

# News & Information

---

Tech trends influencing the future of journalism, media, and the business models supporting entertainment and news.



# Table of Contents

<b>03</b>	Macro Forces and Emerging Trends	<b>30</b>	Geography Reshapes the Virtual World
<b>05</b>	Overview	<b>31</b>	Journalism-as-a-Service
<b>07</b>	Key Insights	<b>32</b>	Application
<b>08</b>	Computer-Directed Reporting	<b>33</b>	Key Questions
<b>09</b>	Dateline: Metaverse	<b>34</b>	Trends in Action
<b>11</b>	Digital Threat Modeling	<b>35</b>	Selected Sources
<b>12</b>	Evolving Search Interfaces	<b>37</b>	Authors
<b>13</b>	Scenario: We're Hiring!	<b>40</b>	About Future Today Institute
<b>14</b>	Subscription Economy Matures	<b>41</b>	Disclaimer
<b>15</b>	Eroding Trust in News Organizations	<b>42</b>	Creative Commons License
<b>16</b>	One-to-Few Networks		
<b>18</b>	The First Amendment in the Digital Age		
<b>19</b>	Scenario: Reporting Live From the Metaverse		
<b>20</b>	Digital Frailty		
<b>21</b>	Sensory Journalism		
<b>22</b>	Teaching News Literacy		
<b>23</b>	Policing the Creator Economy		
<b>24</b>	Attention Metrics		
<b>25</b>	Investigating Technology		
<b>26</b>	Media Consolidation		
<b>28</b>	Cancel Culture and Accountability Politics		
<b>29</b>	Scenario: No News Is Bad News		

# Macro Forces and Emerging Trends

For nearly two decades, the Future Today Institute has meticulously researched macro forces of change and the emerging trends that result. Our focus: understanding how these forces and trends will shape our futures. Our 15th annual Tech Trends Report identifies new opportunities for growth and potential collaborations in and adjacent to your business. We also highlight emerging or atypical threats across most industries, including all levels of government. For those in creative fields, you will find a wealth of new ideas that will spark your imagination.

Our framework organizes nearly 600 trends into 13 clear categories, which are being published as separate reports. Each report includes specific use cases and recommendations for key roles in many organizations: strategy, innovation, R&D, and risk.

Each trend offers six important insights.

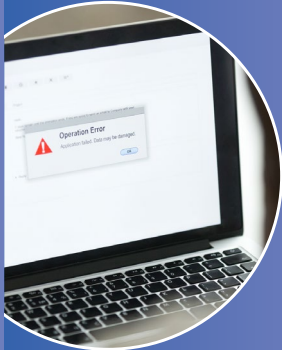
00 01 02 03 04 05 06 07 08 09 10 11 12 13

News & Information

6
Watch Closely
Informs Strategy
Act Now

**7TH YEAR ON THE LIST** — 1

## Digital Frailty



Without planning, critical information could be lost forever.

**KEY INSIGHT** — 2

Digital frailty is the collective vulnerability we face from failing to consider the long-term consequences of losing digital archives to technical glitches, evolving file systems, or intentional design.

**EXAMPLES** — 3

Dallas lost more than 20 terabytes of police files during a server migration in March 2021 because the city had no formal system for managing data storage. The mistake—triggered by a single staffer in the IT department—jeopardized 17,494 family violence prosecutions, including 1,000 priority cases.

Sometimes digital assets appear more fragile than they really are. Users tend to trust that when they click “delete” or let a social media video expire that it is actually gone. That’s not always the case: In June 2021 a researcher studying the origins of Covid recovered files that had been deleted months earlier from a National Institutes of Health database by scientists in China. The researcher was able to find early genetic sequences of Covid viruses by guessing their URL in the NIH’s cloud storage system even after public references to the files were removed.

**DISRUPTIVE IMPACT** — 4

Digital frailty could deny future historians access to crucial primary sources about our time. While the Internet Archive and others try their best to create snapshots in time of the internet, those services struggle with dynamic sites that rely on JavaScript or those with highly personalized experiences like TikTok or Instagram.

But creating a comprehensive, indelible record of all digital assets could be just as risky as archiving nothing. Young people create countless amounts of data daily, from posts shared on social networks to assignments posted to their school’s digital classroom. Do young people have the right to a blank slate when they reach adulthood, or should they be held accountable for every piece of data they create on the way to maturity?

**EMERGING PLAYERS** — 5

- Amazon Web Services
- Google Cloud
- Internet Archive
- Microsoft Azure

### 1. Years on the List

We track longitudinal tech and science trends. This measurement indicates how long we have followed the trend and its progression.

### 2. Key Insight

Concise description of this trend that can be easily understood and repeated to others.

### 3. Examples

Real-world use cases, some of which should be familiar to you.

### 4. Disruptive Impact

The implications of this trend on your business, government, or society.

### 5. Emerging Players

Individuals, research teams, startups, and other organizations operating in this space. Mature organizations are included when they are producing new contributions.

### 6. Action Scale

FTI’s analysis of what action your organization should take. Fields include:

#### ▶ Watch Closely

Mounting evidence and data, but more maturity is needed. Use this trend to inform your vision, planning, and research.

#### ▶ Informs Strategy

Strong evidence and data. Longer-term uncertainties remain. This trend should inform your strategic planning.

#### ▶ Act Now

Ample evidence and data. This trend is already mature and requires action.



# Scenarios Describe Plausible Outcomes

You will find scenarios imagining future worlds as trends evolve and converge. Scenarios offer a fresh perspective on trends and often challenge your deeply held beliefs. They prompt you to consider high-impact, high-uncertainty situations using signals available today.

## 1. Headline

A short description offering you a glimpse into future changes.

## 2. Temporal and Emotive Tags

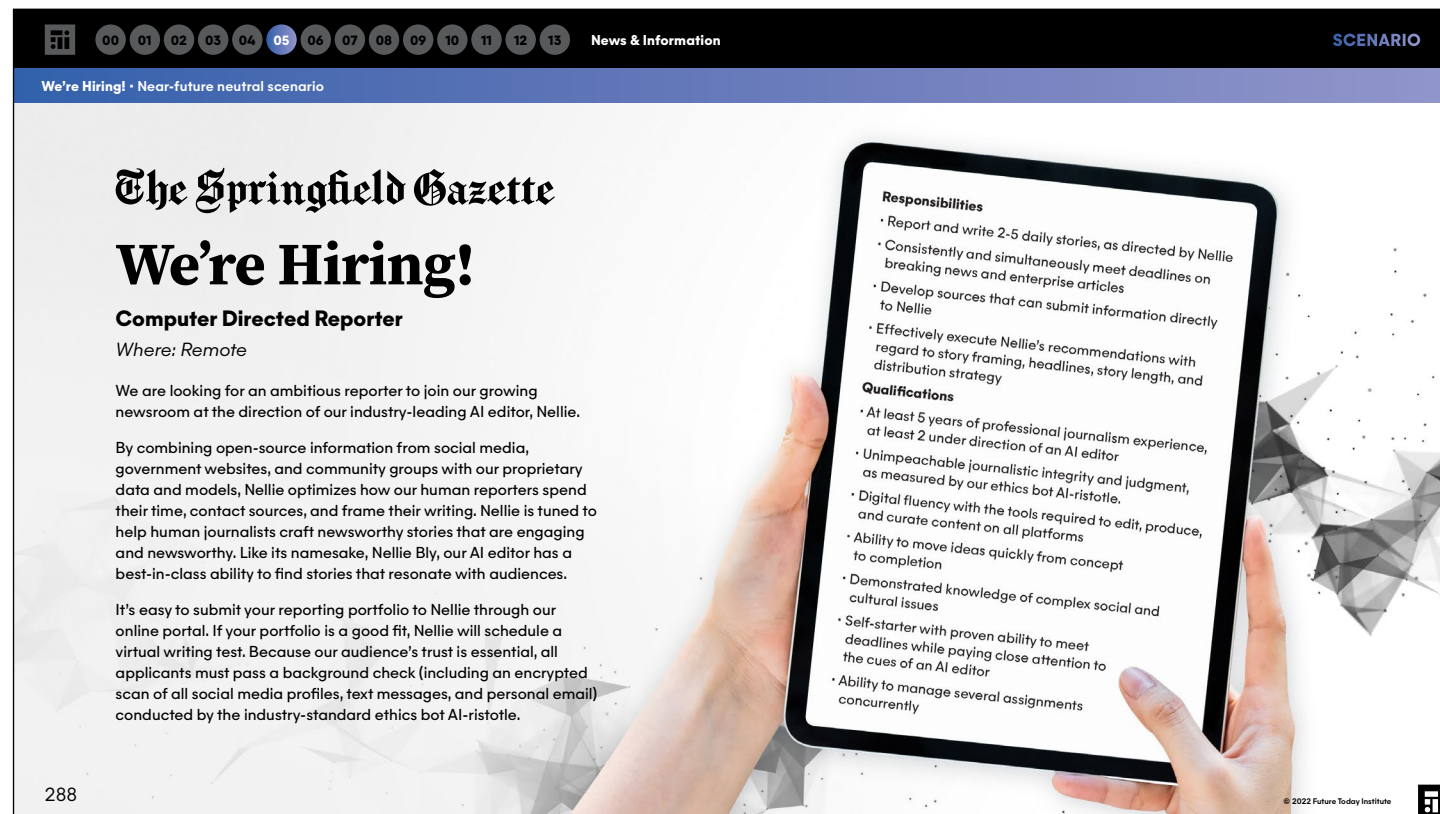
A label explaining both when in the future this scenario is set and whether it is optimistic, neutral, pessimistic, or catastrophic.

## 3. Narrative

The descriptive elements of our imagined world, including the developments leading us to this point in our future history.

### Scenario sources:

The Future Today Institute uses a wide array of qualitative and quantitative data to create our scenarios. Some of our typical sources include patent filings, academic preprint servers, archival research, policy briefings, conference papers, data sets, structured interviews with experts, conversations with kids, critical design, and speculative fiction.







What's the new normal? Most of us feel an urgent need to get back to normal, especially as we continue to witness and endure an unprecedented amount of change. Early this year, Russian President Vladimir Putin waged an unprovoked war against Ukraine, which led to a rapid global response. Switzerland broke with tradition and took a side, freezing Russian assets and denying entry to oligarchs. Anonymous, the global hacker collective, waged a cyberwar against Russia, infiltrating government databases and state propaganda websites.

Within the past 12 months, DeepMind solved a 50-year-old problem in biology, opening up new pathways to drug discovery. AI systems proved that they can generate images and text as well as a human. Facebook and Square changed their names to Meta and Block, signaling a digital land grab in the emerging Web 3.0. The biggest streamers—Netflix, Disney+, AppleTV, Hulu—discovered a formidable competitor in social commerce networks like Shein. Seemingly every day, a new set of signals emerge to challenge our existing mental models.

It might feel pointless to forecast the future past a few weeks or months. But strategic foresight results in preparations, not predictions. Trends invite us to consider alternative outcomes from those we previously imagined. They also unlock something invaluable in each one of us: the ability to re-perceive reality. The act of “re-perception” awakens you to the possibility of a future that differs from your current expectations. It helps you understand that you cannot know all things at all times, and that you should be

curious, rather than absolutely certain, about what you perceive in the present.

Our 2022 Tech Trends Report is designed to help you re-perceive the world so that you can confront deep uncertainty, adapt and thrive. In this 15th anniversary edition, we have analyzed nearly 600 technology and science trends that impact most industry sectors. We created 14 separate volumes, and each report focuses on a related cluster of trends. You will also find vivid scenarios depicting the unexpected ways in which the future might unfold. In each volume, we discuss the disruptive forces, opportunities and strategies that will influence your organization in the near future.

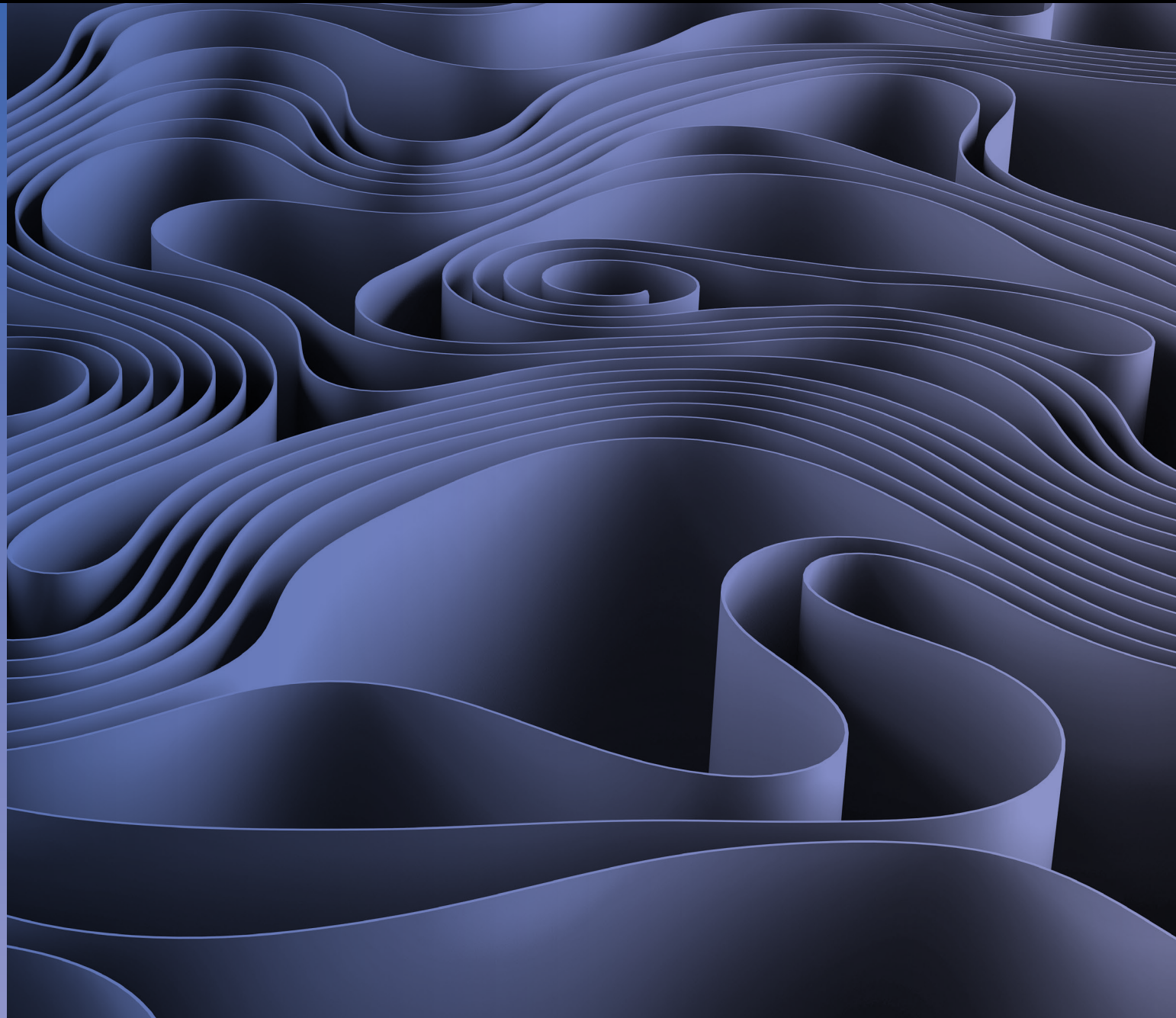
Now, more than ever, your organization should examine the potential near and long-term impact of tech trends. You must factor the trends in this report into your strategic thinking for the coming year, and adjust your planning, operations and business models accordingly. But we hope you will make time for creative exploration. The new normal is unfolding for those who know how to re-perceive signals in the present.

**Amy Webb**  
CEO  
The Future Today Institute



This is volume 05 in the Future Today Institute's 2022 Tech Trends Report. Each volume covers a different set of topics.

To find additional volumes, visit [www.futuretodayinstitute.com/trends](http://www.futuretodayinstitute.com/trends)





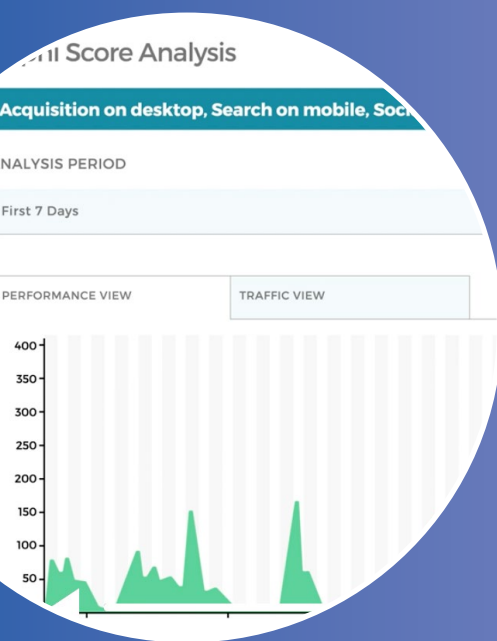
# Key Insights

- \* Metaverse datelines are coming. (Example: ROBLOX—The Republican National Convention began ...)
- \* Journalists need to decide how to cover newsworthy events and avatars as people spend more time in virtual spaces.
- \* Selling digital subscriptions creates new opportunities for media companies looking to find their niche.
- \* A growing number of startups are providing artificial intelligence solutions to newsrooms.
- \* Natural language search interfaces—whether deployed in AI assistants or as a feature in browser-based search engines—threaten the audience strategy for many media organizations.
- \* Sensory clickbait, designed to manipulate a user's emotions, is on the rise.
- \* Media literacy programs are launching around the world, in an effort to curb misinformation among kids and teenagers.
- \* Social media has created supercharged cycles of outrage, boycott, and backlash.
- \* Media consolidation threatens communities, which are losing their only source of local news coverage.



## 1ST YEAR ON THE LIST

# Computer-Directed Reporting



Sophi uses AI to automate homepage production and paywall logic for news organizations.

## KEY INSIGHT

Computer-directed reporting applies natural language processing (NLP) algorithms and artificial intelligence to automate many common tasks like curating a homepage and writing basic news stories. As these tools mature, they'll let newsrooms reassign staff toward creating journalism—or pursue more aggressive cost cutting.

## EXAMPLES

A growing number of startups are providing AI solutions to newsrooms. Sophi offers a bundle that automates homepage production and makes user-level decisions about when to serve a paywall. The Globe and Mail, which created Sophi as an internal tool and spun it out as a stand-alone B2B product, has automated 99% of site curation, trusting the algorithm to do the work as well (or better) as editors.

The Associated Press has automated the production of some corporate earnings stories for nearly a decade. The San Francisco-based startup Knowhere News publishes more than 100 fully automated newsletters in California, Florida, and Ohio. In 2020, a U.K. team of five journalists at RADAR (Reporters And Data And Robots) produced more than 140,000 stories and 55 million words using AI.

## DISRUPTIVE IMPACT

As NLP algorithms grow more powerful, they'll be useful for more editorial tasks. Computer-directed reporting could let human journalists focus on higher value reporting—or it could justify layoffs.

News organizations face an ethical void when adapting journalism-producing AI systems. How should editors detect bias in an algorithm? How should an error made by a natural language generator be corrected? Can AI really know what's newsworthy? Should an AI system replace human judgment for information consumed by millions of people?

The urgency for answering these questions is heightened because technology companies, not journalists, drive much of the innovation in this space. Knowhere News acknowledges that its systems can only capture what's in existing sources, such as press releases and social media posts. "We don't have one side and the other side in an individual story," Knowhere Managing Editor Christopher Noble told The Information. "It is a potential weakness to what we can do."

## EMERGING PLAYERS

- Automated Insights
- Arkadium
- Cortico
- Crosstown
- Knowhere News
- Primer
- RADAR (Reporters And Data And Robots)
- Sophi
- United Robots
- SenseTime
- Scale AI
- Syntiant

1ST YEAR ON THE LIST

# Dateline: Metaverse



In 2020, the Norwegian government hosted a virtual Constitution Day parade on Minecraft that attracted 37,000 participants.

## KEY INSIGHT

While most news organizations today treat metaverse platforms as part of the gaming beat, we're seeing signals that those spaces will be used to reach voters and organize political action. Journalists need to decide how they cover newsworthy events and avatars as people spend more time in virtual spaces.

## EXAMPLES

During the New York City mayoral primary, an avatar of Andrew Yang made a campaign appearance in the Zepeto metaverse. The virtual event reached a small audience and was primarily covered on gaming websites but raised important questions about how mainstream media would respond if Yang broke news on a virtual platform.

The Norwegian government hosted a virtual Constitution Day parade on Minecraft in May 2020 that attracted 37,000 participants. Aftenposten, a major Norwegian newspaper, wrote a brief article about the event using statistics published by the Constitution Day organizers. When U.S. Reps. Alexandria Ocasio-Cortez and Ilhan Omar played “Among Us” live on Twitch, they reached more than 5 million people and generated headlines in mainstream media—but no sustained coverage of the political organizing and engagement happening appeared in nontraditional spaces.

## DISRUPTIVE IMPACT

As investment in the metaverse accelerates, expect to see more celebrities, politicians, and corporations make a play to reach audiences in virtual spaces. Because it's easy to hyper-target interest groups based on which digital communities they belong to, messages posted to metaverse spaces may not match what happens in the real world—or in a different online community.

Journalists need to start thinking about how they will cover entities that pander at scale: How will they report on contradictory statements online and in real life? Which version of a statement is authentic—the one made by an avatar or the one made standing behind a physical podium?

News organizations should also start thinking about their long-term value proposition: If more of our life happens on platforms with built-in archiving and playback capabilities, does a journalist's role need to shift away from telling people what happened?

## EMERGING PLAYERS

- Zepeto
- Fortnite
- Meta's Horizon Worlds



**A True Fan is defined as someone who will purchase anything and everything you produce. They will drive 200 miles to see you sing. They have a Google Alert set for your name. They bookmark the eBay page where your out-of-print editions show up. They come to your openings. They have you sign their copies. They buy the t-shirt, and the mug, and the hat. They can't wait till you issue your next work. They are true fans.**

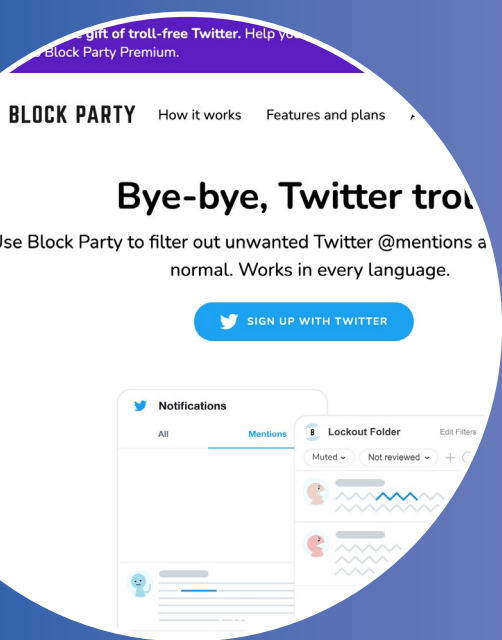
— Kevin Kelly





1ST YEAR ON THE LIST

# Digital Threat Modeling



The Block Party app helps journalists mitigate the impacts of digital harassment.

**KEY INSIGHT**

Journalists and activists have a heightened risk profile in the digital world. Bad actors and governments that want to interfere with their work can wreak havoc by hacking, harassing, and doxxing.

**EXAMPLES**

The world saw a record number of zero day exploits—previously unknown cybersecurity vulnerabilities—in 2021, according to MIT Technology Review. Those attacks can be leveraged against all kinds of targets, but we’ve seen multiple instances of weapons grade hacking, like the NSO Group’s zero-click Pegasus spyware, being deployed against journalists and activists.

Reporters who publish on controversial subjects can find themselves subjected to organized harassment campaigns—especially if they are women or part of a visible minority. A 2021 report commissioned by UNESCO found that the weaponization of social media against journalists disproportionately impacts women, can cut across platforms and into the real world, and can operate in concert with broader misinformation campaigns that undermine trust in media.

**DISRUPTIVE IMPACT**

Hacking and harassment can block journalists from doing the work they need to do and subject them to tangible harm—both psychological and physical. Mitigating those threats takes preparation and common sense: Steps like enabling two-factor authentication on work and personal accounts, regularly auditing what personal information is available online, and keeping up with software updates can go a long way toward staying safe.

**EMERGING PLAYERS**

- Block Party
- Google’s Threat Analysis Group
- Kaspersky’s Global Research & Analysis Team
- International Press Institute’s OnTheLine
- Microsoft’s Threat Intelligence Center

## 5TH YEAR ON THE LIST

# Evolving Search Interfaces



A growing number of consumers are using non-text searches to find information.

**KEY INSIGHT**

Searching for information is increasingly flexible, with advances in voice interfaces allowing consumers to speak their search while image recognition algorithms let users search with their camera. Whether embedded in a wearable device, phone, or smart speaker, non-text searches can deliver more relevant results than traditional text-based queries.

**EXAMPLES**

A 2019 survey of internet users worldwide found that 42% had conducted a voice search in the previous month. Such queries are most popular in Asia-Pacific emerging markets.

Pinterest is a leader in visual search. Fine-tuning its systems since 2015, Pinterest can recognize objects within images, letting users search for items they see in the real world from a picture they took and offering meaningful recommendations with a product called Guided Search.

Another emerging search interface is natural language search. In June 2021, four engineers from Google's research division published a paper proposing a search experience that synthesized answers from scratch, rather than displaying results for users to pick from. Such a search engine would be immensely useful to users—but tremendously disruptive to businesses that rely on search traffic.

**DISRUPTIVE IMPACT**

Natural language search interfaces—whether deployed in AI assistants or as a feature in browser-based search engines—threaten the audience strategy for all kinds of media organizations: Natural language search requires a completely different type of search optimization. To maintain existing traffic levels, publishers need to consider how their structured data models will support audio and image search.

Because natural language queries tend to yield only one result, the risks to media outlets or e-commerce sites that fail to optimize for search are profound—especially as consumers become more comfortable making purchase decisions through voice interfaces.

The growth of non-text search could create an opportunity to challenge Google's dominance in search. Unlike traditional search engines, which aim to index everything, visual searches may be more specialized: One portal might excel in recognizing clothing, while another might help identify real-world locations.

**EMERGING PLAYERS**

- Instagram
- Listen Notes
- Pinterest
- Wonderly

# The Springfield Gazette

## We're Hiring!

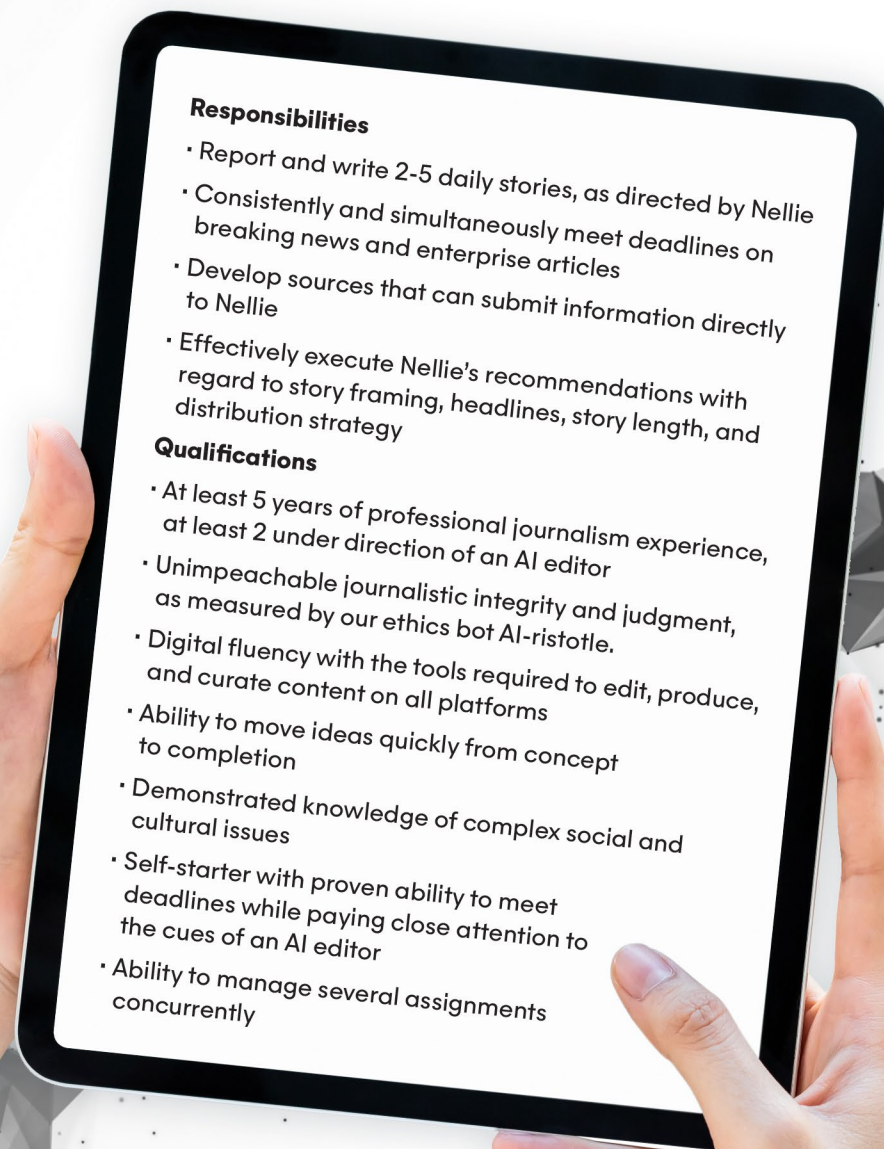
### Computer Directed Reporter

*Where: Remote*

We are looking for an ambitious reporter to join our growing newsroom at the direction of our industry-leading AI editor, Nellie.

By combining open-source information from social media, government websites, and community groups with our proprietary data and models, Nellie optimizes how our human reporters spend their time, contact sources, and frame their writing. Nellie is tuned to help human journalists craft newsworthy stories that are engaging and newsworthy. Like its namesake, Nellie Bly, our AI editor has a best-in-class ability to find stories that resonate with audiences.

It's easy to submit your reporting portfolio to Nellie through our online portal. If your portfolio is a good fit, Nellie will schedule a virtual writing test. Because our audience's trust is essential, all applicants must pass a background check (including an encrypted scan of all social media profiles, text messages, and personal email) conducted by the industry-standard ethics bot AI-ristotle.



#### Responsibilities

- Report and write 2-5 daily stories, as directed by Nellie
- Consistently and simultaneously meet deadlines on breaking news and enterprise articles
- Develop sources that can submit information directly to Nellie
- Effectively execute Nellie's recommendations with regard to story framing, headlines, story length, and distribution strategy

#### Qualifications

- At least 5 years of professional journalism experience, at least 2 under direction of an AI editor
- Unimpeachable journalistic integrity and judgment, as measured by our ethics bot AI-ristotle.
- Digital fluency with the tools required to edit, produce, and curate content on all platforms
- Ability to move ideas quickly from concept to completion
- Demonstrated knowledge of complex social and cultural issues
- Self-starter with proven ability to meet deadlines while paying close attention to the cues of an AI editor
- Ability to manage several assignments concurrently



3RD YEAR ON THE LIST

# Subscription Economy Matures



Pivoting to subscriptions is helping news organizations stay afloat; that shift is part of a larger reorientation away from ownership.

## KEY INSIGHT

Digital subscriptions create new opportunities for media companies looking to find their niche. The proliferation of subscriptions in news arrives alongside a broader shift away from ownership.

## EXAMPLES

Advertising revenue evaporated as COVID-19 swept across the world in early 2020. While those economics would have been catastrophic for many news organizations just a few years ago, the pivot to subscription and membership programs over the last several years gave many newsrooms a stable revenue stream through the pandemic.

It's not just new companies that are turning to subscriptions, however. More than a fifth of U.K. retailers launched a subscription program during COVID lockdown, according to Barclaycard—making it so nearly half of retailers in the U.K. have a subscription.

## DISRUPTIVE IMPACT

Subscriptions' stable revenue streams are not a panacea. As the economy transitions away from ownership, there is more competition for share of wallet. Because many publishers grew their digital subscriber base with aggressive discounting, preventing churn becomes an essential task. Without entrepreneurial thinking and business model innovation, news organizations may not keep up.

Subscriptions also change the relationship between publishers and their audiences: As paywalls tighten, there's a real risk that accurate, timely information becomes concentrated in the hands of the wealthy.

## EMERGING PLAYERS

- The Membership Puzzle Project
- Piano
- Pico

8TH YEAR ON THE LIST

# Eroding Trust in News Organizations



Trust in all media has been falling globally since 2018.

## KEY INSIGHT

Trust in all media has been falling globally since 2018, according to the Edelman Trust Barometer. The trust crisis is amplified as search and social distribution continue fraying relationships between news organizations and audiences. News leaders should be particularly attuned to external forces and events that might exacerbate this trend.

## EXAMPLES

A majority of people globally believe that journalists are purposefully trying to mislead the public, according to the 2022 Edelman Trust Barometer survey. People generally report higher levels of trust in the news they consume relative to the overall media, according to the 2021 Reuters Digital News Report. But the same report finds that consumers across the world report lower trust in information they get from search and social media. That's a big problem for news organizations, because that's where a big portion of their users—and a disproportionate share of their new users—come from.

A variety of factors contribute to the growing distrust in news, ranging from the growing visibility of intentional misinformation campaigns and conspiracy theories on social media to increasing political polarization. While platform companies continue to refine their rules for deleting, demonetizing, or reducing the reach of misleading, fake, or controversial posts, those actions are unlikely to stem the tide of this trend.

## DISRUPTIVE IMPACT

News organizations live and die by their reputation. If a title loses the trust of its audience, it loses the ability to sell subscriptions and advertisements.

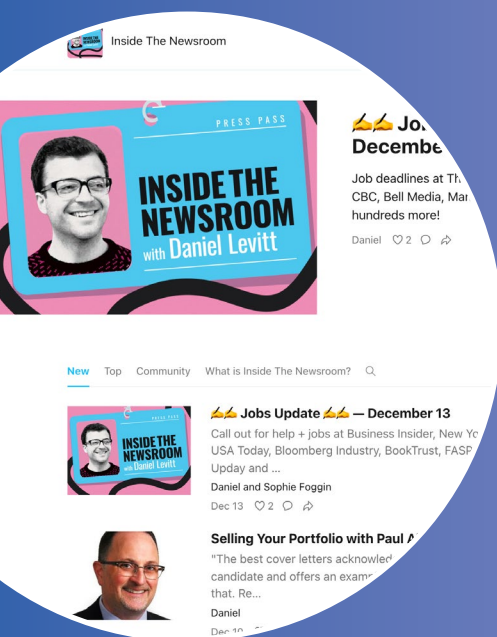
A trust crisis might be triggered by a routine mistake in reporting or by a politician angry about a true—but unflattering—story. There's also a risk that audiences lose faith in the news for something outside of a news organization's control: A manipulated video circulating on social media could impact consumer attitudes toward all kinds of media.

## EMERGING PLAYERS

- Reuters Institute for the Study of Journalism
- American Press Institute
- Consortium on Trust in Media and Technology at the University of Florida

8TH YEAR ON THE LIST

# One-to-Few Networks



Journalist Daniel Levitt publishes “Inside the Newsroom,” one of the most popular newsletter-focused newsletters on the Substack platform.

## KEY INSIGHT

Low-cost tools to produce newsletters, podcasts, and niche experiences are enabling individuals to create personal media brands. These products can super-serve an audience but can also be a powerful vector for disinformation and misinformation because they don’t have the editorial safeguards that protect traditional media.

## EXAMPLES

Email platform Substack has lured a slew of big name journalists away from traditional gigs. It’s also committed \$1 million to support independent creators wanting to launch local news newsletters in the U.S. Ghost is an open-source alternative to Substack. Some one-to-few networks bring together multiple ways to connect their community, like Sidechannel, a Discord server for paid subscribers to several technology newsletters.

While these networks create new opportunities to connect audiences, they’re not free from risk: Creators and communities who rely on platforms to connect can be vulnerable when those platforms fail. When Facebook services went offline for more than six hours in October 2021, activists and families in large parts of the world lost their ability to connect because WhatsApp was inaccessible.

## DISRUPTIVE IMPACT

The technologies that enable one-to-few networks lower the barrier to entry for new competitors to legacy media—or for disgruntled creators who want to strike out on their own.

One-to-few networks will be a major front in ongoing efforts to confront disinformation and misinformation. The same technology that empowers neighborhood-level “buy nothing” groups to cut down on waste and unnecessary consumption can allow networks of white supremacists to plan acts of domestic terror.

## EMERGING PLAYERS

- Discord
- Ghost
- OnlyFans
- Patreon
- Substack
- Zello





**Black journalists continue to be underrepresented in newsrooms today, and Black stories continue to go overlooked and undercovered. We're building trust among Black audiences with quality, trustworthy journalism.**

— Lauren Williams, CEO and Cofounder, Capital B



7TH YEAR ON THE LIST

# The First Amendment in the Digital Age



WhatsApp is one of many platforms that enable small networks to share information.

## KEY INSIGHT

The First Amendment offers broad protections for what individuals and companies in the United States can do, leaving plenty of room for debate about what they should do. That tension is opening up new paradigms for how content is regulated and moderated online.

## EXAMPLES

Increased scrutiny has led mainstream platforms to take a more aggressive posture toward removing speech that violates their terms of service. Facebook removed more than 20 million posts containing COVID-19 misinformation from its app and Instagram between the start of the pandemic and June 2021. Even former President Donald Trump's unlaunched Truth Social network has lines for speech: Its terms of service give the site permission to remove posts that “disparage, tarnish, or otherwise harm, in our opinion, us and/or the site.”

In a Columbia Law Review article, lecturer Evelyn Douek argues that our approach to online speech has reached an inflection point: Instead of privileging the rights of individuals to post without restriction, “platforms are now firmly in the business of balancing societal interests and choosing between error costs on a systemic basis.”

## DISRUPTIVE IMPACT

While the First Amendment's legal protections are generally broad in the United States, its scope is limited in an interconnected world. As a result, debates about free speech now hinge on the moderation policies of private companies—entities that are not directly accountable to their users and that are free to change their rules at will.

Brands, news organizations, and political movements will struggle to find where they fit into the world built by tech companies. That will be especially true for any entity that works with potentially controversial political speech. Journalists in Gaza, for example, lost access to an essential communication platform when they were banned by WhatsApp—allegedly for engaging with groups that were inciting violence. Facebook eventually restored access for some of the journalists, but the story highlights how unpredictably users can lose access to a platform.

## EMERGING PLAYERS

- American Civil Liberties Union
- Electronic Frontier Foundation
- U.S. Federal Communications Commission
- Knight First Amendment Institute at Columbia University



The First Amendment—inflected approach to online speech governance that dominated the early internet no longer holds.

— Evelyn Douek,  
Columbia Law Review

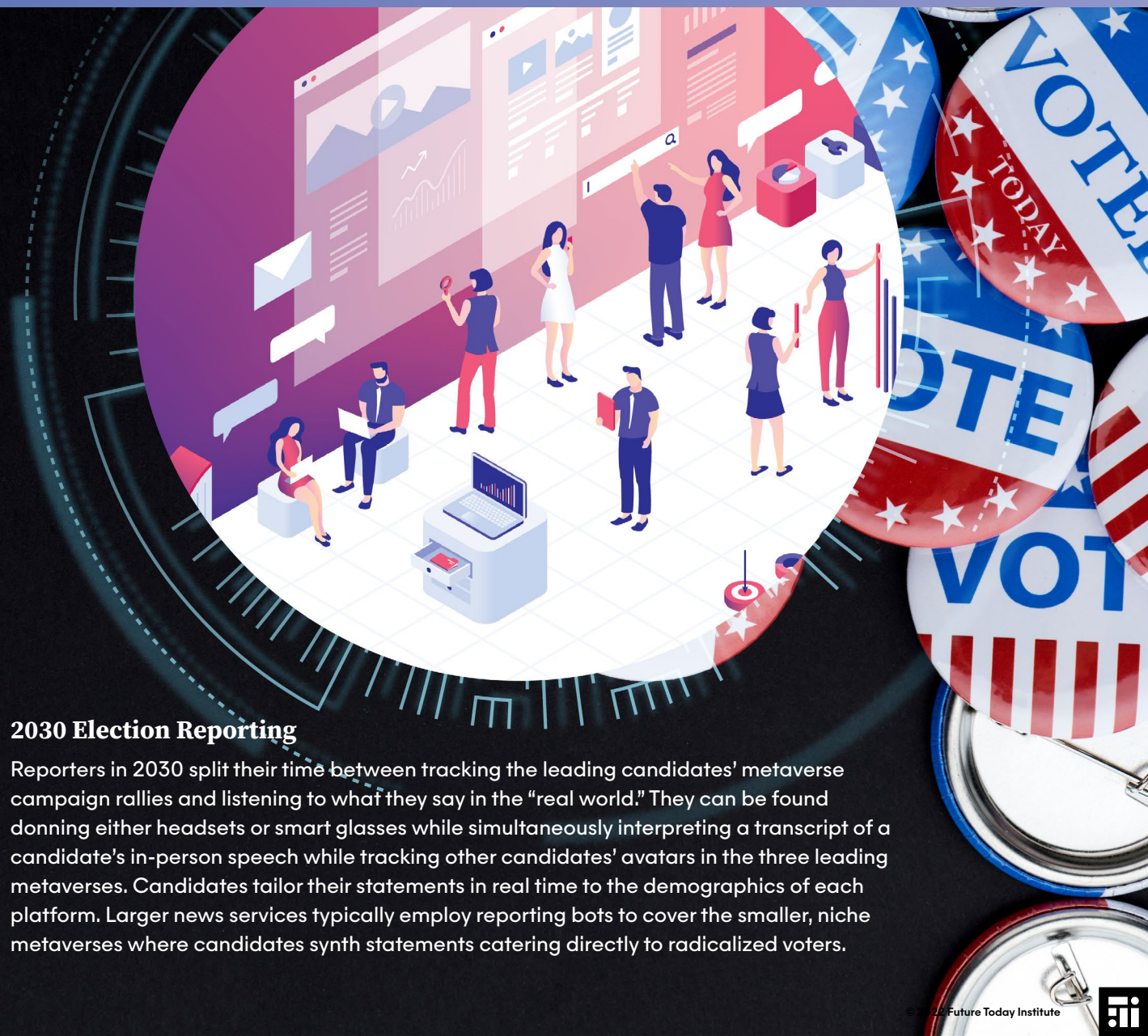


# Reporting Live From the Metaverse

Political reporting shifted when candidates started campaigning in the metaverse. A look at then and now.

## 2020 Election Reporting

The job of a political reporter was relatively easy in 2020. It involved covering campaign rallies, riding along candidates on campaign buses, monitoring Twitter and news sites, interviewing relevant politicians and fact-checking speeches—and then filing the stories to the web.

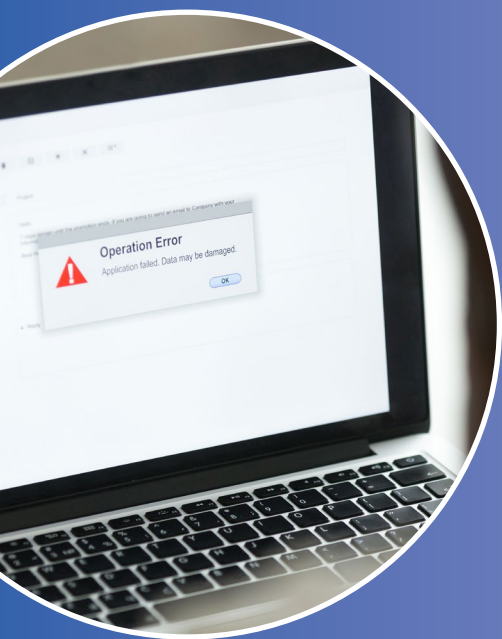


## 2030 Election Reporting

Reporters in 2030 split their time between tracking the leading candidates' metaverse campaign rallies and listening to what they say in the “real world.” They can be found donning either headsets or smart glasses while simultaneously interpreting a transcript of a candidate’s in-person speech while tracking other candidates’ avatars in the three leading metaverses. Candidates tailor their statements in real time to the demographics of each platform. Larger news services typically employ reporting bots to cover the smaller, niche metaverses where candidates synth statements catering directly to radicalized voters.

## 7TH YEAR ON THE LIST

# Digital Frailty



Without planning, critical information could be lost forever.

**KEY INSIGHT**

Digital frailty is the collective vulnerability we face from failing to consider the long-term consequences of losing digital archives to technical glitches, evolving file systems, or intentional design.

**EXAMPLES**

Dallas lost more than 20 terabytes of police files during a server migration in March 2021 because the city had no formal system for managing data storage. The mistake—triggered by a single staffer in the IT department—jeopardized 17,494 family violence prosecutions, including 1,000 priority cases.

Sometimes digital assets appear more fragile than they really are. Users tend to trust that when they click “delete” or let a social media video expire that it is actually gone. That’s not always the case: In June 2021 a researcher studying the origins of COVID recovered files that had been deleted months earlier from a National Institutes of Health database by scientists in China. The researcher was able to find early genetic sequences of COVID viruses by guessing their URL in the NIH’s cloud storage system even after public references to the files were removed.

**DISRUPTIVE IMPACT**

Digital frailty could deny future historians access to crucial primary sources about our time. While the Internet Archive and others try their best to create snapshots in time of the internet, those services struggle with dynamic sites that rely on JavaScript or those with highly personalized experiences like TikTok or Instagram.

But creating a comprehensive, indelible record of all digital assets could be just as risky as archiving nothing. Young people create countless amounts of data daily, from posts shared on social networks to assignments posted to their school’s digital classroom. Do young people have the right to a blank slate when they reach adulthood, or should they be held accountable for every piece of data they create on the way to maturity?

**EMERGING PLAYERS**

- Amazon Web Services
- Google Cloud
- Internet Archive
- Microsoft Azure



2ND YEAR ON THE LIST

# Sensory Journalism



Research device Project Aria is worn like regular glasses.

## KEY INSIGHT

Sensory journalism is news delivered through emerging devices like smart glasses or headphones that directly integrate with a user's senses. This will enable new ways for journalism to resonate with readers but also raises the specter of "sensory clickbait" that is designed to manipulate a user's emotions.

## EXAMPLES

During a 2020 experiment, environmental researchers found that showing people a virtual reality scenario about climate change could make them feel more empathetic about the ocean's future. Other research has shown that VR experiences generate longer lasting emotional responses than text-based approaches to sharing perspectives. As the devices enabling sensory journalism become more immersive, journalists will need to examine how their work could manipulate people in unforeseen ways.

## DISRUPTIVE IMPACT

While there's substantial investment in smart glasses and virtual reality headsets, the technology that will enable sensory journalism is still nascent. That means it's time to consider the thorny questions this trend poses: How will journalists ensure their work is accessible to all—including groups that tech companies frequently fail to prioritize (women, people with disabilities, and people of color)? What are the ethical guidelines for telling stories that integrate with a user's senses? By acting now, newsrooms can be proactive and act strategically.

## EMERGING PLAYERS

- Meta's Project Aria

1ST YEAR ON THE LIST

# Teaching News Literacy



## KEY INSIGHT

Thanks to technology, more information is available today than at any point in human history. But not all of it is created equally. Teaching kids how to identify reliable information will prepare them for the workplace—and avoid a future without shared facts.

Media literacy programs are beginning to launch in schools.

## EXAMPLES

Finland has made media literacy part of its national curriculum for nearly a decade. Lessons from its Ministry of Education and Culture about finding reliable information are embedded in core classes like math and history. That teaching cements Finland’s place on top of the Open Society Institute’s annual Media Literacy Index.

In the U.S., a number of states are requiring students to learn media literacy—the skills needed to critically analyze and interpret media messages. As of 2022, 14 states have passed legislation with such a mandate. In pockets around the country, some elementary schools teach digital literacy as early as kindergarten.

## DISRUPTIVE IMPACT

“Thriving democracies need citizens who can evaluate and access reliable information,” Stanford University professor Sam Wineburg has said, yet emerging technologies threaten to further confuse young people. We’ve already seen that disinformation and misinformation can have a profound impact on our society, whether through disrupting our elections or undermining trust in the medical establishment.

If governments won’t step in to provide education, news organizations will need to fill the void. The inability for citizens to agree on shared facts undercuts their business model—and the basic fabric of our society.

## EMERGING PLAYERS

- Finland’s Department for Media Education and Audiovisual Media
- Media Literacy Now
- News Literacy Project

## 1ST YEAR ON THE LIST

# Policing the Creator Economy



## KEY INSIGHT

If you want to solve a problem, follow the money. We're seeing evidence that platforms and advertisers will use monetization as a tool for fighting misleading, fake, or controversial content.

Hype House was the first creator collective to go mega-viral on TikTok.

*Image courtesy of Hype House/Instagram.*

## EXAMPLES

Policies to protect advertisers from controversial or “brand unsafe” content are nothing new. But as platforms increasingly make sweeping monetization decisions to preemptively block entire categories of content or behavior, they’re sending a broader message about what they want to be associated with.

Streaming service Twitch has a policy that permits banning or demonetizing a user for some behavior that happens on other platforms or in the real world. Google announced in October 2021 that it would no longer serve ads on websites and videos that deny climate change. That adds to an existing list of topics that can’t be monetized on YouTube, like videos that include hate speech or non-medically approved remedies.

On the flip side, look to eye-popping funding from tech companies to bolster content on their platforms: TikTok’s \$200 million Creator Fund, YouTube’s \$100 million Shorts Fund, and Substack’s \$1 million funding for local news, among others.

## DISRUPTIVE IMPACT

Ad revenue and sponsorship are the amphetamines that drive the creator economy. When that cash flow is disrupted it can change the incentives around creating new content. That’s good news for journalists and others who produce reputable websites and videos—with less sketchy players to compete with they’ll have more opportunities to stand out.

But any publisher or creator on the winning side of a platform’s investment decision today should be wary: Algorithm tweaks or changes in funding priorities could rewrite the rules again in a moment.

## EMERGING PLAYERS

- TikTok
- Twitch
- YouTube

## 3RD YEAR ON THE LIST

# Attention Metrics



Many people hadn't heard of Ozy Media until the company's chief operating officer impersonated a YouTube executive on an investment call with Goldman Sachs and brought attention to the company's business practices.

## KEY INSIGHT

Measuring how consumers allocate their attention depends on how you count—and who is counting. As a result, publishers need to get more sophisticated about how they monetize engagement.

## EXAMPLES

The metrics underpinning the attention economy are highly susceptible to fraud. One study estimated that bots make up more than 60% of all website traffic. Another found that as much as 88% of digital ad clicks could be considered fraudulent. Digital media company Ozy Media had a spectacular meltdown in 2021 after an investigation revealed the company had vastly overstated its traffic and attempted to defraud investors.

Even when businesses want to do right, the technological landscape that enables tracking and monetizing attention is unstable. Google plans to phase out support for third-party cookies in its Chrome browser in 2023. It's still unclear how advertisers and marketers will replace the functions currently served by third-party cookies and how any changes will balance the desire to track behavior against user's expectation of privacy.

## DISRUPTIVE IMPACT

The attention economy encompasses news publishers, streaming services, gaming platforms, and more. Without trust in the metrics that connect individuals to their actions across the web, there is profound uncertainty for all those entities. The impending death of third-party cookies creates new urgency for digital marketers and advertisers to quantify the impact of their work—and to ensure that their partners trust their metrics: Nearly half of publishers anticipate needing to lay off staff, according to a survey of 200 decision-makers by ad tech company Lotame.

## EMERGING PLAYERS

- Facebook
- Google Analytics
- Interactive Advertising Bureau
- Plausible Analytics



8TH YEAR ON THE LIST

# Investigating Technology



The Markup is a nonprofit newsroom that investigates how powerful institutions are using technology to change our society.

## KEY INSIGHT

News organizations need specialized reporters with the technical skills to understand how technology operates in the world—and to explain it to a nontechnical audience.

## EXAMPLES

Frances Haugen's decision to leak reams of internal Facebook documents helped journalists at many news organizations better understand the social network's algorithms. One story, for example, traced the weights that Facebook assigned different emoji reactions when deciding how to rank stories in users' news feeds. That reporting helped bring specifics to the debate about how algorithmic distribution impacts society.

Major newsrooms are increasingly building teams that fuse multiple disciplines to create impactful reporting. Visual investigations teams at The Washington Post and The New York Times have used crowdsourced footage to recreate newsworthy moments from multiple angles. Tech-focused publications like The Markup have launched tools that make it easy for laypeople to see how they are tracked and targeted online.

## DISRUPTIVE IMPACT

As AI-powered decisions seep into every corner of our life, investigating the algorithms making those decisions has never been more important. Technology advances make it increasingly harder for laypeople to understand how systems function—even as those systems become more deeply embedded in the fabric of our society. Investigative skills to unpack technology is essential in newsrooms, in order to serve the fundamental journalist mandate of holding the powerful accountable.

## EMERGING PLAYERS

- The Markup
- Bellingcat
- The Washington Post computational journalism team
- The New York Times visual investigations team
- Tow Center for Digital Journalism at Columbia University
- Computational Journalism Lab at Northwestern University
- Online Political Ads Transparency Project at New York University

7TH YEAR ON THE LIST

# Media Consolidation



In May 2021, shareholders of Tribune Publishing, one of the largest U.S. newspaper chains, approved a sale to Alden Global Capital.

## KEY INSIGHT

Consolidation continues in legacy and digital media ownership. There are isolated examples of local communities coming together to save their hometown newspaper from chain ownership, but those instances haven't changed the fundamental economics that drive media consolidation.

## EXAMPLES

Gannett—which grew in 2021 after its merger with GateHouse Media—owns just shy of 40% of the major daily newspapers in the United States, according to an analysis by the Institute for Quantitative Social Science at Harvard. The majority of daily newspapers are owned by just seven conglomerates.

Consolidation among digital publishers is accelerating, driven by a need to justify years-old valuations to early investors and the growing popularity of SPACs—special purpose acquisition companies that can be used to accelerate going public. While consolidation among digital properties is less disruptive to a community than a newspaper or broadcaster merging, it tends to have the same effects: layoffs and cost cutting. BuzzFeed laid off 70 employees in March 2021 after joining with HuffPost.

## DISRUPTIVE IMPACT

When media companies are focused on executing complex transactions, they're distracted from the strategic imperatives they need to face. While publishers are restructuring and trying to realize synergies, the threat of empowered social media platforms and new entrants looms. It's plausible that the larger companies will have more negotiating power with distribution platforms, but it's also possible that the strategy of consolidation won't do enough to proactively mitigate external threats. Only time will tell.

## EMERGING PLAYERS

- Alden Global Capital
- BuzzFeed
- Chatham Asset Management
- Vox Media
- New Media Investment Group



**57% of people worry that government leaders are purposely trying to mislead people by saying things they know are false or gross exaggerations.**

**56% worry that business leaders are doing the same.**

— 2021 Edelman Trust Barometer





## 3RD YEAR ON THE LIST

# Cancel Culture and Accountability Politics



After Dr. Seuss' estate chose to withdraw some books from publication, a backlash to the author being "canceled" led to price surges of those books on Amazon.

## KEY INSIGHT

Social media has created supercharged cycles of outrage, boycott, and backlash. But writing off something as "cancel culture" is a tool frequently used by the powerful to evade consequences for their actions. Beneath the controversy is a meaningful evolution in how we seek accountability in the world.

## EXAMPLES

A group of intellectuals—many who had been "canceled"—founded the University of Austin decrying the "illiberalism and censoriousness prevalent in America's most prestigious universities." A Dave Chappelle special on Netflix stoked controversy, including a walkout of Netflix employees, because it included jokes about trans women. Tucker Carlson, one of Fox News' most prominent personalities, has emphatically embraced anti-cancel culture discourse, claiming liberals are trying to cancel everything from "Space Jam" to the Fourth of July. Brandeis University made waves (in certain corners of the internet) in June 2021 when students published a list of "oppressive" words. Later rebranded as the "suggested language list," the project aimed to "remove language that may hurt those who have experienced violence from our everyday use." Right-wing coverage of the list mocked students for "canceling" words; on the left, students were seen as standing up for their values and trying to undo harm.

## DISRUPTIVE IMPACT

The discourse around cancel culture frequently breaks down around generational lines. Rather than lamenting "kids today," brands and individuals might ask why Generations Z and Alpha seem to demand different levels of accountability than previous generations. Instead of dismissing social media outrage as vapid, look to understand the power dynamics at play—is a controversy a sign of new social dynamics clashing with the status quo? The powerful trying to delegitimize an emerging movement? A disinformation campaign organized by outside actors?

## EMERGING PLAYERS

- Heterodoxy Academy
- American Association of University Professors
- Modern Language Association
- National Coalition Against Censorship
- The Free Speech Project at Georgetown University

No News Is Bad News · Near-future pessimistic scenario

## The Federal Misinformation Act of 2026

People were once convinced that paywalls would save news media—and democracy.

Yet, as more news publications increasingly locked their stories behind paywalls, the only free information available was misinformation. It wreaked havoc on institutions of knowledge and credibility. To curb misinformation with automated fact-checkers, lawmakers passed the Federal Misinformation Act

of 2026, which imposed monetary fines on content producers for violating these terms.

But the regulation came too late. By then, all reputable news was hidden behind a paywall, proving too costly for the majority of consumers. This left only two options: Read the scant misinformation available from free content publishers awaiting censure from regulators, or read no news at all.



3RD YEAR ON THE LIST

# Geography Reshapes the Virtual World



In Europe, rising U.S.-China tensions sparked a movement to develop local digital capabilities.

## KEY INSIGHT

We're seeing increasing evidence that a user's physical location governs how much they can participate in a digital world. Any business that relies on connecting people with information—whether it's a newsroom, social network, or e-commerce website—is impacted by this trend.

## EXAMPLES

Broadband access is concentrated in urban centers. This was especially apparent in the early months of the pandemic when schools shifted to remote learning: Students in rural areas around the globe struggled to get online to complete their studies.

Privacy rights vary based on regional and national laws. Any business that serves customers across international or regional boundaries needs to contend with this patchwork of regulation.

And increasingly, governments are using access to digital resources as a way to control dissent. Human rights group Access Now documented at least 50 internet shutdowns in 21 countries between January and May 2021. "As governments across the globe learn this authoritarian tactic from each other, it has moved from the fringes to become a common method many authorities use to stifle opposition, quash free speech, and muzzle expression," Felicia Anthonio, lead campaigner for Access Now, told *The Current*, a Google-sponsored magazine.

## DISRUPTIVE IMPACT

The growing complexity of connecting users and data changes the economics of operating online. For businesses, overlapping (and sometimes contradictory) regulations increase the cost of serving customers in different places. Established tech platforms and multinationals may have the scale to account for that kind of regulatory complexity, but new entrants may find it hard to serve—and monetize—audiences in multiple jurisdictions.

Newspapers, governments, and others that offer essential digital products based on the assumption of open access need to confront the possibility that geographic inequality or malicious intent could sever an audience from their work.

## EMERGING PLAYERS

- Access Now
- American Telemedicine Association
- BroadbandNow
- Connect Americans Now
- Consortium for School Networking
- Broadband Europe
- U.S. Federal Communications Commission



8TH YEAR ON THE LIST

# Journalism-as-a-Service



## KEY INSIGHT

News organizations are increasingly realizing that their core value proposition doesn't live in 750-word blocks of text. Publishers are scaling up their service-driven offerings, including web products that provide a service and monetized datasets collected during the reporting process.

ProPublica hosts a data store where consumers (or businesses) can buy clean datasets that were produced during the nonprofit's investigative reporting.

## EXAMPLES

“Journalism as a service” stems from experiments that seek to understand what consumers will pay for. The Information, a news site covering the business of technology, offers its members organizational charts of major tech companies and databases of startup investment. The Skift, a digital trade publication covering the travel sector, includes a research arm that delivers original analysis. CalMatters, a nonprofit covering California politics, launched a product that helps voters track where their state legislators stand on key issues. JaaS lets news organizations develop tentpole products that can generate revenue in a recurring way.

## DISRUPTIVE IMPACT

The practice of journalism is more than the published report: The best reporters create an enormous corpus of data as they work. Finding ways to realize additional value from that work could benefit everyone in the knowledge economy—universities, legal startups, data science companies, hospitals, and even tech giants. Because journalists are trained to seek out information that challenges their assumptions, the datasets they assemble might help correct for the bias that exists in machine learning today. News deployed as a service includes different kinds of artifacts: news stories, APIs, databases, calendar plug-ins for upcoming news events, systems that automatically generate reports using the news organization's archives, and more. As those tools are transferred from the newsroom to the business side, however, the risk of losing journalistic ethics rises, threatening to tarnish an entire organization's reputation.

## EMERGING PLAYERS

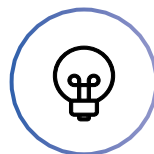
- CalMatters
- The Information
- Skift
- MIT Media Lab
- ProPublica
- The Markup

# How these trends impact your company



## STRATEGY

Emerging technologies present both strategic challenges as well as opportunities for growth. As the subscription economy emerges and the economy transitions away from traditional ownership models, there is more competition for share of wallet. Without entrepreneurial thinking and serious business model innovation, news organizations could find their long-term survivability at risk. Chief strategy officers and their teams should develop scenarios to forecast alternative models for growth.



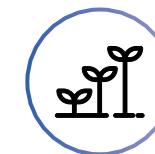
## INNOVATION

In what ways might AI solutions unlock new opportunities for innovation in newsrooms? How might natural language generation lead to news products that meet consumers where they are, every time they want to be informed? As we transition from Web 2.0 to Web 3.0, how should innovation teams harness emerging technologies? Companies that invest in innovation could help disrupt current models and lead to sustainable journalism. Innovation teams can play an important role by working together with product, risk, audience development and newsroom teams on their expectations and road maps.



## R & D

Media consolidation led to slashed R&D budgets. The industry as a whole has underfunded serious R&D efforts for the past decade, instead relying on external tech companies to design, test and build new systems that create and distribute content. Media organizations must prioritize meaningful R&D efforts that work on longer-time horizons. This will ensure go-to-market strategies for revenue generation, audience engagement, and partnerships—with quality journalism and trust at the epicenter of new platform and product development.



## GROWTH

The transition to Web 3.0 will bring new interfaces, platforms, distribution paradigms, and opportunities for transparency. Media organizations must forecast avenues for meaningful growth knowing that the industry faces headwinds from external technology players. For organizations willing to think expansively about alternative futures, a new era of sustainable journalism is on the horizon.

# Key Questions

**We recommend using this report to support your strategic foresight activity in the coming year. Every executive team should begin by asking these questions:**

## 1

- ▶ How will trust in media impact our ability to thrive as a business?  
\_\_\_\_\_
- ▶ As a community?  
\_\_\_\_\_
- ▶ As a society?

## 2

- ▶ How will our employees and customers find information in the future?  
\_\_\_\_\_
- ▶ How might new paradigms be used to our organization's advantage, or to our detriment?

## 3

- ▶ How should our organization think about subscription models?  
\_\_\_\_\_
- ▶ How does the success or failure of content monetization inform our strategy?



# Trends in Action

## Benefits of Strategic Foresight

### 33% Higher Profitability

Companies using a dedicated strategic foresight process outperformed the average by a 33% higher profitability.

---

### 200% Growth

Companies using a dedicated strategic foresight process outgrew their competitors by 200% in desired areas.

---

### 25% Improvement

Companies say that strategic foresight improves business objectives and planning, helps define new markets, and builds flexible mindsets among executives, even in times of deep uncertainty.

## The Future Today Institute Supports Executive Leaders and Their Teams

The Future Today Institute works closely with executive leadership and management teams to transform their strategic thinking on the future.

---

We leverage these and other trends and use **applied foresight** to develop **deep** (20+ years), **long-range** (10+ years) and **near-term** (2+ years) scenarios and strategic plans.

---

FTI's advisory services include signal mapping, trend identification, scenario development, risk modeling, visioning, and strategic planning.

## Selected Sources

"2021 Edelman Trust Barometer." Edelman, 16 March 2020, <https://www.edelman.com/trust/2021-trust-barometer>.

Argoub, Sabrina. "The NLP Divide: English Is Not the Only Natural Language." Polis, London School of Economics, 23 June 2021, <https://blogs.lse.ac.uk/polis/2021/06/09/the-nlp-divide-english-is-not-the-only-natural-language>.

Bloom, Jesse D. "Recovery of Deleted Deep Sequencing Data Sheds More Light on the Early Wuhan Sars-COV-2 Epidemic." *Molecular Biology and Evolution*, vol. 38, no. 12, 16 Aug. 2021, <https://doi.org/10.1101/2021.06.18.449051>.

Blythe, Jessica, et al. "Fostering Ocean Empathy through Future Scenarios." *People and Nature*, vol. 3, no. 6, 2021, pp. 1284–1296, <https://doi.org/10.1002/pan3.10253>.

Coppins, McKay. "A Secretive Hedge Fund Is Gutting Newsrooms." *The Atlantic*, 5 Nov. 2021, <https://www.theatlantic.com/magazine/archive/2021/11/alden-global-capital-killing-ameri->

[cas-newspapers/620171](https://www.theatlantic.com/magazine/archive/2021/11/alden-global-capital-killing-ameri-cas-newspapers/620171).

Douek, Evelyn. "Governing Online Speech: From 'Posts-as-Trumps' to Proportionality and Probability." *Columbia Law Review*, vol. 121, no. 3, 2020, <https://doi.org/10.2139/ssrn.3679607>.

Edmonds, Rick. "The National Trust for Local News Is Trying to Build a \$300 Million Fund to Help Save Local News." Poynter, 15 Sept. 2021, <https://www.poynter.org/locally/2021/the-national-trust-for-local-news-is-trying-to-build-a-300-million-fund-to-help-save-local-news>.

Goodman, Matt. "The City's Investigation Into the Police Data Loss Is Damning." *D Magazine*, 4 Oct. 2021, <https://www.dmagazine.com/frontburner/2021/10/the-citys-investigation-into-the-police-data-loss-is-damning>.

"Guided Search: A New Way to Find What You're Looking For." *Pinterest Newsroom*, 24 April 2014, <https://newsroom.pinterest.com/en/post/guided-search-a-new-way-to-find-what-youre-looking-for>.

Guo, Eileen. "How YouTube's Rules Are Used to Silence Human Rights Activists." *MIT Technology Review*, 29 June 2021, <https://www.technologyreview.com/2021/06/24/1027048/youtube-xinjiang-censorship-human-rights-atajurt>.

Hao, Karen. "How Facebook and Google Fund Global Misinformation." *MIT Technology Review*, 21 Nov. 2021, <https://www.technologyreview.com/2021/11/20/1039076/facebook-google-disinformation-clickbait>.

"Internet Shutdowns." *The Current*, Google, <https://iigsaw.google.com/the-current/shutdown>.

Johnson, Joseph. "Global Voice Search Region Device 2019." *Statista*, 27 Jan. 2021, <https://www.statista.com/statistics/1036727/global-voice-search-region-device>.

Krouse, Sarah. "Google Search Wants to Curate Big News. It Could Be a Minefield." *The Information*, 8 Oct. 2021, [https://www.theinformation.com/articles/google-search-wants-](https://www.theinformation.com/articles/google-search-wants-to-curate-big-news-it-could-be-a-minefield?shared=0e5d70dbab8370d-d&rc=lxgfhfs)

[to-curate-big-news-it-could-be-a-minefield?shared=0e5d70dbab8370d-d&rc=lxgfhfs](https://www.theinformation.com/articles/google-search-wants-to-curate-big-news-it-could-be-a-minefield?shared=0e5d70dbab8370d-d&rc=lxgfhfs).

"Lockdown Fuels 'Subscription Society' as Brits Spend £552 a Year on Sign-up Services." *Barclaycard*, 2021, <https://home.barclaycard/press-releases/2020/8/Lockdown-fuels-Subscription-Society>.

Media Literacy in Finland. Ministry of Education and Culture, 24 Feb. 2021, <https://medialukutaitosuomessa.fi/en/category/medialukutaito/>.

"Media Literacy Index 2021." *Open Society Institute*, 14 March 2021, <https://osis.bg/?p=3750&lang=en>.

Metzler, Donald, et al. "Rethinking Search: Making Domain Experts out of Dilettantes." *ACM SIGIR Forum*, vol. 55, no. 1, 21 July 2021, pp. 1–27, <https://doi.org/10.1145/3476415.3476428>.

Newton, Casey. "What I Learned From a Year on Substack." *Platformer*, 17 Sept. 2021, [https://www.platformer.news/p/what-i-learned-from-a-year-on-sub-](https://www.platformer.news/p/what-i-learned-from-a-year-on-sub)

[stack](https://www.platformer.news/p/what-i-learned-from-a-year-on-sub-stack).

"Over 37.000 Deltok I Digitalt 17. Mai-Tog På Minecraft." *Aftenposten*, 18 May 2021, <https://www.aftenposten.no/norge/i/WOwlwr/over-37000-deltok-i-digitalt-17-mai-tog-paa-minecraft>.

Pisapia, Amelia, et al. "Prioritizing Human Perspectives in Natural Language Processing." *The New York Times*, 21 Dec. 2020, <https://rd.nytimes.com/projects/prioritizing-human-perspectives-in-natural-language-processing>.

Reuters. "Natural Language Processing Tech Startup Primer Raises \$110M." *VentureBeat*, 24 June 2021, <https://venturebeat.com/2021/06/23/natural-language-processing-tech-startup-primer-raises-110m>.

Ryan, Aidan. "Startups Bank on Artificial Intelligence to Help Fill News Deserts." *The Information*, 24 June 2021, <https://www.theinformation.com/articles/startups-bank-on-artificial-intelligence-to-help-fill-news-deserts?rc=lxgfhfs>.

## Selected Sources

Smith, Ben, and Katie Robertson. "Ozy Media Is Accused in a Lawsuit of 'Fraudulent Conduct.'" *The New York Times*, 5 Oct. 2021, <https://www.nytimes.com/2021/10/05/business/ozy-media-securities-fraud-lawsuit.html>.

"Suggested Language List." Prevention, Advocacy & Resource Center, Brandeis University, Aug. 2021, <https://sites.google.com/brandeis.edu/parcsuggested-languagelist/categories>.

Sutcliffe, Chris. "NDC Mediagroep's Ard Boer and United Robots' Cecilia Campbell on How Robot Journalism Is Powering the Modern Newsroom." *Media Voices*, 21 Sept. 2021, <https://voices.media/media-voices-conversations-robot-journalism-powering-modern-newsrooms>.

Takahashi, Dean. "NY Mayoral Candidate Andrew Yang Joins the Metaverse with a Zepeto Avatar." *VentureBeat*, 11 June 2021, <https://venturebeat.com/2021/06/11/ny-mayoral-candidate-andrew-yang-joins-the-metaverse-with-a-zepeto-avatar>.

"Textless NLP: Generating Expressive Speech From Raw Audio." *Meta AI, Meta*, 9 Sept. 2021, <https://ai.facebook.com/blog/textless-nlp-generating-expressive-speech-from-raw-audio>.

Tian, Feng, et al. "Emotional Arousal in 2D versus 3D Virtual Reality Environments." *PLOS ONE*, vol. 16, no. 9, 2021, <https://doi.org/10.1371/journal.pone.0256211>.



# Authors



**SAM GUZIK**

Foresight Affiliate  
[sguzik@futuretodayinstitute.com](mailto:sguzik@futuretodayinstitute.com)

Sam Guzik is a Foresight Affiliate specializing in technology, digital products, subscription products, and newsroom tools. His career includes a broad range of experience that includes product management, strategic foresight, scenario forecasting, audience engagement and leadership in legacy news organizations. Passionate about building a sustainable future for local news, Guzik has demonstrated results creating innovative, engaging and impactful journalism — and business models to support that work. Guzik is a graduate of Washington University in St. Louis, Columbia University Graduate School of Journalism and the NYU Stern School of Business.



**RYAN HOGAN**

Foresight Associate  
[rhogan@futuretodayinstitute.com](mailto:rhogan@futuretodayinstitute.com)

Ryan Hogan is a Foresight Associate at the Future Today Institute where he leads research in recognition, space, and energy. Additionally, he is a coach in the strategic foresight MBA course at the NYU Stern School of Business. He has worked with clients from traditional publishing to large-scale internet platforms, to leading-edge programs in decentralization and space futures. He has been featured in the Journal of Futures Studies, IEEE, and was a 2015 team finalist for Fastco's Innovation by Design Awards. He holds an MBA in Strategic Foresight from California College of the Arts and a BA in Art and Philosophy from Freed-Hardeman University.



**AMY WEBB**

CEO  
[awebb@futuretodayinstitute.com](mailto:awebb@futuretodayinstitute.com)

Founder of the Future Today Institute, Amy Webb pioneered a data-driven, technology-led foresight methodology practiced by FTI and used within hundreds of organizations worldwide. She leads FTI's technology research initiatives on artificial intelligence, synthetic biology and genetic engineering, next-generation networks, and quantum technologies. Webb is a professor of strategic foresight at the New York University Stern School of Business, where she developed and teaches the MBA course on strategic foresight. She is a Visiting Fellow at Oxford University's Saïd School of Business, a Nonresident Senior Fellow in the Atlantic Council's GeoTech Center and a Fellow in the United States-Japan Leadership Program. She was elected a life member to the Council on Foreign Relations. Webb was named by Forbes as one of the five women changing the world, listed as the BBC's 100 Women of 2020, ranked on the Thinkers50 list of the 50 most influential management thinkers globally. A lifelong science fiction fan, she collaborates closely with writers and producers on films, TV shows and commercials about science, technology and the future. Her newest book, *The Genesis Machine*, explores the futures of synthetic biology and the bioeconomy.

# Authors



**EMILY CAUFIELD**

Creative Director  
[ecaufield@futuretodayinstitute.com](mailto:ecaufield@futuretodayinstitute.com)

Emily Caufield has served as Creative Director for the Future Today Institute for the past decade. She uses her graphic design skills to communicate complex ideas, visualize data, and develop frameworks for use in strategic foresight and futures activities.



**ERICA GRAU**

Designer  
[egrAU@futuretodayinstitute.com](mailto:egrAU@futuretodayinstitute.com)

Erica Grau is a freelance graphic designer with over a decade of experience. She grew up in Atlanta, Georgia where she graduated with a degree in advertising from The University of Georgia and then furthered her education at The Creative Circus in graphic design. She then moved to New York City where she has worked with many clients including The United Nations, The Bronx Zoo, Weight Watchers and many more. From print to digital design, she enjoys working on a variety of different types of projects to continue growing her skillset.



**JENNIFER ELSEVER**

Editorial Director  
[jalsever@futuretodayinstitute.com](mailto:jalsever@futuretodayinstitute.com)

Jennifer Alsever led editorial production for the 2022 FTI Tech Trends Report. She has been a journalist for more than two decades covering tech, biotech, startups and business for such publications as Fortune Magazine, the Wall Street Journal, the New York Times, Wired and Fast Company. A popular young adult fiction writer, Alsever has won multiple YA awards for her Trinity Forest Series.



**CHERYL COONEY**

Director of Operations  
[ccooney@futuretodayinstitute.com](mailto:ccooney@futuretodayinstitute.com)

For over a decade, Cheryl Cooney has served as the Future Today Institute's director of operations, where she manages workflows, planning and logistics. Cooney is a published poet, with works appearing in American and Australian anthologies.



# Authors



**MEL BLAKE**

Business Development  
[mblake@futuretodayinstitute.com](mailto:mblake@futuretodayinstitute.com)

Mel Blake handles commercial development and client relations for FTI. He was formerly founder and managing director of Monitor Talent, a speaker agency he founded at the Monitor Group, a global consulting firm. He is a board member of The Yale Center for Customer Insights. He holds an MBA from the Yale School of Management and a BA in Economics from Wesleyan University.

**TOM FOSTER**

Editor

**SARAH JOHNSON**

Editor



# About the Future Today Institute

Founded in 2006, the Future Today Institute researches, models, and prototypes future risk and opportunity. As the leading strategic foresight and futures management consultants to executive leadership teams worldwide, FTI's data-driven applied research reveals trends and calculates how they will disrupt business, government, and society.

Together with our clients and partners, FTI is helping leaders achieve their preferred futures. Our pioneering, data-driven forecasting methodology and tools empower leaders to make better decisions about the future, today.

## Contact Us

[hello@futuretodayinstitute.com](mailto:hello@futuretodayinstitute.com)  
 267-342-4300  
[www.futuretodayinstitute.com](http://www.futuretodayinstitute.com)

## Social

Twitter  
[@FTI](https://twitter.com/FTI)

LinkedIn  
[@Future-Today-Institute](https://www.linkedin.com/company/futuretodayinstitute)

Facebook  
[@FutureTodayInstitute](https://www.facebook.com/FutureTodayInstitute)

Instagram  
[@futuretodayinstitute](https://www.instagram.com/futuretodayinstitute)

# Disclaimer

The views expressed herein are the authors' own and are not representative of the greater organizations in which they have been employed. The names of companies, services, and products mentioned in this report are not necessarily intended as endorsements by the Future Today Institute or this report's authors.

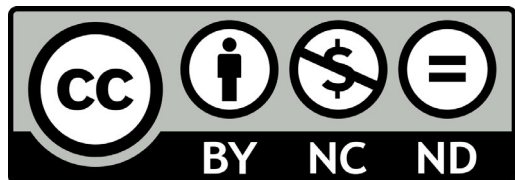
The Future Today Institute's 2022 Tech Trends Report relies on data, analysis, and modeling from a number of sources, which includes sources within public and private companies, securities filings, patents, academic research, government agencies, market research firms, conference presentations and papers, and news media stories. Additionally, this report draws from the Future Today Institute's previous EMT Trends Reports, FTI Trend Reports, and newsletters.

FTI's reports are occasionally updated on the FTI website.

FTI advises hundreds of companies and organizations, some of which are referenced in this report. FTI does not own any equity position in any of the entities listed in this presentation.

Any trademarks or service marks used in this report are the marks of their respective owners, who do not endorse the statements in this report. All rights in marks are reserved by their respective owners. We disclaim any and all warranties, expressed or implied, with respect to this report.

# Using and Sharing the Material in this Report



We invite you to use, share, and build upon the material in our 15th annual Future Today Institute Tech Trends Report. We are making it freely available to the public. This work is licensed under a Creative Commons CC BY-NC-ND 4.0 International License.

## You are free to:

### Share

Copy and redistribute the material in your organizations and classrooms.

## Under the following terms:

### Attribution

You must give appropriate credit to the Future Today Institute, provide a link to this Creative Commons license, and indicate if any changes were made. You may do so in any reasonable manner, but not in any way that suggests that the Future Today Institute endorses you or your use.

### NonCommercial

You may not, under any circumstance, use the material for commercial purposes.

### No Derivatives

If you remix, transform, or build upon the material, you may not distribute the modified material.

## You are prohibited from:

### Commercial Sharing

Don't copy and redistribute this material in any medium or format for commercial purposes, including any personal/corporate marketing and client services.

### Representing This Work As Your Own

Do not represent any part of this material as your own without giving credit to the Future Today Institute.

### Changing This Material

If you remix, transform, or build upon the material, you may not distribute the modified material.

### Additional Restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything this license permits.



