## Trendlines: Navigating the future **with trust**

Five trends that will shape the next decade



## Introduction: Are you ready to navigate the future with trust?

Avanade <u>Trendlines</u> are a way to share our insights about the future with you. Trendlines are not predictions about individual technologies, but our research and thinking on their potential business impact, based on early signals we see across people, culture, technology and our clients.



We're in times of massive continual change, environmental uncertainty and a proliferation of new technology adoption, all during a pandemic. We're approaching a critical inflection point with technology, industry and society that cuts across every business. Decisions in the coming few years will shape the next decade, and organizations will need to rethink how they can quickly adapt, put people first and grow sustainably.

Right now there are more questions than answers. This initial report is the beginning of our answers on what we see coming. Over the course of this year we'll dive more deeply into each trend we've identified so together we're ready to navigate the future with trust. The question is no longer, "Do we have the technology?" but rather, "What's the best technology for our people, customers and partners? What will they trust? And do our people and customers trust us?"





## The relationship between technology and trust

Trust has driven technological change for millennia. Some of the oldest writing in the world governed the exchange of sheep, grain and honey over 5,000 years ago in the Sumerian settlement of Uruk. Marks on clay tablets and tokens established a system of accounts and contracts to build trust among priests, craftspeople and traders. In the 15th century, Europe's early banks issued letters of credit to connect global trade networks. These ornate documents were instruments of trust, providing assurances about not just transactions but reputations, giving people access to resources thousands of miles from home.

Now, the globe is even more interconnected. Instead of using clay tokens or letters of credit, we connect to digital systems to exchange value and confirm our reputations, using apps, APIs and algorithms. All of these technologies evolved to satisfy our need for trust: that is, the belief — usually based on knowledge, experience or shared values — that someone will do what they say they're going to do. When that belief builds over time, it creates a trusted relationship, which can be a source of confidence and stability and a hedge against risk.

It's those relationships — not just the technologies — that make trust happen. When people think of trust now, it's usually in the context of security. But trust is much bigger. It's about ethical practices around data, technology and information sharing. It's about transparency and ensuring systems aren't creating false narratives.

Trust is low today. Global communications firm Edelman describes distrust as society's default emotion now in its <u>2022 Trust</u>

Barometer. So it's more important than ever for organizations to bring all these pieces together to build trust in new ways.



## Technology can help build trust, but it's undergoing seismic change

Over the last 20 years, companies like Alphabet, Amazon, Apple, Meta and Microsoft have driven centralization of communication, commerce and computing. That's given us convenience and narrow interoperability but at the cost of closed systems and a more arbitrary, mediated experience of trust.

In response, a loose vanguard of technology movements has championed aggressive decentralization as an alternative vision of trust — including Web3 (a new iteration of the internet), decentralized finance (a shift in how financial services are delivered), decentralized autonomous organizations (member-owned communities without centralized leadership) and decentralized compute. And while Web3's elevator pitch may be "less trust, more truth," even that framing points to the importance of trust. In some ways, a less pithy but more accurate pitch for Web3 could be "less faith, more credible trust."

Technologies intended to build trust should give people confidence that they're progressing toward a desired outcome, on a common platform for understanding and working with one another, without ceding arbitrary authority to any party. That sort of trust is the bedrock of business, and it squares with both the goals of Web3 and the common-sense way that humans experience trust.

This push and pull of centralization and decentralization has shifted the foundations beneath us. However, the world will not be one where organizations choose centralization or decentralization it will be one where they coexist. It remains to be seen what these competing visions and a hybrid and evolving centralized-decentralized backdrop mean for trust.



# Trust hasn't caught up with technology — yet

The most important activities of a business occur at the intersection of employees, products and customers. And there has been an exponential increase in how much these experiences rely on technology — from livestream shopping and automated pick-and-pack to online collaboration platforms and Al-assisted support. As we learned in our most recent Avanade EmTech Index market survey, 99% of companies are testing emerging technologies; in 2021, they spent more than twice what they originally planned, and most of them (86%) are testing at least three emerging technologies.

It's hard for people's trust in technology to keep up with the pace of innovation. That is, the capabilities of even our current systems exceed what we're ready to do with them — especially in terms of how they can interoperate and build off each other. That's because our technology has reached scale and changed faster than our social constructs for trust have been able to keep up with.

This is compounded by the rapid growth of people coming online, from just 2 billion in 2015 to 7.5 billion by 2030 billions of new digital citizens and workers with different backgrounds, traditions and generational perspectives.

Now, we're in a period when governance, structure, regulation, and cultural and business institutions need to catch up.





## Increasing trust both *in* technology and *through* technology

Companies will keep working to embed mechanisms for building trust in technology itself, but people must be involved because trust is inherently interpersonal. Technology can be a vessel and an enabler for trust, but it's never neutral; it always reflects the values of those who build it.

We believe a few key types of systems will be the foundation for trust in business and institutions over the next decade. Across these systems, trust can bring together people and businesses — and even different parts of a business — in unforeseen ways, creating new growth, connections and opportunities against a backdrop of continual change.

Your employees can now be your customers. Your competitors can be your collaborators. Social media has turned customers into products, just as IoT products are now extensions of customers. As technology breaks down more barriers, the outcomes can be negative or positive. For example, smart contracts might get exploited to steal NFTs or verified credentials might help speed healthcare workers across borders to where they're needed most.

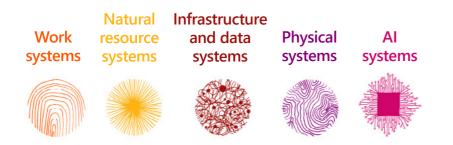
In so many ways now, the lines between "outside" and "inside" the business are no longer strictly drawn — and whether that's good or bad depends a lot on trust.



# Five trends, across five types of trust-based systems

## We know trust matters. And we know technology can help build it. But where? And how?

Based on our signal gathering and research, we see five types of systems that are crucial to any organization and where trust will have the biggest impact:



These systems are all undergoing significant shifts in both technologies and human behaviors. Trust is especially crucial within these systems because they're where technology has the most potential to disrupt. The remainder of this report identifies the most significant trend related to each type of system, describes how that trend might play out and begins the discussion of how you can adapt. We also pose questions that you can start asking to help your organization intentionally build trust, either in people or in technologies.

Building trust with colleagues and customers is the best way to bring them with you through continual change. Over this calendar year, we'll provide detailed reports that dive into innovations and strategies for success within each system. You'll learn how to take advantage of the emerging technologies that underpin each macro trend, and how you can use trust to promote resilience and adaptability.



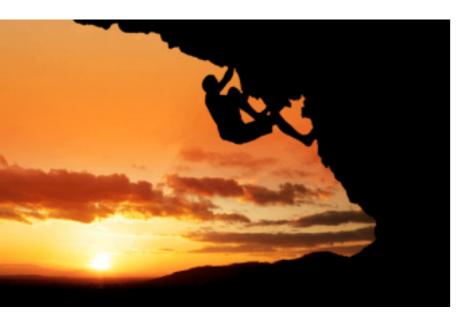


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New systems and tools will enable employees to get more from — and contribute more to — work, with greater autonomy, power sharing, innovation and sense of purpose.

The democratization of technology will continue to drive the democratization of work, transferring more power to employees: to communicate and organize, connect directly with customers, work from anywhere and build their own tools.



#### What does this trend mean for trust?

Organizations and workers will keep finding new opportunities to reexamine their relationship with one another. We'll see new employee value propositions, alternate governance structures and new ways of getting workers the tools they need.

Employees and organizations together will need to work through questions like:

- How do we balance personal autonomy and the common good when we design and develop large-scale systems?
- How do organizations address employees' desire for control over how they work and are compensated?
- How do organizations avoid pushing risk, instability and inequality onto workers, especially those who are already underrepresented in the business world?
- How do we find opportunities for ongoing development, reskilling and retooling?

- What alternate contract models

   (e.g., <u>decentralized autonomous</u> organizations, or DAOs) might we use to meet the needs of our employees and the business?
- How might we redefine what a "business" is and what it's for, in alignment with the values of individuals, society and the environment?





## What might this future scenario look like?

In addition to "skills fit," organizations now measure for "passion fit" — giving weight to what a candidate is passionate about and then deciding how well that aligns with overall company strategy. Companies feel confident choosing employees in this way in part because of "AI apprenticeships": New hires choose the job they want and then partner with expert-generated synthetic humans to learn the ins and outs of their new responsibilities. At any point in their career with the company, they can choose to move to another open role, using the same AI apprenticeship model to develop new skills and capabilities in a hands-on way.

Employees also get to choose the nature of their relationship with the company. Some select a traditional full-time contract, some work part-time and others choose to be compensated in part with tokenized governance, giving them more direct input into strategic decision-making within the company. They can choose based on what works best for their current needs and can change models when their life circumstances change. For example, an employee whose original contract granted them a set number of governance tokens (allowing them to vote on strategic decisions the company was making) may decide when they start a family that they want income more than control, so they switch to a purely salary-based compensation model.





#### Impactful emerging technologies

- Tools for management of open source
- Low-code/no-code, citizen development
- Adaptive learning platforms
- DAOs
- Creator platforms
- NFTs, non-interchangeable digital assets stored on a blockchain, which can be sold and traded
- Metaverse XR third space for work
- Verified credentials
- Synthetic humans/AI training

Where the gig economy failed to deliver true autonomy, workers can now use new platforms to upskill and shape their own career trajectories. There's more technological support for workers than ever, in the form of stronger platforms, easier access to AI and machine learning, and greater literacy in software development. This has coincided with an increased desire for more meaning in work — or at least work that fits better with how people want to live.

#### Signals of change

- Automation and the unrestricted use of content raises legal questions, such as when a university learned that <u>one of its</u> <u>online classes was being "taught" by a</u> <u>professor who had died.</u>
- <u>Dapr</u> allows teams to decide which technology to use for individual parts of their stack within any organization.
- Partners at venture capital firm

Andreesen Horowitz say, <u>"As more</u> workers go solo, the software stack is the new firm."

- <u>Twali</u> purports to be the future of consulting: a DAO built on smart contracts that automatically assigns value to individual contributors.
- Platforms like <u>Zestworld</u> aim to connect people or organizations with ideas to those with the means to bring them to life, while ensuring that value flows to both.
- Increasingly sophisticated audio and video editing software is making it easier for anyone to create high-quality content, helping workers develop their individual brands and voices.





### Natural resource systems Key trend: Resource-aware ecosystems

With the advent of the cloud, computing seemed like a limitless resource. And that resource has been put to amazing use, with cloud computing supporting the development of complex models and systems that are advancing healthcare, manufacturing, even sustainability efforts. But there's growing recognition that the way we generate energy for computational power is causing harm. Data centers alone, responsible for 2% to 5% of today's energy consumption, <u>could</u> <u>consume between 20% and 25% of the</u> <u>world's energy by 2030.</u>

Far more awareness of resources — energy, materials, waste — will be designed into all aspects of the network, cloud and devices, going all the way to the software layer and well beyond recycling hardware and physical objects. Resource awareness will inform the entire product lifecycle, from design to distribution, encouraging creative use of finite resources and regenerative choices over exploitative ones.

#### What does this trend mean for trust?

People will increasingly need to trust that any company they interact with — whether as consumers, workers or citizens — is committed to managing resources and building sustainable, responsible tech ecosystems. Companies that work with these issues openly and transparently will build trust over time. They'll attract more customers and better talent by aligning with what we know people value: the sustainability of life on our planet.

Companies need to rethink their relationship with resources and ask

themselves questions like:

- Which suppliers are we comfortable partnering with, and how do we create an environment of trust across our third-party network?
- How do we demonstrate our authenticity and avoid accusations of "greenwashing"?
- How do we build standards to help us make more informed decisions about available options?
- How do we communicate openly and transparently about how our systems use resources, both intangible (e.g., electricity) and tangible (e.g., plastic)? How much can or should we share, and with whom?





#### Natural resource systems

## What might this future scenario look like?

A large chemical manufacturer recently implemented automated resource allocation. The company analyzes its own data along with external sources for electricity, water and material usage and availability, and then the system automatically balances workloads for the smallest resource impact. Unlike what we see today, this company is coordinating with other manufacturers and organizations in a region, so all jobs are aligned and running at the same time. For example, the system calculated that the best time to run a power-intensive process was 5 p.m. — when input from solar panels was highest but overall grid usage was lowest across other companies. The system also knows when to capture a discount through a connected marketplace. Human workers frequently review and can override any of the processes as needed.

These good-faith efforts helped the manufacturer expand operations throughout Europe because communities felt confident that new facilities would be environmentally and economically beneficial.







#### Impactful emerging technologies

- Climate remediation technology
- Software impact measurements
- Renewable/regenerative energy sources: geothermal, hydrogen, wave energy, etc.
- Cryptocurrencies
- Climate accounting and reporting
- Next-generation connectivity

Emerging technologies within natural resource systems tend to focus on three outcomes: 1) measuring and moderating existing resource usage, 2) remediating damage that has already been done and 3) finding and/or creating new sources for energy and materials. Some, like cryptocurrencies, have unresolved concerns around how they consume resources. Others aren't typically associated with natural resources but can enable resourceaware systems, like the ability of nextgeneration connectivity to help manage energy usage in systems that currently have little connectivity.

#### Signals of change

- Events in the Ukraine highlight the fragility of existing energy systems.
- The <u>Green Software Foundation</u> helps the software industry cut emissions.
- The <u>Global Sustainability Standards</u> <u>Board</u> is setting the world's first globally accepted standards for sustainability reporting.
- A landscape architect in China is <u>building</u> <u>"sponge cities,"</u> which use the properties of water to combat seasonal flooding.

- Engineers are creating new materials that turn buildings themselves into sources of energy.
- New research explores how to <u>build</u> <u>carbon-aware data centers.</u>
- <u>Neu.ro Al Cloud</u> integrates Al compute with MLOps (machine learning operations) tooling and environmentally responsible green energy from <u>atNorth</u>.
- <u>Nori</u> is creating a more transparent, verifiable carbon removal marketplace.
- Startup <u>electricityMap</u> tracks and maps energy usage.
- <u>Climeworks</u> uses a technology called "direct air capture" to capture carbon dioxide directly from the air.





### Infrastructure and data systems Key trend: Secure cooperative architectures

Privacy and security are still top priorities, but flexible networks (of both people and organizations) are creating new ways for discrete organizations to intersect and collaborate via data cooperatives. Composable apps, confidential computing frameworks and advanced computing power now enable multiple data owners to work together safely in controlled spaces protected by encryption-in-use.



This networked collaboration can fulfill one of the key promises of Web3, but without requiring any particular commitment to Web3 philosophy. Competitors can now be collaborators and with so many organizations now fully in the cloud, there's more potential than ever to connect with the right partners and adapt quickly to constant change.

#### What does this trend mean for trust?

Organizations will start working together through multiparty systems in ways they never have before, making co-opetition a new frontier for innovation. This much wider pool of partners might require greater transparency with employees and customers, even as software safeguards keep data secure.

Looking through this new ecosystem lens, organizations will need to explore questions like:

- How do we understand expectations of privacy and communicate our adherence?
- To what degree are our systems transparent and auditable?
- In multiparty systems, how do we establish accountability in cases where something goes wrong?





#### Infrastructure and data systems

#### What might this future scenario look like?

A large healthcare system created a data cooperative with a big pharmaceutical company to develop a new treatment for depression. Patient records were used to create digital twins, with privacy-enhancing technology preserving confidentiality. Simulation software combined known interactions and effects of the proposed drug, and virtual tests were run on patients' digital twins via confidential computing processes.

This combination of simulated and actual data cut the time to market in half. The healthcare system received enough compensation in "data usage" fees (via smart contracts) from the pharmaceutical company to double the number of beds it can support.



"If you can trust the change that you're making, then change is not that difficult. There's not that resistance to change."

CTO, enterprise collaboration software company

#### Impactful emerging technologies

- Solid personal data pods, an opensource project that lets users control their data in online storage entities
- Ethereum, a decentralized, open-source blockchain that supports smart contracts
- Dfinity Foundation, a nonprofit foundation building a public blockchain network with a more environmentally friendly proof of stake
- Confidential computing, a new way to protect data in use (vs. data at rest or in transit)
- Privacy-preserving/secure multiparty computation
- "Zero trust" security



 Changes to computation capabilities with HPC (high-performance computing) and quantum

Many changes in emerging infrastructure focus on controlled integration: Privacypreserving computation allows for multiple parties to share and process encrypted data, protecting their interests even while collaborating.

Personal data storage will become even more crucial as individuals can take more control over access to their identity, information and credentials. Core computing advances like quantum computing and high-performance computing may exponentially increase the capabilities of these systems.

#### Signals of change

- <u>SICCAR</u> is a blockchain-based enterprise data sharing platform that gives organizations full control over how data is shared and used across their business ecosystem.
- Data "clean rooms," like those created by <u>Dcentriq</u>, allow for secure data collaboration.
- Reactions to "right to repair" laws point to the <u>need for — and difficulty of —</u> <u>open data platforms</u> as social institutions struggle to keep up with the rapidly changing technology landscape.





### Physical systems Key trend: A new software canvas

There's a new canvas out there that's programmable — the physical world.

Physical products embedded with computer chips. New types of flexible hardware and screens. Smart fabrics and materials that give spacesuit-wearing astronauts a sense of what space feels like. We can now be more creative in the way we use software by interacting with physical things.

#### What does this trend mean for trust?

For these new physical experiences to be net-positive, we need to build transparency and respect for human needs and capabilities directly into them. The unique capabilities of software — especially its updateability and access across distances — are powerful enablers when applied to physical systems, but there are many considerations organizations need to keep in mind. Forward-thinking organizations need to ask themselves questions like:

- How can organizations across industries build the foundations of interoperability so consumers and users aren't tied to a single system?
- When unique physical characteristics are used for identification, do we need to protect against breaches in new ways?
- How much do we need to understand about the physical and mental implications of these technologies before widescale adoption?







#### What might this future scenario look like?

What began as a purely personal new wearable — a chic device that you slip on your head to change your brainwaves and your mood — has now expanded into the collaborative metaverse with its most recent update.

Now this new wearable lets users share and sync their moods with others. Early adopters say it makes work meetings more enjoyable and productive. Since the device is compatible with every major augmented and virtual reality platform, millions of people connect in this new way. Mobility and physical spaces have been transformed, with desks, lighting and mapping technology all adjusting for the individual. Integration with productivity software is on hold, though, until corporate ethics committees can address employee privacy concerns.







#### Impactful emerging technologies

- Moldable materials: rollable screens, bioink, xenobots, smart textiles
- Digital twin
- Digital identity/biometrics
- AR/VR/MR (metaverse)
- Biohacking/biological compute/DNA storage/CRISPR
- Synthetic data
- Autonomy: cars, drones, delivery robots, service robots
- Ambient controls: gesture, voice, braincomputer interface, materials input

Biohacking and cyborgs may feel far in the future, but the reality is that humans have long used technologies to protect and enhance our capabilities. We'll see new opportunities and concerns as our unique (and unchangeable) biometric data is collected and stored more frequently, as our identities become increasingly digital. Today a VR headset captures data on users that has never been accessible before, like eye tracking, response times and mapping your physical environment. Other emerging technologies in this space, like digital twins and moldable materials, turn passive IoT systems into active participants in our work lives and must be deployed responsibly.

#### Signals of change

- <u>Project Soli</u> from Google uses radar technology for gesture-based interactions.
- The <u>Ripple</u> project is developing an open radar API standard to accelerate interoperability and growth of generalpurpose consumer radar applications

- <u>"The failed promise of Kenya's smart</u> <u>city"</u> reminds us of the importance of working within the value system of the people most affected by the technology being built and deployed.
- Earbuds aren't just for music anymore: Scientists are experimenting with earbuds that <u>electrically stimulate the</u> <u>nervous system to treat rheumatoid</u> <u>arthritis.</u>





### Al systems Key trend: Safer and more resilient Al

As more organizations come to grips with thinking through and documenting rules for AI, they're realizing it isn't easy. AI deployment will inherently reflect specific values and points of view, intentional or not, beyond just bias. "Safety" is far more nuanced for AI than it is for factory-floor machinery, and codifying AI rules can involve complex discussions of values and trade-offs. For example, does our AI prioritize equality or equity? Who's accountable for harm?

Organizations that invest the effort to tackle these substantive safety issues will be able to use AI more fully and widely, tapping into the incredible promise of these systems; organizations that underestimate that difficulty will stumble, deploying brittle AI that can cause real harm and repercussions.

#### What does this trend mean for trust?

Al and machine learning systems are propagating through industries and organizations, but many of the people affected by them are unsure of how these tools align with their values.

Organizations must begin to apply artificial intelligence more responsibly, considering questions like:

- How do we build redundancy and "safe failure" into the system?
- How do we build in controls to help ensure these systems continue to operate ethically as they learn and evolve?
- What is our role in creating the standards that will shape the next decade?







## What might this future scenario look like?

A large retailer won a landmark government contract because of its participation as a founding member of the "Safe AI Certification" body. In announcing the award, the government stated that while the retailer didn't have the lowest bid, its history of transparency and goodfaith efforts towards ethical AI development pushed it into the winning spot.

The "Safe AI Certification" body was initially formed by organizations that were all moving on their own to improve AI safety. Many members had established training and certification requirements for all people in AI roles, including not only technical instruction but also "softer" skills like ethical considerations and ethnography. Those efforts were so successful driving recruitment, reducing attrition and generating external praise — that a large university spearheaded the formal creation of the "Safe AI Certification" body. That independent body is now 30 organizations strong.

Its certification is issued through a verified credential on the blockchain, and it's used by IT departments worldwide to automatically limit usage of data, algorithms and models to only those that have been deemed "safe."





"[AI] technology is absolutely evolving, and it's evolving very, very quickly. The challenge is that the people, the processes, are having a hard time keeping up."

CIO, university health care system

#### Impactful emerging technologies

- Synthetic data/agent-based modeling/ simulation — generating new learning in a resource-efficient way (learning real things but with no real resource risk, other than the cost of compute and skilled time)
- Low-shot learning/AL/MLOps/lowcode/no-code AI — tools to make AI easier to build and deploy in various circumstances
- Marketplaces/open source reducing barriers to access for AI/ML tools and models
- Swarming robots/autonomous robots/ chatbots/business automation/ autonomous vehicles — autonomous decision-making systems.

Many innovations in the AI space are making AI/ML more resilient and accessible. For example, synthetic data and low-shot learning lessen the demands for large data sets, while marketplaces offering pretrained models can get companies off to a strong start. Development standards and control frameworks are still rare but important. Advances in robotics will bring more automated decision-making systems into the physical world.

#### Signals of change

 Respected AI scholar Timnit Gebru recently founded the <u>Distributed</u> <u>AI Research Institute in</u> an effort to contribute research aligned with the common good.

- John Deere's autonomous tractor stirred up debate about ownership of both goods and data, reinforcing that agriculture is increasingly automated and becoming a front in the battle over who owns and controls data and the systems that generate it.
- While low-code/no-code access to Al can bring many benefits to organizations, several leaders are vocal about the <u>attendant risks</u>.
- Google's Visual Inspection AI is a product that benefits from <u>internal ethics review</u> <u>committees.</u>



## Conclusion: Building trust takes time and transparency

We're no fortune tellers, but we hope to inspire the world we'd like to see. As long as the world is run by humans, trust will likely never be perfect nor complete. But together we can build a future in which our physical and virtual lives merge in safe, inclusive ways, one in which technology is thoughtfully built to engender trust — not erode it.

Building trust takes time and transparency, but it's worth it. Shifting from our traditional approach for building products and services to one that looks through a lens of trust can help us adapt to continual change.

This report is just an introduction to the five types of systems where trust is having the biggest impact. Join us for in-depth reports on each of them throughout the year.





#### Suggested reading

In addition to the links shared throughout this report, the following reading influenced our thinking:

- <u>Bubbles, Golden Ages, and Tech Revolutions</u>, *Harvard Business Review*, October 16, 2019
- Magic Carpets: Ubiquitous screens aim to reshape our physical environment, not carry us away to an alternative space, Real Life, February 10, 2022
- False Futurism: The metaverse is just another way to "go online," Real Life, February 24, 2022
- Interview: Tyler Cowen, economist and public intellectual, Noahpinion, January 9, 2022
- <u>Value-Sensitive Design Lab</u>, University of Washington, accessed January 20, 2022
- <u>Resilience Tech Report 2022</u>, John Maeda, accessed March 10, 2022
- <u>The Inevitability of Trusted Third Parties:</u> <u>The search for a crypto use-case continues</u>, *OneZero*, January 30, 2022
- <u>A libertarian 'startup city' in Honduras faces</u> <u>its biggest hurdle: the locals</u>, *Rest of World*, October 5, 2021

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- Microsoft chief hails \$75bn Activision deal as grand step into metaverse, Financial Times, February 3, 2022
- <u>The Seven Rules of the Metaverse</u>, *Medium*, October 22, 2021
- <u>The Authentic Data Economy</u>, *Medium*, February 26, 2021
- <u>My Brain Is Already Cyborg</u>, *Wired*, December 21, 2021
- <u>The Staggering Ecological Impacts of</u> <u>Computation and the Cloud,</u> *Scientific American*, March 1, 2022
- <u>Advancing Al trustworthiness: Updates on</u> responsible Al research, *Microsoft Research Blog*, February 1, 2022
- <u>A New Proposed Law Could Actually Hold Big</u> <u>Tech Accountable for Its Algorithms</u>, *Slate*, February 9, 2022
- In the realm of paper tigers exploring the failings of AI ethics guidelines, Algorithm Watch, April 28, 2020
- Americans Need a Bill of Rights for an Al-Powered World, Wired, October 8, 2021
- Microsoft's Asim Hussain on Designing Software for Sustainability and the Green Software Foundation, InfoQ, October 25, 2021

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