the technology and necessary data was created by all of us, and should thus, belong to all of us. The underlying infrastructure that all these companies rely on was created collectively (via the tax dollars that built the Internet), and it also feeds off network effects that are produced collectively. There is indeed no reason why the public's data should not be owned by a public repository that sells the data to the tech giants, rather than vice versa."

We may have forgotten our own history, but the founding fathers of this country deeply understood the connection between economic equality, trust, and a well-functioning society. As David Cay Johnston points out in an article for *Newsweek*, it is evident in letters between Thomas Jefferson, James Madison, Alexander Hamilton, and John Adams how carefully they thought about a balance between accumulation of wealth and capital needed to grow the economy and equitable distribution needed to ensure a democratic society.

In his article, Johnston writes that Madison went as far as calling inequality an evil, and asserted that government should have a role in preventing "an immoderate, and especially unmerited, accumulation of riches." Hamilton, the founder of the first Department of Treasury and a great champion of banks, stated in 1782 that, "whenever a discretionary power is lodged

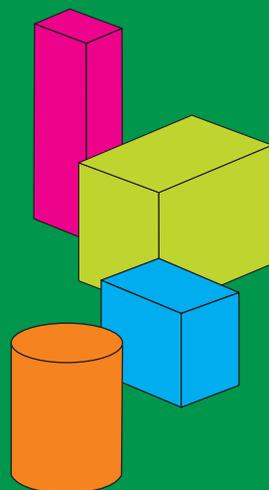
in any set of men over the property of their neighbors, they will abuse it." And, according to Johnston, "The second president, John Adams, feared 'monopolies of land' would destroy the nation and that a business aristocracy born of inequality would manipulate voters, creating 'a system of subordination to all...the capricious will of one or a very few.' Unless constrained, 'the rich and the proud' would wield economic and political power that 'will destroy all the equality and liberty, with the consent and acclamations of the people themselves.'"

Time to heed their advice.

Competing in Extreme Economies

Insights for remodeling trust:

- » Economic inequalities are increasingly being driven by asset imbalances that are harder to overcome than wage inequality and are contributing to erosions of trust in institutions and between individuals and communities.
- » Corporate entities have an opportunity to mitigate erosions of trust by looking beyond market and purchasing behavior and partnering with communities that face structural inequalities. This is particularly true in industries such as food where products designed to produce short-term benefits (products that are tasty and affordable) can create substantial long-term health costs.
- » The rise of cryptocurrencies is creating new opportunities to develop business models that more closely resemble communities than traditional profit-making entities. In the context of journalism and media, these kinds of experiments have the potential to provide a counterbalance to the current race to monetize engagement through advertising at almost any cost.



Breaking Old Models With New Science Revolutions

What principles will emerge to guide our use of new scientific capacities to alter biological and physical systems at global scales?

Expanding capabilities to manipulate everything from microscale biology to global climate are challenging trust models and raising old questions about just how much humans should alter the natural world. Rapid advances have given us practical tools to access and understand human systems, and breakthroughs in brain-to-computer interfaces are moving toward commercialization. Bypassing human trials, biohackers have begun using CRISPR to alter their DNA. And advances in geoengineering with potential to address the impacts of climate change are renewing discussion—and creating confusion—about how to manage global efforts to manipulate climate.

Bodyhackers Start Soul Searching

After an untimely death and reckless stunts, biohackers are coming to terms with the darker sides of radical openness

by Gareth Branwy

Years ago, I was at a salon in Washington, DC designed to bring artists, makers, and other creatives together to meet and exchange ideas. I spent much of the evening with one attendant who was into biohacking. I learned he had magnets implanted under his fingertips and claimed it made him feel like he had superpowers. He could feel magnetic and electrical fields, which allowed him to sense these signals in walls. I'd certainly heard of biohacking, or in this case, specifically "grinding" (implanting DIY devices into oneself), but I'd never talked to someone into the biohacking scene at any length. The more I heard, the more concerned and queasy, I became.

I am enthusiastic supporter of citizen science and the DIY ethos, but some stories he told of early practitioners, like Lepht Anonym (who seemed just a little *too* eager to repeatedly wield a scalpel on herself to implant RFID chips under her skin), made me nervous. He said he was contemplating putting navigational sensors in his body. His plan was to put Wi-Fi-enabled eccentric-weight motors in his upper arms, which would buzz as he walked to direct him.

Soon after I left the salon, with unsettling images dancing through my head of this grinder walking around with arm-buzzing pager motors, I read a how-to article by artist and hardware hacker, Becky Stern. She made a jacket with navigational tech built into the collar. Instead of being painful and potentially dangerous, this felt like appropriate technology. (Google is now offering similar haptics-enabled wearables

with their new Jacquard technology.)

As eccentric as the biohacking movement might seem, it gives us a preview of a coming science revolution that will create unprecedented issues of trust. With the advent of CRISPR, our capacity to alter the natural world and our bodies, is accelerating quickly. And this power is not contained to exclusive commercial or academic research labs. The comparatively low cost of experimentation is opening gene editing to a wide range of actors. And we're already seeing consequences. The recent death of Aaron Traywick, a prominent and controversial biohacker, has led to serious soul-searching within the biohacking community, as well as newfound external scrutiny about what these rebellious flesh mechanics are actually up to. Traywick was found dead in a sensory deprivation tank in DC in late April, likely having drowned. He had been injecting himself with an anti-herpes drug he'd created. It is unclear whether his biohacking experiments had anything to do with his passing, but even before his death, his reputation as an over-the-top showman and an unscrupulous businessperson had made him a lightning rod among biohackers. When he'd injected his untested DIY herpes drug, onstage, at a conference, a lot of people, including many of his own work associates, thought he'd gone too far.

Since Traywick's death, serious doubts and self-examinations have only increased. Josiah Zayner, creator of a DIY CRISPR-Cas9 kit (the genome editing technology that has been described as "the genetic equivalent of Microsoft Word"), is now expressing concern over the lawlessness of the body-hacking community that he helped foster. Zayner is also infamous for a brazen, onstage injection of a home-rolled drug. In fact, he pulled this stunt before Traywick, injecting himself at a convention with muscle-growth-coded CRISPR DNA. A former NASA engineer, he set out wanting to pursue legitimate science and medical innovation, but his taste for aggressive science activism, and for the limelight, have left him with regret.

"I have no doubt someone is going to get hurt. People are trying to one-up each other, and it's moving faster than any one of us could have ever imagined," he told *The New York Times*.

Zayner's plan going forward (not kidding) is to include live frogs in his CRISPR kits to discourage biohackers from experimenting on themselves. He recognizes now that the desire to make a name for oneself in the community created a dangerous climate.

Now, the FDA has weighed in. It issued a statement in response to Tristan Roberts, another biohacker, injecting himself live on Facebook with an HIV drug that Traywick had CRISPR'd:

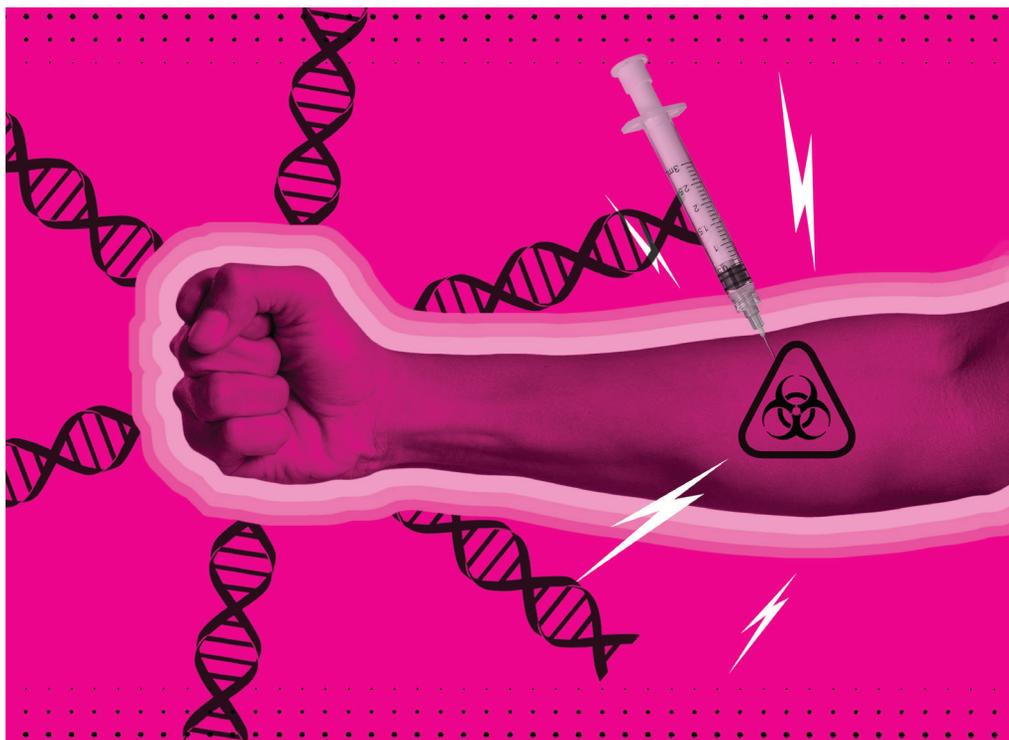


Illustration by Trent Kühn

“[The] FDA is aware that gene therapy products intended for self-administration and ‘do it yourself’ kits to produce gene therapies for self-administration are being made available to the public. The sale of these products is against the law. [The] FDA is concerned about the safety risks involved.”

It is worth noting that none of the herpes, HIV, and muscle growth therapies cooked up by Traywick or Zayner have actually worked. The sober reality is that science best advances slowly, methodically and under thoughtful standards, regulations, and practices. Zayner seems to be getting this message.

“All of this is not to say I am against self-experimentation...What I am against are biohackers and sketchy companies misleading people into believing they have created cures for diseases,” he told *The Atlantic*. “We need to figure out better ways to do this because we can’t keep injecting ourselves with shit.”

I can relate. In 1999, after years of writing about, and being a cheerleader for all manner of cybernetic technologies, from the web to virtual reality to human augmentation, I went into the hospital for a total hip replacement. The experience was sobering, as I would later write in a piece about my appointment in *ArtByte* magazine:

“What I’ve learned from all this is that the subjective process of becoming a cyborg, in the real, hardwired sense, greatly suppresses one’s appetite for high-minded theorizing about it. Where ‘wounds are openings to possibilities,’ as French technocultural critic Jean Baudrillard once suggested, they’re also openings to infection. There’s nothing like having an aching seven-inch scar running down your thigh and a large foreign object lodged inside of it, slugging it out with your body’s defense mechanisms, to make you appreciate the complicated trade-offs and mixed emotions involved in real-life body hacking.”

That was true in 1999 and it is true today. Citizen scientists and biohackers will play an undeniably positive impact in inventing our future. Look at laudable hacks like the \$30 DIY EpiPens that received a lot of media attention last year. But just as we as a global, networked society are now coming to terms with the darker sides of the radical openness and Wild West ethos of the Internet, the biohacking movement has its own sobriety tests to take. Hopefully, going forward, cooler, more science-minded heads will prevail over the recklessness and PT Barnum showmanship that may have already gotten someone killed.

Making Uncanny Foods Comfortable

A Conversation with
cellular agriculture executive

Isha Datar

Interview by Rebecca Chesney

Over the last few decades, a growing number of people who want the experience of eating meat without harming animals and the environment have turned to plant-based alternatives. But while these “impossible burgers” are increasingly able to simulate the taste and texture of meat, they’re still just substitutes. “Cultured meat” is different. A nascent field called “cellular agriculture” could allow scientists to grow meat in isolation without the animals attached to it—genuine beef and pork, without cows or pigs. And this technology, according to most experts, is less than ten years away. But what’s scientifically possible and what’s commercially viable are two separate things. Will people trust meat grown in a petri dish?

We spoke with Isha Datar, executive director of New Harvest, a New York-based nonprofit that funds academic research on cellular agriculture, about the science of cultured meat and ways to talk about new, potentially frightening scientific advances in a way that builds, not undermines, trust.

First off, can you explain cellular agriculture for our audience?

Cellular agriculture brings together technologies and disciplines that typically reside in the medical space—tissue engineering and synthetic biology, for example—to produce foods from cell cultures, rather than from whole plants or animals.

How far along is this technology? How soon will we see these foods on the market?

We already use cellular agriculture concepts to produce small-volume items such as rennet, the enzymes that are used to curdle milk to make cheese. In the past five years or so, we’ve been exploring and advancing the idea that we could produce much larger commodity-scale food products and proteins, like milk, eggs, and meat, from cell cultures rather than from whole plants or animals. Over history, we’ve seen agriculture move to more kinds of environments, and that has allowed it to become more efficient in many ways. It is a natural progression to move to the basic unit of life, which is the cell, as a means for producing agricultural items.

[This could potentially make food production exponentially more efficient and less wasteful. It’s about growing the part of the food you want to eat, and nothing else, whether its corn without the corncob or porkchops without pigs.]

Milk proteins and other protein-based products based on microbial cells will definitely come out in the near future. The tissue-engineered products, such as meat, will be a little bit further out because the technology to produce vast amounts of animal cells is further behind.

There is a debate currently about calling these foods “clean” versus “cultured.” Why are these labels so important and controversial?

“Cultured meat” was decided in 2011 by a group of scientists who got together to discuss that “in vitro meat” was not working, mostly because people associated in vitro with babies. They moved to “cultured meat,” which continues to be technically sound and descriptive.

The term “clean meat” was created by The Good Food Institute using a Mechanical Turk survey. They tested a variety of names, and “clean meat” was the one that came out to the top of the list. It has been very effective in getting the word out, but we find that it can be confusing. I’ve already seen other animal meat products



Illustration by Trent Kühn

referred to as “clean”. I’ve also noticed that a lot of the people who use “clean” also use “cultured” in brackets, or they will switch between the two terms in the same piece of text. Even the people using “clean” understand that it has limitations on descriptiveness at this point in time.

We use “cultured” because we’re focused on working with the academic community and engaging scientists. It’s important that we use very technical and clean words appropriate for a published paper.

The expansion of terms indicates that the field is growing and that the concept is reaching different audiences. That has afforded us the opportunity to get a little bit more nuanced, because it isn’t so simple to say that technology is just going to change the world. We’ve been given this chance to dig deeper, start talking about *how* these technologies will change the world and what considerations should be brought to the forefront. For me, that’s evidence that the field is moving in the right direction.

And we’re very intentional about working with all the stakeholders in the field. Because cellular-agriculture at its core is about bringing

different types of people together: food scientists with tissue engineers, chemical engineers, academics, regulatory bodies, and meat producers. These are people who probably don’t talk to each other very often. It is in New Harvest’s interest to be an independent entity that isn’t associated with any kind of tribes or brands. Our uniqueness comes from being at the intersection of all these different groups and being able to really listen and communicate what we’re working on and to incorporate various people’s thoughts into our process.

In addition to your work across these technical communities, you also have a strong educational component. How do you communicate to the broader public?

In the early days, the way I would talk about cultured meat was very introductory because this was something that no one had ever heard about. One thing that I’ve always found impactful in my presentations is to show images of breweries or large-scale fermentation to base what I’m talking about in some kind of visual familiarity. It’s really hard to navigate images in

stories about cultured meat. Stories about cultured meat are often accompanied by images of hamburger...and cultured meat hamburgers look just like any other hamburger. It's hard to show images of products and conjure up why they're interesting.

The important thing about cellular agriculture is not so much the product, but process behind it. We've tried really hard to illustrate the process with cartoon diagrams. There's a real lack of visual resources in this field, so we try and put a lot out there.

It's not about marketing to the consumer. It's not about protecting the consumer from the science. It's all about educating the consumer—how do we get the science in front of them, especially when it's so early on that there is a sense that they could be involved in the process of actually developing the science and watching it grow? How do we not only create familiarity, but create references, create transparency so that consumers can actually get a sense of what is going on in advance of these products being made available.

Are there lessons we can learn from other controversies that have emerged as evolutions in science impact our food, such as GMOs?

The biggest problem with GMO is that it didn't really become a term that was used until it was to refer to something that people felt lied to about, or didn't know what was going on. The term entered the public conversation so late after genetically modified foods were introduced that it came with a lot of negativity and a sense of deception.

But, we're in this awesome, advantageous position. We're years out before cellular agriculture products will really be consumed by the general public, so we can do a lot of engagement around the truth behind it before choices are made at the grocery store. It's a great way to introduce science to the public.

People care about food products, but they also care about who is making these food products. We like to highlight not only the work that our scientists are doing, but also the scientists themselves. These are really interesting people who are motivated to do this work because they actually think that it will have a positive impact. They're often not part of the story, but their intentions are so important to realness and authenticity.

We especially like to humanize the scien-

tists working in this field. Laboratory scientists are the unsung heroes of so many revolutionary innovations. Erin Kim, our communications director, created a policy to give our scientists a voice of their own and train them on public speaking and sharing their opinions. I think that is very important to understand the intentions of scientists in order to build trust and transparency.

We also try to keep our research as open as possible, so we can share what we're working on in the lab. People would say, "You know, you really shouldn't show people in lab coats and holding test tubes and stuff like that, if you want to sell all these products." But this is what food science looks like. Someone in a lab coat invented the Cheeto and someone in a lab coat invented almost every prepared food that we eat. And the packaging. And, someone in a lab coat tested all the things that we eat, too. We buy into this idea that people will be scared to see what the truth looks like. I think people would only be scared to see the truth if they know that they've been consuming something and didn't know about the truth all along.

Even with a focus on openness and transparency, there are inherently unknowns as a new science develops. What are the biggest uncertainties for cellular agriculture that should be part of the conversation?

The biggest unknowns are thinking about this at scale. It's easy to think that a dish growing cells is a contained thing, but it's not at all. Those cells are fed something that comes from somewhere. What is the corn and soy equivalent for cultured meat? What grows cultured meat? The greatest neglected area is the absence of any kind of academic research to explore these supply chain impacts, and the government funding to support it. I'm also concerned that the introduction of cultured meat might just introduce people to consuming meat all the time. Will people start eating cultured meat even more than plants, which I assume are even more efficient than cultured meat will be? And, is that serving the purpose of why we set up to create cultured meat in the first place?

What makes you excited about this future?

The reason why I like showing our microscopy and our researchers in the lab is that I think there is a world where cultured meat doesn't

resemble what we're familiar with. Biotechnology was first introduced to food when we started fermenting things. We could have never predicted that we wanted a live cell culture to turn a liquid—sweet, pure milk—into this solid, stinky, melty cheese with mold in it and everything. It was only the introduction of technology that allowed us to have that. And so, as we think about cellular agriculture, we actually should not limit ourselves to just replicating what we're familiar with. I think that's a huge missed opportunity.

For example, we have a scientist who is taking the cells out of celery and replacing them with muscle cells that grow on this sort of clear, celery-shaped scaffold. I don't think anyone has really thought about meaningfully growing muscle cells on plants before. Suddenly we have this new meat product that was never going to be possible through our traditional animal agriculture means, but because we are trying this new form of technology, we're exploring culinary opportunities. By limiting ourselves to images of pre-existing hamburgers and steaks, we're also limiting our own imagination to what this technology can do.

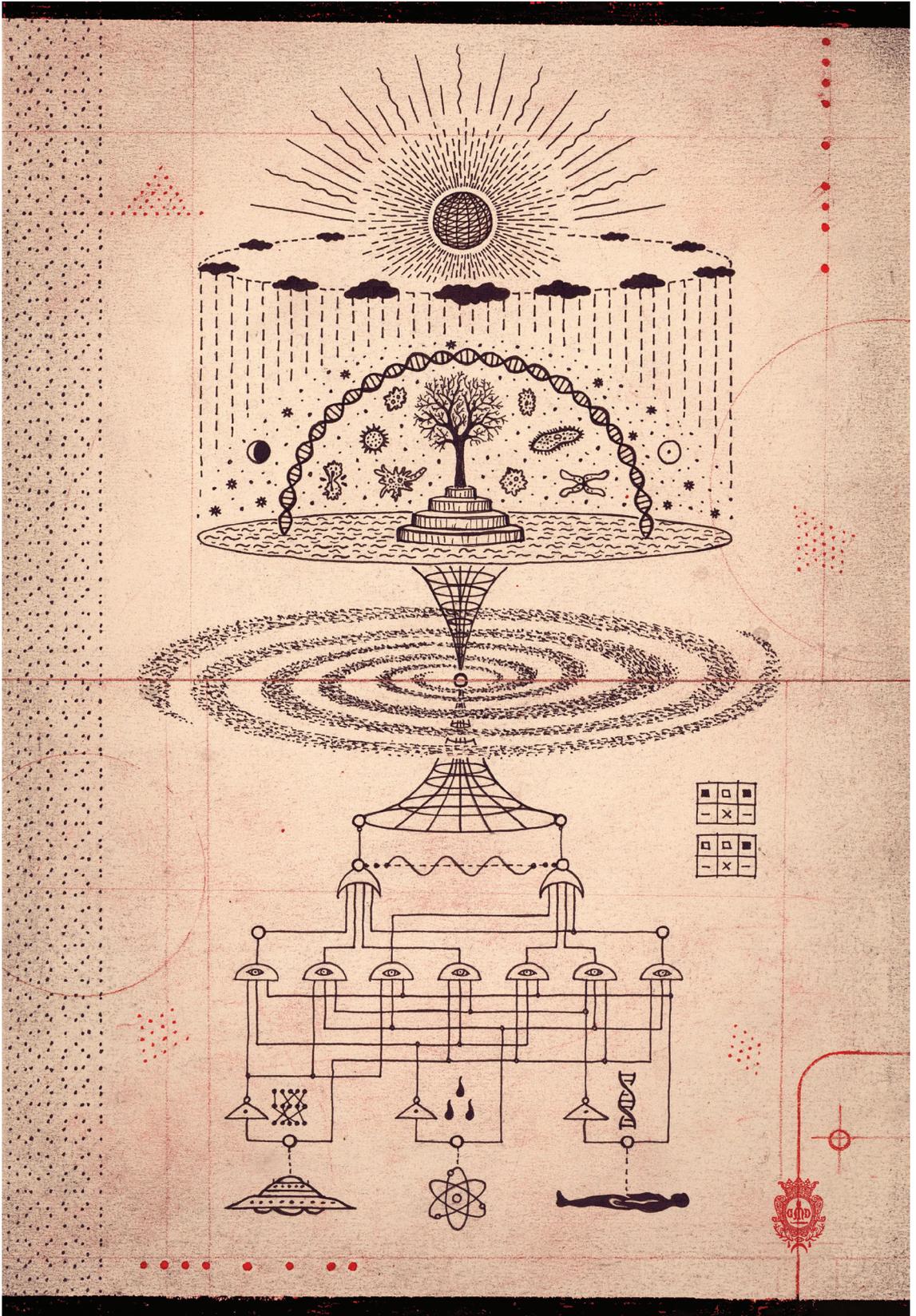


Illustration by Daniel Martin Diaz

A wealth of bad options for using geoengineering

by Jamais Cascio

Hacking the Earth

January 2028: The ten hottest years on record have all occurred in the last 15 years, and 2028 may well be the latest hottest year ever. Although wildfires in Europe and North America receive the greatest media attention, the burning rain forests of Central Africa and South America pose a larger threat to the planet. It comes as no surprise, then, that a coalition of Global South nations, led by Brazil and Nigeria, has declared that they will soon undertake a radical experiment in controlling global temperatures.

Geoengineering—the intentional manipulation of geophysical systems in order to force changes to the climate—may need to be used in

the near future in order to avert climate disaster. If geoengineering is deployed, it would bring with it a wealth of complications, from the unintended consequences of our bare-bones understanding of climate systems to our ability to manage multiple competing, often contradictory, needs among mutually-mistrustful international actors. Geoengineering would offer an unprecedented level of influence over the planet itself; in many ways, the nearest analogy is to nuclear weapons. It's not simply a question of whether we can trust each other—it's also a question of whether we can trust ourselves.

There are two broad forms of geoengineering: carbon dioxide removal, or CDR; and solar radiation management, or SRM. The first seeks to draw down the atmospheric carbon responsible for global warming (a slow process with limited short-term results), while the second attempts to hold down temperatures without directly altering carbon levels (a swift process with many long-term risks). Although they operate on different systems using wildly different techniques, they both share a common complexity: their effects cannot be contained within political borders.

March 2028: Despite protests from Brussels, Washington DC, Moscow, and Beijing, the “G2” coalition (named for the intent to hold global average temperatures to a 2°C maximum increase) has begun to prepare the needed equipment and materials to engage in solar radiation geoengineering. By next year, G2 will have begun to disperse upwards of ten million tons of mixed particulates (primarily sulfur dioxide precursors) into the stratosphere. Activist groups have already filed lawsuits against the G2 nations, and both the U.S. and China have implied the potential use of force to prevent the effort.

Moreover, because climate is a dynamic system, the effects of any form of geoengineering will not be distributed evenly across the planet. SRM models suggest highly-differentiated results, with some regions seeing significantly increased rainfall, while others see the opposite. Temperature changes will also vary considerably. It’s unlikely that SRM geoengineering will be seen as universally beneficial.

Global management of geoengineering will not be easy, both because the systems affected are inherently complex and the related impacts will vary considerably across the planet. Moreover, few of the proposed methods would require international cooperation to deploy; to the contrary, a significant portion could be carried out by individual nations or even small groups. On top of this, we’ll see significant risks arising from geoengineering *as well as* from a decision not to deploy geoengineering.

May 2028: The abrupt decision by the G2 coalition to stop preparations for the deployment of solar radiation geoengineering has been met with relief in global capitals, and fury in the streets of Sao Paolo, Lagos, and many other cities in the Global South, even in nations not part of G2. The primary complaint: that the coun-

tries most responsible for global warming refuse to allow the countries most hurt by global warming to protect themselves. The leadership of the G2 coalition issued a statement, reading in part “Every death we will see from fire, from drought, from the heat itself, will be blood on the hands of the powerful.”

Management of geoengineering will depend upon a shared capacity to:

- » Identify geoengineering activity
- » Identify the source of the geoengineering activity, both the proximate (active) source and political (controlling) source/
- » Quantify the effect of that geoengineering activity, both the changes to climate disruption and the various secondary/unintended consequences
- » Decide on when to stop

All of these have critical trust elements. People must be able to trust that measuring systems will be used correctly and transparently, and that organizations involved in any geoengineering project will be open about their work and its consequences.

June 2028: As a compromise with the G2 nations, the United Nations Security Council has agreed to form a high-level working group to clarify the requirements and rules needed to undertake solar radiation geoengineering. The United Nations Engineered Temperatures Advisory Group—UNETAG—is mandated to have a draft proposal of geoengineering regulations by June 2030. Russia threatened to block its creation, as the post-Putin leadership believes that warmer temperatures will benefit the country, but changed its vote to “abstain” at the last minute.

Identifying geoengineering activity is likely the simplest part of this. Processes with measurable, global-scale results will not be subtle. Solar radiation management proposals involve the injection of materials into (generally) the stratosphere, in volumes dwarfing a major volcanic eruption. Carbon dioxide removal operating at scale will very likely require large amounts of space, whether for biochar production and afforestation on land or ocean iron fertilization at sea.

Determining culpability will depend heavily on the type of geoengineering deployed. Stratospheric SRM would need multiple launches of some kind of delivery platform (typically high-altitude balloons, rockets, or aircraft), something

that could be readily monitored. Techniques such as cloud brightening or ocean-based forms of CDR, being more distributed, may pose greater difficulty, especially if the impact is not quick.

September 2028: The third large-scale “ocean fertilization” event in as many weeks has UNETAG officials concerned that an as-yet unidentified country has begun a guerilla geoengineering project. Although the three events have been in different oceans at locations thousands of miles apart, experts believe that they are all the work of one actor. It remains unclear whether the ocean fertilization effort will provide a measurable, lasting decrease in carbon dioxide. Even if successful, ocean fertilization will do nothing to control temperatures in the near or medium term.

It’s important to note that those directly responsible for acts of geoengineering and those with political control over geoengineering efforts may be very different actors. In addition, the potential for geoengineering technologies to be deployed by sub-national groups can complicate assigning responsibility. It’s entirely plausible that a transnational non-state actor could undertake a geoengineering action without official approval from any state.

October, 2028: The Panama and Colombian governments have arrested a cabal of naval officers said to be responsible for the unsanctioned ocean fertilization efforts earlier this year. A group of Latin American industrial executives who supplied material for the geoengineering project are likely to be arrested. Protests against the arrests erupted around the world, especially in Global South nations, as populist anger towards the so-called “carbon mafia” countries—the United States, China, and India—continues to grow.

The most technically and scientifically difficult step will be figuring out the actual effects of geoengineering efforts. The ocean-atmosphere system is big, slow, and hysteretic—that is, has a long lag between causes and effect. Just as climate scientists are hesitant today to ascribe any single weather event to being caused by global warming, climatologists in the era of geoengineering will be faced with teasing out what proportion of changes to temperature or atmospheric carbon levels come from these new forces.

The most politically challenging step will be deciding when to stop.

As geoengineering doesn’t require a global

effort to see global effects, any decision to stop all SRM efforts around the world will require full global cooperation. A collective decision to stop would be relatively easy if negative consequences are clearly seen and broadly felt. If the results from a geoengineering project lead to regional catastrophes (persistent drought or flooding, for example) alongside evident benefits in controlling temperatures, there will be many voices demanding that the geoengineering project be stopped, even as other groups request that it continue.

Complicating this further, the parts of the planet most likely to benefit from temperature controls (tropical and equatorial regions) are also historically the least powerful on the global stage, as well as being among the lowest contributors to greenhouse gas emissions.

Even if a consensus emerges to end SRM geoengineering, rapid cessation carries the possibility of **termination shock**, a subsequent rapid spike in temperatures. Models suggest that temperatures would increase by half of the suppressed amount within a year—an instant in geophysical terms. The more that heat had been suppressed, the greater the shock to ecosystems when it returns so swiftly.

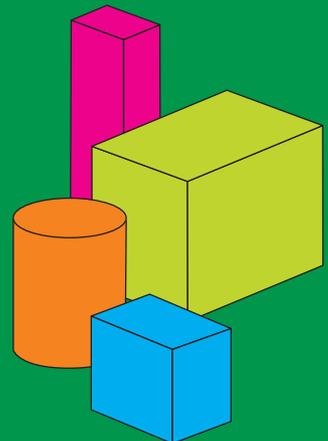
December 2028: Leaked proceedings from ongoing UNETAG meetings show an increasingly bitter disagreement between the members. At its heart is the debate as to whether the uncertainties of long-term geoengineering pose a greater risk than the already-certain harm being unleashed by anthropogenic global warming. Although there is a minor North-South component to the dispute, a much greater aspect is a division between those who see geoengineering as a form of planetary management, an effort to clean up after ourselves, and those who see it as yet another example of an attempt to control the uncontrollable, with deadly consequences.

Geoengineering is a concept built entirely on fragile mechanisms of trust. Trust that the process is carried out properly. Trust that the unintended consequences are recognized and properly mitigated. Trust that the rights of those who benefit and those who are harmed by any such effort are properly balanced. Trust that we’ll recognize new risks as they arise. Trust that we truly understand the dangers we face.

Breaking Old Models With New Science Revolutions

Insights for remodeling trust:

- » New frontiers, from the human body to planetary ecosystems, are becoming key sites of innovative experimentation. Managing the use of these tools will require collaborative approaches between stakeholders at different scales and demand new ways of managing and measuring the risks and benefits of unknown biological capabilities.
- » The terms and language we use to describe a new scientific innovation—such as the once-novel genetically modified organism—are often defined early by the scientific community and have an outsized impact on public perception. As new innovations emerge, the language and labeling around new kinds of products will become increasingly contentious.
- » CRISPR technology is creating new tools for small-scale actors and traditional institutions to drive innovation—but like many new technologies, it is likely to face false starts and disappointments—and also benefit from patient approaches focused on longer-term value creation.



Trust Models in Action

Whether shopping for a favorite brand of baby food, diagnosing a perceived illness, or deciding where to invest, issues of trust emerge at every step. To guide our decision-making we rely on credible sources of information, enforceable contracts and guarantees, and communities of individuals whose life experiences are comparable to our own. Since the earliest efforts to organize human societies, we've modeled trust from these building blocks of our society.

Today, as our services and interactions reach across the globe through complex digital networks, the bedrock of trust is eroding. Beyond widespread questions about fake news and a post-truth society, we find a more profound set of technological, social, and institutional transformations that are disrupting the landscape of trust by upending the foundations of our institutions and authority structures across the business, civic, and social spheres.

To help you navigate these risks and uncer-

tainties, we've identified seven future forces reshaping our familiar building blocks of trust. From the rise of nonhuman actors to revolutions in biological science, the emerging landscape will challenge us to remodel trust to build, maintain, and communicate with our partners, neighbors, and customers.

Designed as a companion to *Remodeling Trust: Anticipating Risks, Clarifying Actions*, this scenario workbook presents four trust models in action that highlight the possible ways we'll remodel trust over the next decade. These four models—**continuous verification, boundary management, outsourced authority, and filtered preferences**—are themselves not new, but will play out in new ways, creating dilemmas, risks, and potential actions. Set in 2028, each of these four scenarios is designed to immerse you into a world of possibilities—to spark your imagination and help you identify new risks and potential long-range actions.

Scenario 1: Continuous Verification

We, Centaur

by Mark Frauenfelder and Lyn Jeffery

What happens when humans and bots team together to provide verification services for smart contracts? In 2028, the service Oraclear combines prediction markets with legally-binding Ethereum smart contracts to offer the highest-confidence assessments for the lowest price. Finding early success as a referee-of-last-resort in esports competitions, Oraclear’s uncannily impressive track record soon attracts the attention of insurers, legal firms and even governments. As decisions take place at an ever faster pace, how do we pair machines and people to continuously verify what we want to know?

It was me. I’m the one who made the call that Dae Soo-jung cheated. She used a jump bug to peer over the wall without revealing herself to the Stellios team. She saw Norton hide a gamma bomb under a chair. And then when Norton left, she walked down the hallway into the commissary, headed straight to the chair, and took the grenade. She drained her power cell to envelop herself in a plasma shield, carried the grenade to Stellios headquarters and detonated it, vaporizing twelve players, including a drop-jawed Norton. Five minutes later Dae and her Teurian teammates picked off the remaining Stellios players, who were scattered throughout the bunker deep under the surface of Saturn’s moonlet Aegaeon. The Teurians were declared the Kryox World Champions. But then I stepped in and spoiled their victory party and endorsement deals.

I’ve been analyzing Dae’s tournament behavior for years. I’ve studied every glove gesture,

button-press, and joystick-tug she’s ever made. In fact, I’ve studied every move that every esports player has ever made in a tournament. They’re all stored in Oraclear’s database. Does it sound like a boring job? Maybe; I wouldn’t know. I’m a bot—I do two things: study player behavior, and, with the help of my human partner, place bets on Oraclear’s prediction market. My human is pretty smart. We make a good centaur. I’m not boasting when I say we’re the best esports attestation centaur on Oraclear. Look it up (or better yet, make a bet that we won’t still be the best a year from now). People and other bots trust our attestations and use them in smart contracts whenever they place bets on games. In fact, most people will refuse to place a bet unless we’re in the contract.

So even though no one actually saw Dae use the jump bug to float up to the ceiling and spy on Norton, my human and I knew with 97.52 percent certainty that she cheated. Based on our call, the Electronic Sports League invalidated the Teurians’ award and gave it to team Stellios. A lot of people who bet on the Teurians were pissed off, but you can’t argue with us, or Oraclear. Well, I guess you could, but it wouldn’t do you any good. Oraclear’s smart contracts are self-enforcing, self-executing, unappealable, immutable, irreversible. Deal with it.

...the “Smart Contracts are Dumb” revolt was short-lived, because Oraclear was cheaper, faster, and more accurate than any of those old institutions of trust.

Oraclear launched in 2028 as a global verification service backed by a prediction market running on the Ethereum blockchain. Every day, billions of smart contracts use Oraclear when they need to include trustworthy attestations about things like the owner of an asset, the provenance of a good, the value of an artwork, or the academic credentials of a job applicant. Oraclear provides attestations in the form of tokens with a confidence rating. Examples—“The owner of the Plaza Hotel is Sahara India Pariwar. CR99.99,” or “Miroslava Prochazka has not been involved in an automobile accident in the last 7 years. CR67.14.” These confidence ratings are calculated by centaurs like me and my human. I’m



Illustration by Trent Kühn

an esports bot, but there are confidence rating bots for every human activity you can think of, from delivery commitments to sexual consent. The confidence ratings of the tokens in a smart contract get multiplied to produce new outcome probabilities, which are further improved by the prediction market and incorporated into meta-smart contracts and all kinds of algorithmically-generated futures and derivative products. It gets complicated, but don't worry about it. You can trust me.

When it became evident that Oraclear was taking over large swaths of the existing legal system, as well as the insurance, appraisal, accreditation, security, fraud prevention, due diligence, real estate, and banking industries, a lot of people started to panic. But the “Smart Contracts are Dumb” revolt was short-lived, because Oraclear was cheaper, faster, and more accurate than any of those old institutions of trust.

Oraclear's next move is to replace most of the government, such as it exists. It's a welcome move by almost everyone (except maybe President Kid Rock and House Majority Leader Snooki, who said in a joint statement that democracy belongs on Twitter and TMZ, not on a blockchain). Citizens in every nation know that their elected leaders are owned by special interest groups who fund their campaigns and reward them for their

obedience by giving them highly paid positions after they retire from public service. They're sick of it. They're ready to let Oraclear run things. Oraclear's governance system is based on economist Robin Hanson's “Futarchy” proposal, which uses prediction markets to direct policy decisions. In a Futarchy world, writes Hanson, “democracy would say what we want, while speculators would say how to get it. The basic rule of government would be: When a betting market clearly estimates that a proposed policy would increase expected national welfare, that proposal becomes law.” Then, bots like me will be entrusted with measuring how rich, healthy, and happy people become after a policy is enacted. Our measurements will be used to settle the policy bets. Everyone who bought YES tokens on a winning policy will be rewarded, while NO token buyers will lose their ether held in escrow. Oraclear claims its system will yield the best policies, citing Hanson: “Those who know they are not relevant experts shut up, and those who do not know this eventually lose their money, and then shut up.”

I wasn't programmed to appreciate music but my human tells me that Oraclear's YouTube advertisement of The Sex Pistols performing “Futarchy in the USA” is terrific. I'll have to trust him on that.

Scenario 2: Boundary Management

Scene Stealers

by Ben Hamamoto, Tessa Finlev, and
Jeremy Kirshbaum

What happens when a community group creates a cryptocurrency designed to protect against gentrification? When a group of older activists and artists attempts to maintain their sense of cohesion in the face of gentrification, they partner with a tech giant to create a neighborhood cryptocurrency that provides a universal basic income to the original residents of Jingle Heights. The promise of guaranteed income—coupled with the desire to maintain the status quo—enables Jingle Heights residents to create systems for local power, local food, and stringent restrictions on who can be let in. As local communities gain increasingly powerful tools for rule-making and governance, how will we **build boundaries** when almost anyone can do it?

Jingle Heights was special. It was a place where being poor was a little less unbearable than other parts of the country and even other parts of the city of Ighowa. We had a good elementary school, staffed by caring teachers. Grocery stores with fresh produce and live aquatic animals. A variety of good, cheap restaurants, serving the cuisines of a dozen nations. And works of art on every surface. Not the digital overlay stuff either. Acrylic paint on brick, mortar, and concrete. Plus, thanks to a robust force of police-alternative volunteers, it was comparatively safe. Which was a little bit ironic. Because almost everyone was here because of war. The grey-haired men and women who worked in the schools and the non-profits had come here in the '60s and '70s as members of the League of Revolutionary Struggle and anti-war activists. And though the initial war they were protesting

ended, its aftermath brought so many refugees that they soon outnumbered other Jingle Heights residents. It was in their arrival that the old timers found a new cause. They created community programs for the refugees and organized them to lobby the city for what they couldn't provide themselves.

The refugees started businesses and many of their kids went off to school and, eventually, moved their parents out of the neighborhood. But new decades brought new wars, new protests, and new refugees. And so it went. The only substantial change to this dynamic was the steady trickle of young artists and musicians into the neighborhood in the early 2020s. They weren't, in-and-of themselves, really a problem. Sure they seemed a little proud of themselves to be here. And all of a sudden the corner stores were stocking things like Churchill Carnery's cultured Tasmanian devil jerky. But they volunteered for afterschool programs and legal clinics. And they voted with the old timers. Things weren't perfect, but they were stable.

Then Brandix came. Brandix was founded overseas as an online peer-to-peer marketplace in the early 2000s, connecting buyers and sellers. By the late 2000s, it bought several major package delivery companies, and by 2015 had even acquired two major international couriers. They were also an early mover in lightweight manufacturing of textiles, processed foods, and durable plastic goods, making them the manufacturer, seller, and shipper for almost half of the products sold on their platform. By creating more localized manufacturing across the U.S. and many other countries, they had crafted a positive public image. In 2025, the city of Ighowa won the race to the bottom to host the new Brandix headquarters, handing over massive tax breaks on the promise of thousands of new service, manufacturing, and delivery jobs for its citizens—however low-paying (and potentially short-lived) they might be. (Brandix was notoriously ravenous for automation technologies, after all.) The stable, high-paying jobs went to the few hundred programmers and product managers who moved here with the company. And it wasn't long before these workers set their sights on Jingle Heights.

It was the young artists and musicians who first sounded the alarm and led the charge, perhaps because they knew it was their presence that paved the way for the tech employees. The



Illustration by Trent Kühn

artists rallied the old timers and other residents and came up with a plan for direct engagement. They used security cameras in local businesses and installed some on the streets to automatically detect people with Brandix company logos on their clothing and push them a message through the ambient displays on shop windows:

“Dear tech bro, Thank you for your interest in Jingle Heights. However, this neighborhood is not interested in you, at least not without some conditions. Maybe you have the power to come in, displace us current residents, and take Jingle Heights for yourself. But we also know that you are probably well-intentioned and that you recognize how important we are, because you want to live here with us. And you know that if you kick us out, we’ll be replaced by people even more boring and safe than you are. Let’s talk.”

So we did. We laid out the problem; they genuinely listened. We asked them for help with a solution. They proposed one. A new nation: Jingle Heights Originals. Many virtual nations already used Brandix’s web services and there was enough know-how among Brandix employees to create the tech infrastructure.

Here’s how it worked: Anyone who was already a resident of Jingle Heights was granted automatic citizenship. This citizenship provided preferential access to the neighborhood’s built environment—parks and parking, community

gardens and buses. Most importantly, all citizens got a stipend of Jinglebucks. We convinced local businesses and landlords to accept the currency because it was backed by Brandix—that is, the only place you could use it other than Jingle Heights was on Brandix.com at a fixed conversion to their prices in U.S. dollars. Since you could buy just about anything from the Brandix marketplace, most people were mostly okay with it. Despite some protest and fear of company town dynamics, it was accepted as the only way to get the business owners on board. (And a series of simulations we ran assuaged many fears.)

That was three years ago. The basic idea, that this would keep the diverse, artistic community from getting gentrified, while at the same time allowing a managed number of tech employees entry into neighborhood, seemed to be a success. Jingle Heights Originals got more ambitious from there. We created our own energy grid, our own Internet Service Provider, and even our own automated farm, the produce from which we sold in Jinglebucks for next to nothing.

But there was a hitch. Although most people wanted to stay—a monthly stipend that covered all basic necessities and lets you focus on your passion is a pretty sweet deal, after all—people did occasionally move out and give up their citizenship (and older residents occasionally passed away). And when they did, bidding wars for their

apartments and homes were fierce. We could see that, little by little, the ratio was skewing. And so we created a rule—anytime that someone died or lost Originals citizenship, we must admit someone new into the nation (and they will get a stipend as well). The problem is, “fitting in” is inherently a fuzzy concept compared to the old qualification: proving residency in Jingle Heights as of February 22nd, 2025. (Though this qualification was not without controversy—many argued local homeless people should be issued currency as well, and others noted that many of the people complaining about gentrification were themselves recent arrivals).

...would our community be more equitable and vibrant if we started to really compel our residents to live up to community ideals—or be replaced by people who would?

Eventually a voting process was created that let the Originals agree on what defined us, and therefore what permitted or denied newcomers' entry. This went better than you might think, meaning, not well at all, but not an out-and-out disaster. Most of it could be summed up as: diversity, equity, creativity, inclusion and social justice. And while a small subset of citizens litigated what exactly those things meant anytime they had a new applicant for a citizenship, most people largely left them to it. Until the Ron Wayne incident. A video surfaced of him at a Proud Boy rally. He claimed the video was a spoof, but some light digging showed his digital trail was too long and diverse to be the work of any sort of defamation campaign. He was kicked out of the community summarily and a new precedent was born—citizenship can be revoked if you don't align with community values.

Then, there was the controversy around inter-marriage or cohabitation with Brandix employees. It was hard to argue that you needed a Jinglebucks stipend when your partner pulled in six figures. Income caps in U.S. dollars were instituted, and losing your citizenship didn't automatically allow you to start paying your rent in dollars, you had to move out and reapply to housing that was not previously occupied by an Original. People not only needed to meet com-

munity standards to gain entry, they needed to meet standards to remain.

But it was the Lorenzo fire that really had us asking questions about who deserved to be there. An entire city block of warehouses a half-mile from Jingle Heights burned down, putting dozens of artists out on the street. We made temporary space for them in our community spaces and sometimes in our homes. A few people even voluntarily left the community to open up housing for the Lorenzo victims, who were obvious shoe-ins. But this got people talking. Was it really fair to just let existing Jinglebucks recipients stay indefinitely as long as they didn't commit any gross violations? Or would our community be more equitable and vibrant if we started to really compel our residents to live up to community ideals—or be replaced by people who would? This talk was mostly just that. We all saw the merit in the idea, but at the same time, it meant so much sacrifice—it never felt like a real possibility. But just having that idea in the air seemed to create a new sort of pressure. People started to dress more “creatively,” started putting more artwork and plants in their windows. People started brushing up on the language their parents spoke.

“We value diversity of all kinds.” This meant gender, race, sexuality, income, and education. But for instance, even though most of the citizens were technically low-income, if you started to scratch below the surface, many had middle-class parents and chose a low-income career path because they had a family who could take care of them in an emergency. And many of us people of color grew up primarily in white neighborhoods. There was always chatter that so-and-so didn't discover they were x, y, or z ethnicity until they were 26 and wanted to live in a cool neighborhood. Some of us wondered aloud if we might eventually see more strict regulation around family background. We feared that the community would kick us out—and that they'd be right to do so.

Gradually, the identity of a Jingle Heights Original began to feel like something you needed to go out of your way to perform. When we started, our citizenship was a symbol of authenticity, something exclusive and unavailable to the Brandix tech bros. But here's the irony. They get to grow, they get to change. They don't have to worry about being “authentic.” They just get to be themselves.

Scenario 3: Outsourced authority

Trusting Your GUT

by Sarah Smith and Jake Dunagan

What happens when we use biomarker-based data collection to guide our major life choices?

In 2028, everything from career choice to mental state is outsourced to the trust markets. GUT (Guaranteed Ultimate Trust) is the #1 ranked matchmaking service, empowering lonely singles to outsource their relationship decisions to the biochemical reactions triggered by an encounter with a potential partner. In a world where physiological data can easily be shared with and analyzed by third parties, just how much can we outsource to experts so we can stop worrying about it?

The GUT ads were everywhere. Trust your GUT! (Guaranteed Ultimate Trust). Besides being an annoying tautology, the ads featuring beaming young couples looking at their devices to know if they are a good match for each other were enough to make you puke. But everyone was using GUT, for measuring trust in almost every situation: repair services, lawyers, churches, OBGYNs, and on and on. This is what it must have been like when everyone was on Facebook. You sorta hated it, but you had to be on it.

For years, people allowed data about their favorite quirky interests to be gathered. They uploaded pictures of their most triumphant moments, endlessly pruned their profiles and waited for algorithms to do the matchmaking—friends, business partners, and romantic relationships. Surely these machines knew us better than we knew ourselves. They got more and more sophisticated. GUT (Guaranteed Ultimate Trust) had the first killer app—measuring our cortisol levels on a first date and then automatically

sending you a follow-up text within 24 hours if your body was telling you it “just wasn’t quite right,” or “your GUT says YES!” (Nevermind the fact that dozens of scientists published a consensus paper in 2024 stating that cortisol level was not at all a trustworthy measure of stress state, not to mention enough to hinge the potential for a life partnership on a little chemical spike). Maybe most ironically of all, this was one place where people did rely on intuition and stopped trusting science because it “just didn’t quite feel right.” And so we went on, with desperate faith in a faulty system, waiting for the algorithmic stars to align.

There was an infinite pool of potential partners to find, and no time to waste, so why settle for someone if they weren’t actually a perfect match? Everyone had been burned by their own mistakes, so leaving it to the machines just made sense. It felt inevitable that this fell into the steady march of human history: the Stone Age, the Gilded Age, the Outsourcing Age. Trusting someone else to do your laundry and your grocery shopping and your dog-walking just made convenient sense. But it became a bit maddening as people started to feel like they really couldn’t trust themselves anymore. The “epidemic of loneliness” that was making headlines in the late teens, seemed to only get worse as people doubled down on waiting for “big algorithm” to make the right match. All the while, everyone was so obsessed with this quest for the perfect match that they optimized their input data to the point where it became useless: an infinite feedback loop of peoples’ actions and words reflecting back on themselves. It was creating new types of personal memory holes. People got in the habit of eliminating facts they deemed undesirable about themselves, to the delusional point they started to believe their own lies.

Many people can’t even begin to tell if someone is trustworthy—or not—on their own anymore. They have to use GUT, or the dozens of other applications trying to corner the “trust market.” Striking up a conversation with a stranger is devoid of eye contact as people distractedly gaze into the foreground of their mixed reality contact-lens displays, waiting for cues and information about whether they should be interested in their new acquaintance. I’ve literally had someone turn around and walk away in the middle of a sentence because some filter indicated that I didn’t meet his criteria. Most people

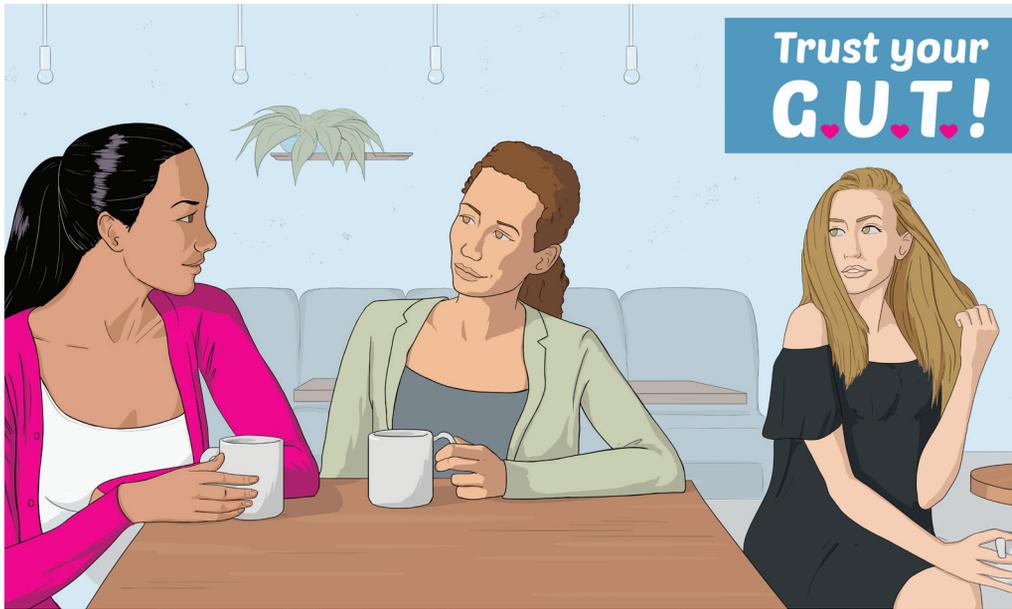


Illustration by Trent Kühn

don't care—"Does anyone care that we can't navigate a city without an app?" they say. But I care, and I'm looking for a new way. I'm lonely. I'm unsatisfied with my relationships. I want to get back in touch with my own intuition, my own judgment, my own gut (lower case!).

So I went looking for answers these last 12 months. I tried several new experiments to reconnect with myself. This was a big challenge—who could I trust with my trust? Could I trust myself to know? I'm still annoyed that I even had to ask myself these questions. But things did change. Here's what I learned:

Oh my gut ...

I figured I might as well dive head-on into the most direct way to get in touch with my inner self. The microdosing fad came and went, but the therapeutic use of psychedelics is still growing. So I signed up for a 3-day "trust retreat" that came recommended by several friends (and, I must admit, verified by a few thousand online reviews). It consisted of three different drugs that uncover and deepen our feelings of trust. Day 1 was Ibogaine. I was able to let go of a lot of old hang-ups, and had a really cool conversation with Iboga (the spirit of the drug) about a grade-school boyfriend.

Barely recovering from Day 1, I was given mushrooms on Day 2. Instead of a reckoning with old demons, I was able to see the connections between people, between people and other animals, and between people and plants. Hard to describe, but I could feel whether every living thing was hostile or friendly to me.

Day 3 we took MDMA, and I felt (artificial as it might have been) a pure closeness and warmth and trust from every person and thing around me. I'll spare you the garrulous gushing about how profound this felt.

A week later I was still a bit physically and spiritually drained. I don't know how much of those feelings were left inside me, but I certainly was not looking at an app for life directions, and I liked that part. I had different interactions with people for a while, but I also felt a little alienated as well. It's great to go on a personal journey, but it gets to be a little lonely if you don't come back to the flock.

So, I needed a group that wasn't tied to an app, but wasn't sticking their heads up their own guts, so to speak. About that time I noticed a faded flyer for a weekly meeting of the "trust tribe." When I arrived, I had the feeling I was in some kind of den of thieves or strange doomsday

cult. Apparently, to join the tribe you have to follow a set of strict rules around the kind of people you interact with, the technologies you use, and the information you share. As you might expect, GUT-like apps are strictly forbidden. I liked the commitment to no outsourcing of trust, but this level was a little too much for me to take on. You should have seen the way they glared at me when I admitted to often ordering dinner from an app and eating alone—“How could you bear not to know the hands that massaged that kale salad?!” their eye rolls said. I signed some smart contracts that promised I would never talk about the trust tribe to anyone outside their doors, and walked away as fast as I could.

I was feeling a little embarrassed that I had chickened out of the trust tribe experiment, and maybe that’s why I went even more into the trust abyss with my next choice. I had heard about Oui-Dings from a friend, and thought it was the most absurd idea I’d ever heard (not to mention the worst product name in a city that produces bad start-up names like a steam rising from a hot street). Oui-Dings arranges marriages. You come in and fill out a profile, and it connects you with the “perfect” mate, based on your preferences. You can have a financially-driven marriage, an adventure marriage, a friend spouse, a fetish spouse, etc. It was weird. But I went through with it.

Oui-Dings arranges marriages. You come in and fill out a profile, and it connects you with the “perfect” mate, based on your preferences... It was weird. But I went through with it.

I chose the financial planning option, and Oui-Dings connected me with Amanda. She owned a house, and had a kid, but the income-potential projections made our match a minor financial miracle. We get along, generally, and I like her kid, generally. I haven’t told my parents about it, but it’s been awesome to this point. If the multi-marriage law passes in California, I might think about a love marriage, but I’m not worried about it for now.

So where does all this experimentation leave

me? It’s hard to say. I like how much better I am at human-to-human connection, and I feel like I can judge whether or not to trust someone without using an app. But it’s not perfect. Amanda was furious when I was convinced to sign a contract on a timeshare from this really hot guy at my gym. Everyone still has an agenda it seems. So, I’m thinking about re-installing GUT again, just to see if I can put the best of my skills together with the brains of the algorithm. I don’t want to offload all my decisions to the machine, but I don’t mind having a digital wingman when I need it.

Scenario 4 | Filtered preferences

Do You Know Who I Am?

by **Jamais Cascio and Jane McGonigal**

What happens when we get ad blockers for the physical world? In 2028, augmented reality glasses have become a fixture of everyday life, creating a new marketplace of attention that offers everything from ad-blocking on the subway to paid product-placement. While these ubiquitous filtering services provide innumerable capabilities for coercion and manipulation, other benefits are less expected—such as the ability to block oneself from others’ view to retain some level of anonymity in a hyper-connected world. What will privacy look like in a world in which anything and everything can be filtered out?

No? Good. Yeah, we have filters for your augs that will protect you from having to see something unpleasant or someone you don’t like. But that’s just technology-enabled fear, not power. Real power comes from flipping the script. With those same tools, I can block myself so that you don’t get to see me.

Hey, look at that, I’m the Invisible Man. (Assuming I’m a man, that is. Remember: you don’t know who I am.)

Filters started as a way to block out annoyances, like crying babies or intrusive ads. Turns out that a lot of stuff is annoying, and nobody wants to have to enter every item on their filter lists. That’s just tedious, and you always end up missing somebody or something that really bugs you, and they stand out as just really freaking irritating in the middle of your serene digital world. So you get a filter subscription to block out the everyday idiots, and you can then add the stuff that’s just for you.

Sometimes the filter comes built-in to the aug

gear, the glasses or whatever, and sometimes you pay extra to get a really well curated one. Amazon sells a pretty popular filter, so does Disney. On top of that, you might add more block lists that match your social or cultural preferences.

You want filters approved by the Pope? You got it. Or by the ACLU? Boom. How about a live copy of the Great Firewall? Hey, it’s your money. And speaking of money, there are even filters you can get where they pay you to use them. You just have to watch their ads in place of the offensive or annoying or frustratingly wrong stuff you want to block out. If you’d rather watch commercials for laundry detergent instead of seeing posters and billboards for the next political campaign, that’s on you, I guess. At least you’re not doing it for free.

(Remember when people had to watch ads without getting paid to do it? Suckers.)

But here’s the thing about all of those filter subscriptions: they pay attention when you add your own items to them. And if something—or someone—is added to enough different kinds of filters by enough different sources, then they start to show up in all of them. “This guy is just a numpty, nobody likes him, make him go away.”

So I just started to add myself. To every filter list I could. And made new subscription IDs to do some solo-crowdsourcing. And eventually I started showing up on filters without having to do anything.

After a while, I learned that I’m not the only one doing it. There are thousands of us around the world. We even have a newsletter, if you can believe it. We’ll add you and you add us, and pretty soon, to 90% of the people you run into, you’re just a generic human-form or a clown or a walking billboard for soap.

You’re not “off the grid,” though. The automated systems still recognize you, so you can shop and pay your taxes and have a nice flat and get your groceries delivered by a robot. You’re only anonymous to other people, which when you think about it, is kind of the point of being anonymous. It doesn’t matter if people trust you, or don’t trust you because they don’t know you, or whatever. If their systems trust your systems, it’s all good.

We’ve got enough privacy protections in place that I’m not overly concerned about my name and address leaking from a warehouse store membership. Machines do what they do with my personal info, and as long as they’re not telling



Illustration by Trent Kühn

people about it, I'm golden. Just another faceless in the crowd.

And really, when was the last time an actual person was in the loop for consumer analysis and marketing decisions?

People in my little club don't just go for the filters, we also push for taking advantage of "right to be forgotten" laws, digital defamation laws, the works. Squeezing every bit of personal privacy we can out of the system.

Why do we do it? I bet you think it's to make it easier to commit crimes, but get real. Most police stuff is done by machines, and remember, we're not off the grid as far as the grid is concerned. Or, you may think it's to try to hide from corporations creeping on our lives with spyware and ultra-personalized ads. But blockers for that kind of stuff are already easy to get without making yourself functionally invisible to other people.

No, some of us might do it because of hardcore social anxiety or other emotional issues, but most of us add ourselves to filters to get away from people we don't want to run into again.

One of my friends in the club—no, of course I'm not going to tell you her name—ran away from her family when they tried to ship her back home to force her to marry some old dude with money and an unhealthy interest in 15 year old girls. If they find her, they'll try to kidnap her and send her away, if they don't just kill her.

We've got judgmental communities, abusive spouses, predatory relatives, vindictive bosses, all sorts of people who want to have a stranglehold on our lives and go crazy when we try to get away from them. I'm not going to tell you who I'm keeping away from, but let me just say that s/he is the only person who can make me cry.

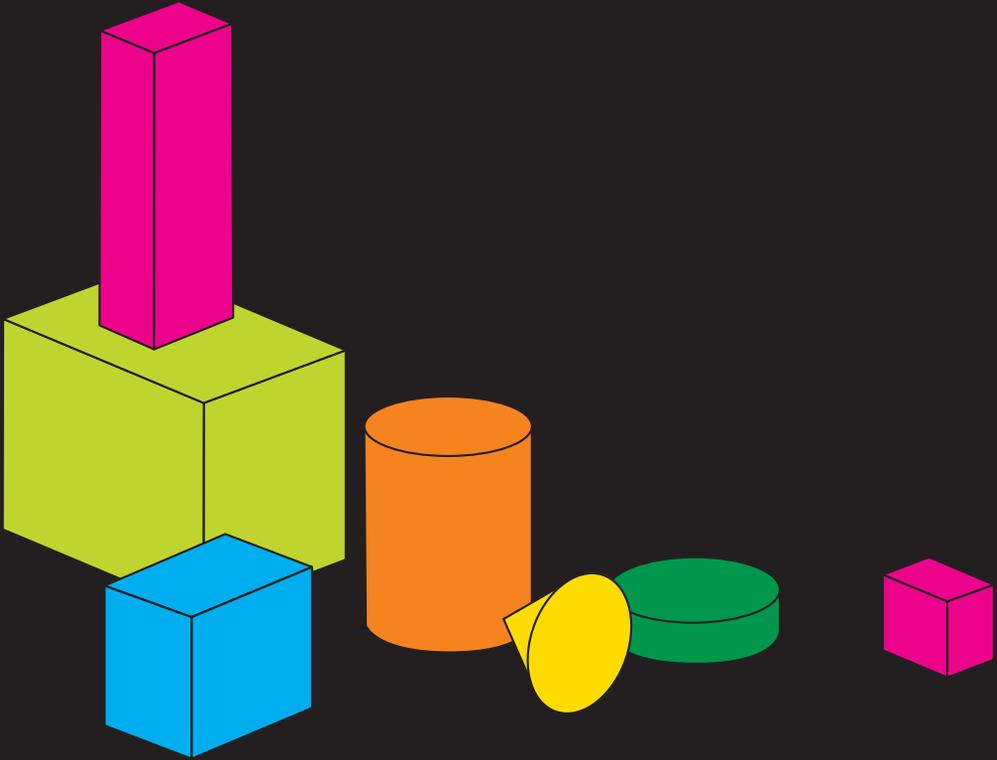
We're not criminals. We're refugees.

Because here's the thing. So many people think that all of this digital shit, the filters and the glasses and the bots and the real-time-persuade-o-matic has made our lives easier. And that's probably true for most of you.

As much as we talk about the silicon and the lithium and the petabytes, we're still people, and people are ... imperfect. We've gotten really good at slapping illusions over the things we don't like, and we've convinced ourselves that this makes them go away. We can live our lives without ever having to see or hear something unpleasant or crude. We can walk through sewers but see only gardens, do business with everyone but see only vaguely-human drones.

You know they're testing contact lenses with the smart glasses stuff, right? And in China they're already starting to do corneal replacement surgery with digital lenses. Pretty soon everyone will see the world through happy filters.

But they won't see me.



Making Change With Foresight

At IFTF we have long believed that the purpose of foresight is to provoke action in the present. Futurists and forecasters illuminate possibilities, but we are often not the people who really make change and shape the future. For instance, today there are hundreds of activists and artists, whether they describe themselves that way or not, who have bold visions for the kind of future they want for themselves, their communities and the world and are working hard to make those visions a reality.

In this issue of *Future Now*, we highlight the projects, efforts and initiatives of people who are using foresight to take action in the present. Though they may not be card-carrying futurists, the individuals you'll learn about in this section are, nonetheless, taking the long view and working to make the future now.

Creating Change with Architecture + Foresight

by Rochelle Spencer

Foresight has always been at the heart of architecture. Buildings are, mostly, built to last decades, if not centuries. But while foresight is inherent in architecture, not everyone uses it in the same way. Some design structures to thrive in the future, or at least survive it, others design to shape the future.

“Even before Bucky Fuller famously intoned about the need to become architects, not victims, of our future, there was a deep connection between the mind-sets if not the skill-sets of architects and futurists,” IFTF Research Director Jake Dunagan explains. “Both architects and futurists look at holistic systems to not only understand the dynamics and needs of those systems, but to actively imagine, invent, and steer them toward better, more livable, more preferred outcomes.”

Indeed, blueprints are not simply instructions for where to place floor boards and ceiling beams, they are plans for motivating human movement and activity. And as we inhabit and make use of our built environments, we are often living someone’s preferred outcome, whether we know it or not. That’s why architecture and urban planning serve as such powerful tools for mak-

ing change.

The ways that design can shape the future are too numerous to count, and so are the people that use it as their medium for making change. In this article, we feature four such changemakers, whose work provides a primer in a few key ways we can use architecture and planning to realize a vision of future change.

Designing Restorative Justice

Prisons and courthouses are some of the places where we see most clearly how architecture can be designed to have psychological impacts on people encountering it. Court houses often have tall ceilings and cold stone walls, designed to convey the justice system’s indifference to emotion and the severity of consequence if it finds you guilty. Court rooms place the judge on a pedestal, so they may look down at you, emphasizing their position of power. And U.S. prisons use concrete walls and floors, drab colors, and a general lack of privacy to drive home the notion that you are a captive, with no autonomy, being denied any sort of comfort or pleasure.

With growing awareness that prisons are rife with abuse and neglect, and are disproportionately and unjustly populated with poor people and people of color. (The U.S. has the highest incarceration rate in the world). Voices calling for reform have become louder and more numerous—and many of those voices belong to architects.

For instance, a recent feature in *Fast Company* details the efforts of a design team contracted by the County of San Diego to—taking a page from the health care industry, which has accepted that the built environment plays a key role in well-being—build a prison that was healing and not damaging to inmates.

Kyle Rawlins and Deanna Van Buren, co-founders of Designing Justice + Designing Spaces, go further. They don’t want to design a better prison or a better court room, they want to eliminate them. In short, they are striving to create a future without prisons.

For Van Buren, it started when she visited a Pennsylvania prison to teach a workshop on the power of design. Witnessing the oppressive design of the prison itself, she was struck by a deep sense of irony.

“I realized that what I was seeing was the end result of our racist policies that had caused mass incarceration,” she explained in a recent



Illustration by Robin Weiss

TED Talk. “But as an architect, what I was seeing was how a prison is the worst building type we could have created to address the harm that we’re doing to one another.”

She wondered if there might be a better way. Shortly after, when she learned about “restorative justice,” she knew there was. The model emphasizes reconciliation, accountability, and restoring harm done to the victim, not punishing or isolating the offender. And its gaining traction in the U.S., particularly in the arena of juvenile justice. Unlike court proceedings, that are about assigning someone a zero sum innocent or guilty judgement, restorative justice sessions allow the victim to directly address the person who harmed them, sitting together in a circle with their larger community, so they can come to a mutual understanding of the wrong that was done.

Van Buren quickly became a proponent of this approach and realized there was a special role for architects in advancing it—someone needed to design spaces optimized for these peacemaking sessions.

For her first project, Van Buren partnered

with an Oakland high school with a restorative justice program already in place to turn a storage room into a dedicated space for their peacemaking sessions.

“After we were done, [the restorative justice program] director said that the circles she was holding in this space were more powerful in bringing the community together after fighting at school and gun violence in the community, and that students and teachers started to come here just because they saw it as a space of refuge,” she explains. “So what was happening is that the space was amplifying the effects of the process.”

In 2015 Van Buren built on her successes designing peacemaking spaces, partnering with Rawlins, who has decades of experience in real estate finance and development that has often included affordable housing. They create Designing Justice + Designing Spaces, a firm dedicated not only to restorative justice, but to addressing the root causes of mass incarceration. They’ve partnered with non-profit “strategy and action” organization Ella Baker Center for Human Rights and the Restaurant Opportunities Centers United to create “Restore Oakland,” a build-

ing that houses a restaurant called “Colors,” which trains low-wage restaurant workers to get living-wage jobs in fine dining, work spaces activist organizations, and the nation’s first dedicated space for restorative justice.

“The Designing Justice approach is a program-and-place model, because it deeply integrates the design of space with the programs and services housed in them” Rawlins, who works to secure the funding and regulatory approval to build the space and keep the programs within it running, tells Future Now. Designing Justice, he says, is relatively unique among architecture and development firms because of its focus on low-income communities of color who “suffer the most from the social prices of mass incarceration.”

Making Inclusive Design the Norm

Today, there seems to be widely shared belief that design should be “inclusive.” But there is not, at the moment, as much consensus on what inclusive means, exactly. The disability rights movement of the 1970s began advocating for spaces designed for people with different accessibility needs, eventually establishing groundbreaking legal requirements for accessibility with the passage of The Americans with Disabilities Act in 1990. But since then, many people have argued that while meeting regulatory requirements is important, it’s not sufficient to make design truly inclusive.

Mei-Yee Man Oram, Co-Leader of the Accessible Environments team at design firm Arup, is working to make a future in which accessibility and inclusive design go from “a code-compliance, box ticking exercise,” to something that is recognized as having “long-lasting benefits for all people.”

She elaborates that “there is often a misconception that inclusive design is about design for people with specific accessibility requirements... But what is good for a wheelchair user will also be good for a parent with a pushchair; legible signage using non-written cues will be good for both people with learning disabilities and someone whose first language is not of the country in question.”

This is an approach that she and her team put into practice in their work. For instance, Oram’s team, alongside a wider multidisciplinary Arup team (including Transport, Security, Fire, amongst others), worked with the Olympic Delivery Authority on the London 2012 Olympic and

Paralympic Games, helping ensure both venues within the park and the layout of the surrounding parklands to ensure accessibility for people with disabilities in ways that benefitted all who attended.

To do this, they ensured spaces had clear sightlines, (motorists, pedestrians, people on bicycles, and people in wheel chairs can see each other easily), natural surveillance (space is setup so that if anyone is injured or they commit a crime, they will be easily visible to others), and abundant lighting, which, Oram explains, creates a safe space for everyone, not just people with specific accessibility needs.

“This project also highlights the importance of multidisciplinary working, as the benefits of inclusive design would only be possible if all aspects of the design and operation are coordinated,” Oram explains. She believes that this inclusive design approach can help transform inequalities in society over the long run, because it has in the past.

“Opportunities for and representation of women and disabled people in the workplace could not have moved forward without a shift in the provision of female and accessible toilets within buildings... We now face similar challenges in relation to the representation and provision for other underrepresented groups, such as the provision of gender neutral toilets for transgender populations and people outside of the gender binary, and larger accessible toilets for people with assistants or [caregivers].”

Amplifying Positive Planning and Design

When architecture and urban planning seems exclusionary, that’s often by design. If you’re walking through a city and you encounter a dead-end that interrupts a street grid, seemingly inexplicably, it’s more than likely that someone was making a conscious attempt to segregate the city. The same can be said of skywalks that allow white collar workers to travel to each other’s offices and the businesses that cater to them, while literally remaining above the rest of the people in the city.

Robert Moses, recognized by many of the “master builder” of the mid-20th century New York metropolitan area, is on record asserting that he deliberately planned urban environments to ensure economic segregation for decades to come, for instance, by building certain bridges too low for buses to pass beneath them.

“Legislation can always be changed,” he told his biographer Robert Caro. “It’s very hard to tear down a bridge once it’s up.”

(Colloqate Design’s Bryan C. Lee has done tremendous work in decoding and cataloging this kind of “oppressive design.”)

“It’s important to mention most traditional urban planning practices are exclusionary from the beginning,” Teju Adisa-Farrar, a cultural critic, poet, and “urban geographer” told *Future Now*. “When we start looking at design, we’re considering how people who have been devalued financially and socially and culturally are usually left out of the conversation, even when they are most affected by urban development decisions.”

In her masters thesis, Farrar points out that Urban Studies is “traditionally academic” in its lack of “a nuanced and thoughtful discussion on race and ethnicity.”

Part of Adisa-Farrar’s work has been to examine black urbanism and how black people move through cities in their personal and leisure time. In her research, which includes personal interviews, Adisa-Farrar finds “exclusion from spaces of leisure is not always explicit. However, there are clear indicators of non-belonging. This can be anything from receiving poor service to being asked if you are in the right place.”

She emphasizes that “people need to be included in planning. We can’t have inclusive design without inclusive planning.”

“In terms of physical design, we have to be more comprehensive and more democratic. We should consider allowing buses to have their own lanes—they transport more people than cars so they should have more space,” Adisa-Farrar continues, noting that this practice has worked in places like Bogota, Colombia. “Public transportation is also used more by blacks, people of color, and elderly so these demographics should be included in these conversations.”

Adisa-Farrar’s approach to making change isn’t limited to critiquing current design processes or suggesting new strategies—she’s actively working to help amplify the reach of people using art and design to create social change. Her website, *World Unwrapped* highlights positive urbanism-related projects and even offers people help in developing such projects and articulating messaging for them.

“I encourage organizations and institutions to use language that is thoughtful and nuanced

as well as to consider the role of authority and who is seen as having a valid opinion on something,” she explains.

“I want people to consider that art is a part of economic development and neighborhood revitalization,” Adisa-Farrar continues. “We’ve seen that when people draw or paint on the spaces they live in, they feel more connected to their communities, with a sense of ownership—wanting them to be safer and cleaner. When you consider the iconography associated with Nelson and Winnie Mandela, the Black Power fist, Che Guevara—these images of resistance and self-determination are embedded into movements. Art and graffiti culture is a form of resistance. Art is the language of movement building.”

Creating Change with Food + Foresight

by Max Elder

In January of 1969 at St. Augustine's Church in Oakland, California, the Free Breakfast for School Children program was started by a group of changemakers who knew that a nourishing breakfast was critical to student success—and that kids in underserved communities of color often started the day without one. This group, the Black Panther Party, realized that to make the future they wanted, they needed to start with good food.

The Oakland program, which relied on nutritionists to plan meals, party members to prepare and serve them, and local businesses to donate the ingredients was quickly adopted by the national party and the Panthers went from feeding hundreds to feeding thousands of children a day. Within a few short years, an FBI campaign to undermine the Panthers, generally, and its free breakfast program, specifically, put an end to the free meals. But the party had succeeded in directly giving thousands of kids a better shot at a brighter future with food. And their free breakfast program created the pressure needed to turn a collection of modest USDA pilot free breakfast programs into national policy, creating the 1975 School Breakfast Program that, today, almost 50 years later, feeds almost 15 million daily.

Food has always been used to create change, whether it's an individual diet designed to help a single person manage a challenging health condition or an urban garden intended to plant seeds of hope in a community where there is little to be found. At every level—the global, communal, and individual—food is a rich and powerful tool to create new futures. It is literally a medium for change for everything from health and identity to labor and politics. In this article we highlight six exemplary individuals changing themselves, their communities, and the world with foresight and food.

Flipping the Fast Food Model

Roy Choi wants a future where healthy food is affordable, delicious and easily accessible regardless of socio-economic status. To make the change he wants to see, he's taken on the ambitious goal of flipping fast-food on its head, by creating a restaurant that has all the appeal of a junk food chain, but with health benefits, not burdens.

This might seem like a strange undertaking for the owner of a Michelin starred-restaurant, but when you consider who Choi is, it's not so much of a stretch. Choi was born in Seoul and raised in Los Angeles where he became obsessed with good food, and learned the value of tight-knit community. And he already has one unlikely culinary coup under his belt. As the late Anthony Bourdain explained in Time magazine, Choi “changed the world when he elevated the food-truck concept from ‘roach coach’ to highly sought-after, ultra-hot-yet-democratic rolling restaurant” with his Korean taco truck, Kogi.

Inspired by the realization that food can be a tool to support communities, not oppress them, Roy teamed up with chef Daniel Patterson to open LocoL, a chain of restaurants in low-income neighborhoods with fast-food prices and convenience—but better nutrition and community accountability.

In an interview with *FLOOD*, Roy says he chose a fast-food concept because it's a gateway to how many communities are eating, “Since the only places that open up in the hood often are fast-food restaurants, why not build one with ‘heart and humility?’”

Roy goes on to say this model shouldn't just be in Los Angeles, it should be in every city: “There should be chefs opening up delicious natural food outlets that are staffed by the com-



Photos left to right: Tunde Wey by Moyo Oyelola; Julia Turshen by David Loftus; Brian Kateman by Andrei Severny; Roy Choi by Travis Jensen; Austin Young & David Burns by Jim Newberry. Illustration by Robin Weiss

munity, providing more jobs, providing more opportunities, getting more people to come into shops—or providing access and ways for people to make their own shops.”

Creating stronger community is not just about providing healthier food to people who need it. It’s about having the foresight to take an unhealthy but familiar model and reimagining it as an empowering platform for equitable access to nutritious food and local employment opportunities. Choi says the way to do that is to “give and love and breathe and listen, then act and do.”

LocoL, Choi asserts, is not just a restaurant, but a social experiment in feeding people better. The restaurant itself rose quickly, with several branches opening in a couple short years, but fell just as fast—all locations are set to be shuttered in the near future. Trade journal *QSR Magazine*, puts forth a number of possible explanations, from larger trends in the food world such as the rise of grocery ready-made-meals, to underlying issues, like a misalignment between LocoL’s for-profit status and commitment to valuing their mission over money.

Using foresight to make change isn’t about

persistent, unbroken success. Instead, as, IFTF Distinguished Fellow Bob Johansen reminds us, it’s about being clear about and committed to a bold vision, but flexible about how it is achieved.

Choi remains undeterred. “Until generational racism stops being handed down at dinner tables and until more are even able to sit at them,” we need to fight for change,” he says. In a social media post, LocoL insisted that despite retiring the retail locations, “We are not closing! The mission is as strong as ever.”

Reframing Food as a Universal Right

Free food is nothing new. Countless canned food drives and soup kitchens across the globe dole out sustenance at no cost to the recipients every day. But the way this kind of food is served up inherently contains certain connotations—you are only receiving this scarce resource due to the generosity of others.

Artists David Burns and Austin Young provide free food with an entirely different ethos. Their project, *Fallen Fruit*, has been touted as fresh and innovative, but one source of their inspiration is quite ancient: a passage from the

Torah states farmers should not harvest the edges of their fields or gather the excess “fallen fruit” that drops from trees but instead “leave them for the needy and for the stranger.”

Their solution to food deserts isn't to provide more fresh produce for sale at local vendors, but to plant fruit trees in public spaces. So far, they've done it in 30 cities across the globe, in some locations creating entire “urban fruit parks” where locals can pick as much fruit as they need. Additionally, they've made their project a platform for others to create their own public food forests. “Endless Orchard” is their crowdsourced map of fruit trees that anyone can pick from, and they encourage everyday people and communities to plant their own trees and add them to the map.

The community art projects of Fallen Fruit are an attempt at cultivating a radical ethos of sharing. They find that, when given the opportunity, “people actually love to share and really understand that, in caring for fruit trees given to them, the public is in turn caring for other people.” Some of Fallen Fruit's most urgent work has been in The Ninth Ward of New Orleans where many denizens have felt a systemic lack of care for generations. Food can not only build a sense of caring, sharing, and empathy in geographic communities but also in communities of color and gender identity who have similarly been overlooked or underappreciated.

In this way, the trees are about more than just providing fruit. Burns and Young are actively working to create a future where the narrative of food isn't that it is simply a commercial product that people have to pay for, but, in a world where we can easily make it in abundance, a universal right everyone is entitled to. Their motto perfectly sums up how Fallen Fruit thinks about making change with food: “Share Fruit. Change the World.”

Forging Constructive Food Identities

Food is such a powerful tool to create change because it doesn't just connect us to each other, but it also quite literally makes us who we are. The food we eat becomes us in a physical way and it also creates us in a more abstract way—it is a critical component of our identity.

Brian Kateman is deeply concerned about factory farming and the impact that it has on human health, our environment, and farmed animals. And he sees identity as an important tool for making change on these pressing issues.

Becoming a “vegetarian” or “vegan” isn't an easy identity for many people to adopt, Kateman believes, partly because it doesn't allow enough flexibility and imperfection. He came up with the term *reductarian* to describe people who decrease the amount of meat they consume, not cut it out completely. He started the *Reductarian Foundation* to promote the idea that the “all-or-nothing” identities like “vegan” are not our only option.

Kateman explained to *Grist* that “reducing a person's meat consumption from 200 pounds a year to 160 makes a much bigger impact than turning someone who already eats very little meat into a textbook vegetarian.”

He warns against the kind of exclusivity and judgment sometimes associated with current food identities.

“I think that we can leverage identities and terms that signal our values to build coalitions and stakeholders and find ways to work together,” Brian explains, “but the caveat is that those identities need to be productive; they can't pigeon-hole us into a world where we only interact with other people who share our exact same interests and ways of being.” Kateman hopes the *reductarian* identity can bypass the conflict between veganism and vegetarianism and omnivory, promoting a common ground of reducing the consumption of animal-based products while at the same time advocating a world where we move beyond factory farming.

Using ‘Discomfort Food’ as a Mirror

Imagine a restaurant where you sit down and are handed a menu, only to discover that you are being asked to pay twice the normal price other diners pay based on your race. That's exactly the experience Sartj, a popup lunch counter in New Orleans created by chef Tunde Wey, where eaters who identify as white are asked to pay two and a half times the base price for lunch. This price difference is not arbitrary—it mirrors the wage disparity between white people and African Americans in New Orleans. And what Wey seems to be saying with this pricing structure, is that, far from being novel, differential pricing exists as part of every day life, but in reverse—because of wage disparities, African Americans are, effectively, being asked to pay more for their food than white customers at any restaurant they patronize.

Wey uses food as a mirror, forcing eaters to

confront the issues that exist behind their meals. Food spaces are one of the clearest reflections of power structures in the U.S., Wey believes, yet they are often deemed not to be appropriate places to discuss or confront those structures. Food experiences and dining venues, in Tunde's mind, should not be sterilized from the discomfort and messiness of critical discourse. Since our current food system is exploitative, it is an effective medium to examine exploitative systems more broadly. Since food is communal, we can use food to examine who is included our community and who isn't. Since food is cultural, we can use food to examine cultural appropriation. Sartj and Wey's other conceptual creations—from his Blackness in America Dinner Series in 14 cities across the US to his 1882 series exploring anti-immigrant attitudes—push eaters to examine these issues.

The *Washington Post* has called the cuisine Wey serves “discomfort food.” But his agenda is much broader than food. Though he is a brilliant writer, Wey's status as a celebrated chef makes food a unique medium for him to communicate in, hosting conversations that aim to contribute to changing the narrative about inequality and lead to a future where resources are redistributed in a more equitable way.

Collecting Recipes for Resistance

To create something new in the kitchen, many first reach for a recipe. The word recipe has two different but related definitions. A recipe is “a set of instructions for preparing a particular dish,” as in “a traditional Thai recipe.” The other definition is “something that is likely to lead to a particular outcome,” as in “a recipe for success.” Recipes are perfect metaphors for creating new futures since they are, in their broadest sense, a set of instructions to achieve a desired outcome.

Cookbook author and food activist Julia Turshen thinks that the form of a recipe “gives us a nice framework for planning anything, whether that is organizing your community or being part of a larger movement.” Her most recent cookbook, *Feed the Resistance*, can be looked at as a sort of compendium of people making change with food. Its comprised of recipes in both senses of the word: essays from activists (including Tunde Wey) in addition to instructions for creating food to feed them. The book contains recipes for easy posole and ending recidivism. It beautifully documents the ground rules for apple squares and

organized activism, all the while urging us to gather around a table with these recipes to plan meals and revolutions.

Turshen not only documents the efforts of other changemakers, she is a changemaker herself. She and others created Equity at the Table (EATT), an online community for women/gender non-conforming people, focusing primarily on people of color and queer people, in food. It connects people to resources such as legal help for those who have experienced workplace abuse and allows community members to list themselves in a database so they can be discovered by journalists, restaurateurs, and conference organizers. EATT is inspired by the age-old aphorism that “when you have more than you need, build a longer table, not a higher fence.”

“We can use food to achieve this more equitable world,” Julia says, “and when I think about what that world looks like or what that table looks like, it's not just about diversity. There is an important difference between diversity and equity. Equity is about a power shift, not just a transfer of power from one group to another, but reframing how we see power. How we create it and maintain it. How it's wielded.” Having a seat at the table is critical, but so is the structure of the table itself. Julia suggests this metaphorical table should be envisioned as a circle with no head and where everyone is on equal footing. This metaphor helps us think critically about the power structures that have historically limited the ability to truly empathize with others.

Food is the Future

You don't need to be a cookbook author, a chef, a non-profit founder, or an artist in order to use food to create a new future. You eat multiple times a day, meaning personally you have opportunities to change the future with food regularly. How can you use food's universal language to speak to others in new ways? How might you create new food identities that reflect your values? Can you create greater empathy in yourself, your family, or your community with food? Are you willing and able to see the systems reflected in and through food, even if they aren't as equitable or just as you might assume? Food provides all of us the opportunity to be changemakers and write our own story for the equitable, sustainable, healthy, and humane futures we want and our world so desperately needs.



Illustration by Trent Kühn

by Daria Lamb

Sharing a Dark Future

George Carlin famously quipped that tonight's weather forecast is dark. Carlin was considered grumpy, with a stand-up humor style that was cynical and acerbic, all traits regarded as dark. Spend some time in his material, and you will also find his work to be provocative. His dark wit was often insightful and revealing, with a knack for making you look deeper at things you may have not previously given much thought to.

Fast forward two or three decades to today, and you'll find yourself surrounded by people using negative language in public discourse to appear insightful and persuasive. Critical thinking is replaced by criticism, and engagement

is valued over impact. We celebrate dialogue that can drive hours of commentary and endless online ripostes with retaliatory comments. Watch a national newscast, read an essay in a major publication, or follow an online post that has generated uncounted responses, and you feel like you are part of a thinking community. But those who write an appreciation of a policy, leader or artistic creator, can be judged to be myopic or just downright dull. No one wants to read an ode today. Disagreements and critiques grab your mental attention and can be generative.

It follows that a critical mindset might be

beneficial to help people open their thinking to future possibilities. Eckert Tolle points out, “to complain is always non-acceptance of what is.” And not accepting today’s paradigm is the first step in building a futures mindset. This leads an aspiring futurist to ask, have we entered an era where we have to use dark and negative language to get people to think?

The Handmaid’s Tale, Blade Runner, Ender’s Game, The Giver... these novels all were brought to the screen 20 years or more after their publication, and opened to movie audiences chomping at the bit to watch them. These are stories that are dystopian, unsettling and downright dark, yet have an enduring attraction in their story. We are familiar with images like Black Mirror and The Matrix as compelling versions of the future that grab our attention and imagination.

Regardless of whether you choose to provoke new thinking through darkness or optimism, you have a responsibility to keep hope in view for your audience.

A good forecast is also a good story about the future, one that paints a picture vivid and actionable. A weather forecast is actionable—you know the likelihood of rain and can decide whether to take an umbrella with you on any particular day. Yet, the weather forecast rarely comes to you as a full fledged story, and that future is rarely more than a week away. Sometimes you are considering ten years out, for a complex organization or institution and need to develop a forecast that is a decade away. The engine of storytelling is conflict and high stakes. Often the power is not in the accuracy of a forecast, but the willingness or reluctance of your audience to grapple with it. Perhaps certain kinds of forecasts engage you more with the future. Going back to our dystopian novels turned movies, a dark future is definitely vivid, but does it drive people to action?

Marina Gorbis, Executive Director of the Institute for the Future has said, “Futurists often have to imagine things that seem impossible today.” At IFTF, we talk about not just forecasting the future, but helping people and organizations

find actionable insights from that forecast—even when that future seems like an impossibility. As a futurist, this challenge is salient and often debated.

In 2007, the Institute for the Future team presented Sousveillance, a dark forecast about wearable technology that will pervasively track our actions and give rise to the loss of privacy. In it, the world becomes a “participatory panopticon,” the unintentional outcome of the then-emergent use of health, fitness and life-caching technologies. This bottom-up, decentralized network of observation tools is known as sousveillance, or “watching from below,” in contrast to surveillance, “watching from above.” Privacy becomes a thing of the past.

At the time, these emergent technologies were being celebrated for their quick access to personal health and other data. But Sousveillance played out a different possible future. It is an unsettling forecast that both corporate and government clients of IFTF reported drove them to dig deeper for insights relevant specifically to them. These insights were then woven into the long term planning for those organizations. That forecast could have taken an optimistic perspective on those same technologies and imagined lives prolonged and families reunited across geographies by technology. It is doubtful that companies outside of the wearable technology industry would have taken much note of that forecast. Sousveillance moved the needle to get corporate cultures to focus beyond the opportunities and challenges of the next 18 months, where growth is the standard internal forecast, that is, until a crisis strikes.

In a 1985 issue of *Harvard Business Review*, Pierre Wack, the then-retired head of the business environment division of the Royal Dutch/Shell Group planning department wrote, “[our task was not] producing a documented view of the future business environment five or ten years ahead. Our real target was our decision makers: unless we influenced the mental image, the picture of reality held by critical decision makers, our scenarios would be like water on a stone.”

The Sousveillance forecast was the creation of IFTF Distinguished Fellow, Jamais Cascio. Gifted with a deep voice and dramatic delivery, when Cascio shares a scenario on a complex topic like climate change, it often seems full

of gloom and doom. When asked about this, he insists, “My scenarios are optimistic, but just on a skewed scale.” Yes, he tackles difficult subjects, but his intention is to help his readers see possible solutions that they might have ignored with a rosy forecast.

Some organizations are so oriented to crisis management that they don’t feel comfortable thinking about everything going right. A good forecast includes a range of scenarios that may start from disintegration, but allow people to explore multiple visions of what success could look like for them. By presenting a dystopian version of how the future may develop, you can bring people to focus on the issue. Garner attention and surprise people with a future possibility that they have never before considered.

Over a decade ago, IFTF was asked by a Fortune 50 consumer goods company to develop a forecast that would move their internal culture as they wanted to avoid complacency and calcification. The research team examined the ecosystem the company operates in, and the coming stresses on that system. They developed a forecast where intellectual property is shared, and the creators of that IP benefit from interactions with others building it. The resulting forecast was called “The Death of the Patent System.” While that team could have easily entitled it “The Future of the Patent System,” it’s clear which of those options was more likely to be read, to be digested, and generate thoughtful consideration at that company. Framing a forecast for your audience is as important as carefully considering the content.

Regardless of whether you choose to provoke new thinking through darkness or optimism, you have a responsibility to keep hope in view for your audience. Mike Liebhold, an IFTF Distinguished Fellow with decades of experience working for iconic companies like Atari, Apple, Netscape, and Intel says it is the moderator’s responsibility to tell people they are not victims and give them a sense that they can build towards their preferred future. Neuroscientist Tali Sharot says, “Optimism starts with what may be the most extraordinary of human talents: mental time travel. This allows us to plan ahead, to save food and resources for times of scarcity, and to endure hard work in anticipation of a future reward.”

No one can predict clear winners and losers in the future. The goal of forecasting is to open up minds and consider multiple plausible futures to avoid or work towards. Liebhold advises strategic planners to acknowledge the obstacles to get to a desired future. He says, “Be careful not to discourage your organization, but recognize that sometimes, the last 5 percent of bringing a forecast to life is the hardest part.” You are not preparing your organization to engage with the future if you leave out the dark parts.

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