

Volume 4 of 12

14th Annual Edition

2021 Tech Trends Report

Strategic trends that will influence business, government, education, media and society in the coming year.



Work
Culture
Play

03

Overview

04

Macro Forces and Emerging Trends

06

Summary

07

Work

08

The New Hybrid Workweek

09

Home Offices Introduce New Cybersecurity Risks

10

Apps Shaping the Virtual Workspace

11

Scenario: Managed Meetings

12

Culture

13

Digital Fashion

14

Upcycled and Circular Fashion

15

Digital Makeup

16

Scenario: Extreme Sunscreen

17

Vices

18

Neuroenhancers

18

Nutrigenomics

18

Nootropics

18

Grinder Biohacking

18

CBD-Infused Products

19

CBD-Infused Drinks

19

Cannabis Supply Chains

19

Cannabis Compliance Systems

19

Specialized Cannabis CRM Platforms

19

Banking for Cannabis Dispensaries

19

Vaping and E-cigarettes

20

Play

21

eSports

23

eSports Training Academies

24

Gaming Subscription Wars

25

Infinite Gameplay

26

Sports Tech

27

Connected Toys

28

Kids Fitness Games and Toys

29

Protecting Little Gamers

30

Digital Addiction

31

Scenario: Digital Drugs

32

Application

33

Key Questions

34

Sources

35

Authors

39

Why FTI

40

About FTI

41

Disclaimer

42

Creative Commons License



Overview



The 1920s began in chaos. Cataclysmic disruption resulting from the first world war and the Spanish flu shuttered businesses and provoked xenophobia. Technological marvels like the radio, refrigerator, vacuum cleaner, moving assembly line and electronic power transmission generated new growth, even as the wealth gap widened. More than two-thirds of Americans survived on wages too low to sustain everyday living. The pace of scientific innovation—the discovery of insulin, the first modern antibiotics, and insights into theoretical physics and the structure of atoms—forced people to reconsider their cherished beliefs.

The sheer scale of change, and the great uncertainty that came with it, produced two factions: those who wanted to reverse time and return the world to normal, and those who embraced the chaos, faced forward, and got busy building the future.

It's difficult not to see striking parallels to our modern world. A tumultuous U.S. election, extreme weather events and Covid-19 continue to test our resolve and our resilience. Exponential technologies—artificial intelligence, synthetic biology, exascale computing, autonomous robots, and off-planet missions to space—are challenging our assumptions about human potential. Under lockdown, we've learned how to work from our kitchen tables, lead from our spare rooms, and support each other from afar. But this disruption has only just begun.

With the benefit of both hindsight and strategic foresight, we can choose a path of reinvention. Our 2021 Tech Trends Report is designed to help you confront deep uncertainty, adapt and thrive. For this year's edition, the magnitude of new signals required us to create 12 separate volumes, and each report focuses on a cluster of relat-

ed trends. In total, we've analyzed nearly 500 technology and science trends across multiple industry sectors. In each volume, we discuss the disruptive forces, opportunities and strategies that will drive 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. From chaos, a new world will come.

Amy Webb

Founder
The Future Today Institute

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 14th 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 500 trends into 12 clear categories.

Within those categories are specific use cases and recommendations for key roles in many organizations: strategy, innovation, R&D, and risk.

Each trend offers six important insights.

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 emerging in this space.

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 it to inform your vision, planning, and research.

Informs Strategy

Strong evidence and data. Longer-term uncertainties remain. Use it to inform your strategic planning.

Act Now

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

00

01

02

03

04

05

06

07

08

09

10

11

12

Health, Medical, Wearables

6

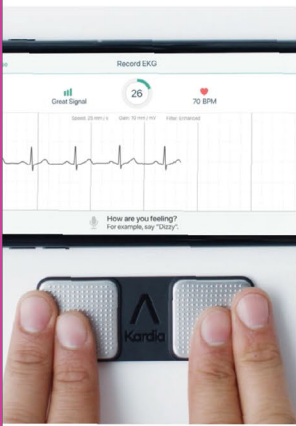
Watch Closely

Informs Strategy

Act Now

1ST YEAR ON THE LIST — 1

Doctorless Exams



AliveCor's personal EKG monitoring system.

59

KEY INSIGHT — 2

Advancements in diagnostic testing and remote monitoring, supported by cloud computing, machine learning, and low-cost technology are upending traditional doctor visits. Patient data are triaged by algorithm, rather than human doctors alone.

EXAMPLES — 3

Smartphones and smartwatches now take blood pressure readings and perform electrocardiograms, using apps approved by the U.S. Food and Drug Administration. Phones don't just record data; they interpret it. People who wear an Apple Watch know that an unusually high or low heart rate or irregular rhythm may suggest atrial fibrillation. The VROR system, a VR-based eye exam, emulates an eye doctor's ultra-widefield imaging machine but within a compact headset. Data are sent to a mobile app for an understanding of a patient's optic nerve health. StethIO is a mobile stethoscope that uses a smartphone to capture, decode and analyze heart sounds. AliveCor is an FDA-Cleared wireless personal EKG that connects to a phone. Butterfly iQ is a portable ultrasound device that delivers a 2D image. The ParatusPerio Test analyzes different bacteria and sources of inflammation in a patient's mouth.

DISRUPTIVE IMPACT — 4

Continual monitoring helps patients know their baseline vital stats and track any changes. This disrupts traditional healthcare in a few ways. First, with continual monitoring, patients are more likely to intercept an emerging problem in advance and seek out care. For example, if a patient's smartwatch warns of atrial fibrillation, they can call their doctor for next steps. This reduces strain on emergency departments. It also unlocks new opportunities for healthcare systems and insurers willing to use those data and to make medical records systems interoperable. Financial forecasting that harnesses real-time data could be algorithmically recalibrated, and more accurately assess risk. But connected devices aren't accessible to everyone, which means that a new digital divide could be on the horizon, further reducing health equity in many communities.

EMERGING PLAYERS — 5

- The Clue period tracking app
- Apple Health
- StethIO
- Healthy.io
- Paratus Diagnostics
- Butterfly Network
- AliveCor

© 2021 Future Today Institute

Macro Forces and Emerging Trends

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.

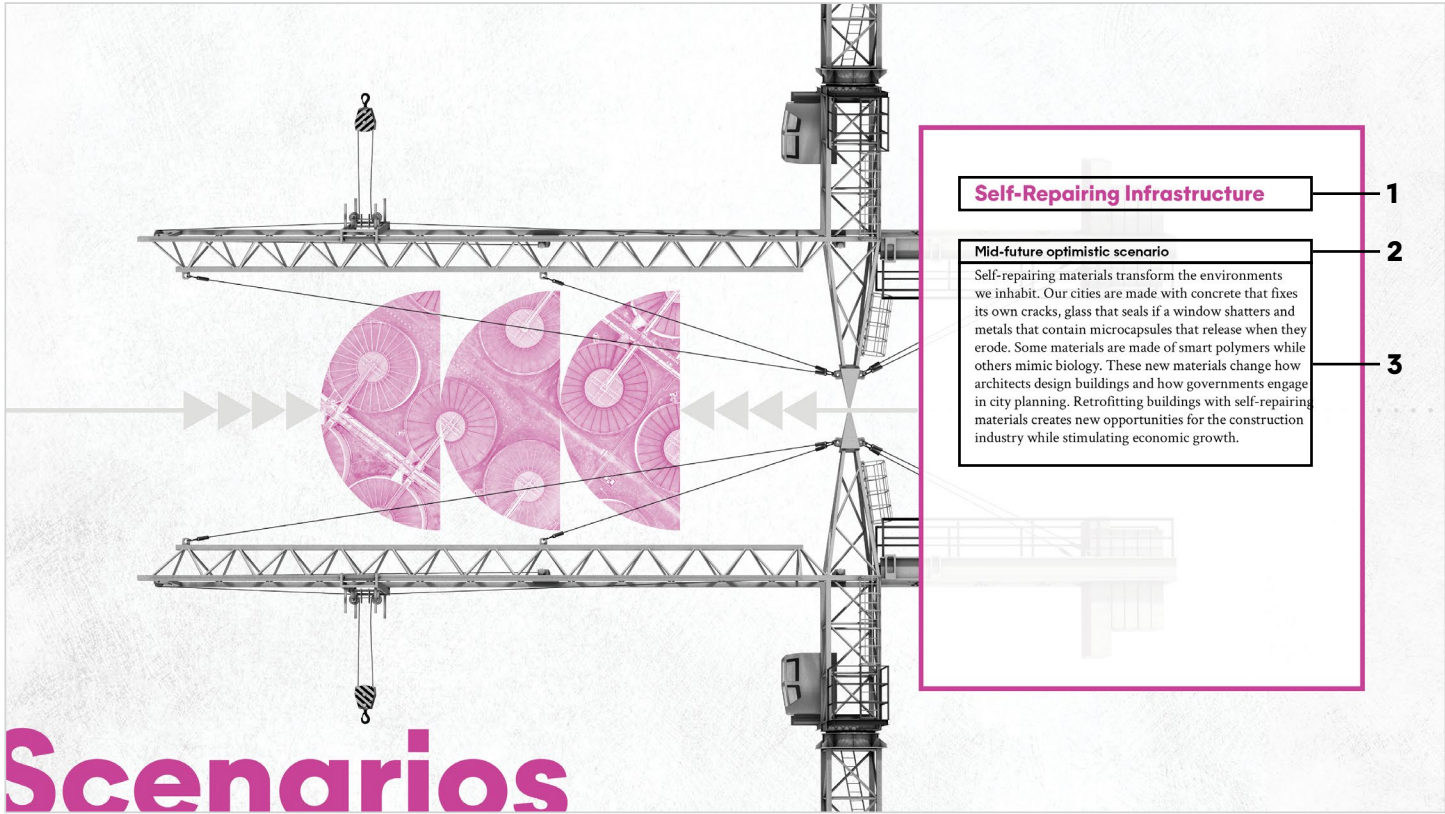
2. Temporal and Emotive Tags

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.



Work Culture & Play Summary

- + A tech exodus from Silicon Valley has redistributed a highly-skilled workforce to other parts of the U.S.
- + Companies are rethinking long-term investments in office space.
- + 69% of companies will reduce their real estate footprint because of COVID-19.
- + The global pandemic condensed a decade of digital transformation into a few months.
- + Black tech professionals are paid, on average, \$10,000 less than their white colleagues.
- + Newly-remote workforces rely on video conferencing systems, messaging platforms, networks and home routers that aren't necessarily secure.
- + Virtual luxury fashion moves from fringe to mainstream in 2021. Affordable digital clothing will be available this year.
- + Celebrity makeup artists are selling AR filters to use in place of traditional makeup in video conferences and social media posts.
- + As the eSports ecosystem grows, new academies are launching to recruit and train prospective professional players and coaches.
- + E-doping is already an issue in professional eSports leagues, where Adderall and Ritalin are banned substances and using a cheat-code can get you banned for life.
- + As genome sequencing becomes more affordable, some biohackers are using DNA results to nutritionally manipulate their bodies.
- + From neuroenhancers to sextech, the market for digital and high-tech vices is growing.

Work

1ST YEAR ON THE LIST

The New Hybrid Workweek



With offices unlikely to ever return to their pre-pandemic capacity, floor plans will be re-worked to accommodate hybrid in-person and remote meetings.

KEY INSIGHT

When the COVID-19 pandemic displaced office workforces around the world, managers and employees had to rethink how, where, and when they could carry out the responsibilities of their job. Having now adapted to remote work and new digital tools, the question remains: Will things ever return to business as usual?

EXAMPLES

Work routines have shifted dramatically in the last year, creating new norms and accelerating change, with effects expected to endure long after the pandemic has subsided. Companies like Facebook, Twitter, Square, Shopify and Slack have already pledged to allow employees to work remotely even after lockdowns and social distancing restrictions are lifted, paving the way for hybrid virtual and in-person workforces at scale. Google is exploring a model wherein workers work three days a week in the office, and the other two remotely, either working from home (WFH) or working from anywhere (WFA). It is also important to note that these changes primarily affect white collar industries—most manual laborers, service industry workers and others do not have the luxury of working remote.

DISRUPTIVE IMPACT

Participating companies are likely to hold less commercial real estate, and revamp remaining floor plans to accommodate lower headcounts and hybrid meetings between in-person and remote workers. The hope is that allowing workers more flexibility will improve their quality of life and mental health, and thus their productivity, however most companies experimenting with these new models do not have data with which to conclusively support that conclusion, and the opposite could prove true. The changes could also blur lines between full-time, part-time, and contract employees, and potentially infringe upon workers’ rights. Companies will also have to make important decisions about what remote work platforms and applications to use, as they will likely play a far greater role within the organization as the hybrid workweek becomes standard.

EMERGING PLAYERS

- The Society for Human Resource Management (SHRM)
- The MIT Center for WorkLife and WellBeing
- Occupational Safety and Health Administration

Office centrality is over.

— Shopify CEO Tobi Lutke

1ST YEAR ON THE LIST

Home Offices Introduce New Cybersecurity Risks



Two-factor authentication (TFA) should be standard practice for workforces accessing sensitive company information from home.

KEY INSIGHT

As employees became accustomed to working from their own living spaces over the past year, CISOs raised concerns that insecure and unmonitored home networks could expose the company’s proprietary data, trade secrets, video conversations and more to malicious hackers or industry rivals.

EXAMPLES

The sudden unexpected shift to remote workforces opened wide gaps in cybersecurity for companies around the globe. Soon after the pandemic sent workers home indefinitely, reports emerged that Zoom, which had quickly become the go-to video conferencing app for countless remote teams, had serious security flaws. From unauthorized users “Zoom-bombing” calls, to questionable encryption, to claims that the company was selling user data, the app was unreliable enough to raise red flags for cybersecurity experts, even leading one computer science professor to declare that “Zoom is malware.” Another issue is that housebound employees were much more likely to use personal devices not vetted by corporate cybersecurity officials to access work documents and correspondence, leaving these potentially sensitive assets vulnerable to theft. According to a study by Deloitte, hackers and scammers increased their efforts soon after COVID hit, specifically targeting remote workers.

DISRUPTIVE IMPACT

Companies that were left scrambling to adapt to pandemic-related workforce shifts may not have properly addressed new cybersecurity vulnerabilities. As remote work becomes more widely and regularly practiced, it’s time for CISOs to shore up security measures for off-site employees. Reinforcing cybersecurity best practices, requiring two-factor authentication, installing anti-malware software on all machines, increasing privacy settings on home WiFi networks, and even scanning video backdrops for any exploitable information are some straightforward ways to mitigate risk. Another option is to invest in cyber liability insurance. Any companies that handle highly sensitive or classified materials should consider sending technicians to secure the domestic working environments of all employees with security clearances. Failure to address these vulnerabilities greatly increases the odds of a potentially devastating breach.

EMERGING PLAYERS

- Chubb
- Norton 360
- Malwarebytes
- Wyse

“Zoom is malware.”

— Princeton computer science professor Arvind Narayanan

Apps Shaping the Virtual Workspace

Interest and investment in remote work platforms has never been higher, and a crop of lesser known startups are rising to meet the growing demand. Some provide niche solutions, others offer versatile collaborative platforms, but all have the potential to help shape the future of remote work.

Teamflow

Founded by ex-Uber exec Florent Crivello, Teamflow is a remote work application designed to replicate the organic interaction and conversation of a traditional office environment in a virtual setting. Users see their video or profile pic in a bubble that appears on a virtual office floor plan. The user can then move through the digital space using their arrow keys, and approach colleagues' bubbles to engage them in conversation. Users only hear the voices of coworkers whose bubbles are within close proximity, and spatial audio recreates the directional perspective of an in-person chat.

Gather

Bringing a retro cyber aesthetic to collaboration software, Gather emulates the routines of office life in order to bring structure to the remote work experience. Customizable avatars can be navigated through a 2D virtual office, designed in charming 8-bit graphics reminiscent of '80s console games. Logging in and sitting at a digital desk marks one's arrival and the symbolic start of the workday,

and colleagues can gather their avatars in common areas or meeting rooms to conduct work and social interactions.

With

Opting for a more conceptual approach, With operates on more of an abstract digital canvas, rather than trying to represent the layout of a physical office space. Workers are represented by subtly animated avatars of animals distributed throughout the virtual space, and can drag documents and tools onto the shared desktop.

Reslash

Most work software is designed for clarity and efficiency, but not Reslash—founder Ashwin Gupta says the platform was founded on the premise that remote coworkers can connect during the workday as they “destroy and create beautiful chaos out of nowhere.” The result is a variety of meme-soaked, gif-spangled shared screens, where users are encouraged to make a mess in the name of unstructured creativity. It's hard to imagine this format directly improv-

ing productivity, but it does appear to be a fun, cathartic way to interact with your colleagues.

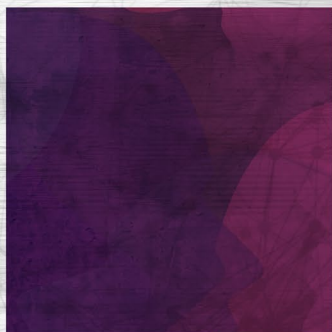
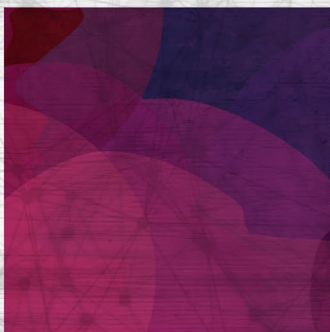
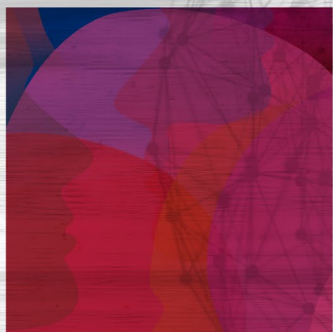
Sneek

This startup has designed its interface to reflect one specific office habit—dropping by your coworkers' desks to see if they're free to chat. The Sneek app displays your workmates in a grid format, with still images from their webcam updated at regular intervals. Users can scan the grid to see if colleagues are at their desks and appear available, or if they've indicated they are busy and don't want to be disturbed. To initiate a video call with a fellow worker, the user can simply click their image.

Around

Rather than try to faithfully recreate face-to-face conversations with a fullscreen video interface, Around shrinks participants' videos and places them in the margin of the user's screen, leaving the desktop visible and accessible so that the project at hand can remain the focus. Ultimately the hope is that this format

will even the playing field for remote and in-office workers—even teams gathered in a single conference room at the office can log in individually on their devices, so that every participant is displayed in the same format. The app has even developed a feature so that users in close proximity to one another don't experience audio feedback or echo on the call.



Managed Meetings

Near-future optimistic scenario

Mathematician and computer scientist Alan Turing once proposed a thesis and a test: If someday, a computer could answer questions in a manner indistinguishable from humans, then it must be “thinking.” You’ve likely heard of the paper by another name: the Turing Test. It’s been a guiding force in the development of artificial intelligence ever since. Tests built on either deception (can a computer fool a human into believing it’s human?) or replication (can a computer act exactly as we would?) do not acknowledge A.I. for what it has always been: intelligence gained and expressed in ways that do not resemble our own human experience. Rather than judging an A.I. based on whether it can or cannot “think” exactly like we do, a new test judges the value of contributions made by the A.I. on its own during meetings. The Meaningful Contribution Test would be passed when an A.I. assistant can help manage a meeting, by pushing back on a small but growing consensus, tactfully argue for an alternative plan and recruit another member of the group to support that alternative.

Culture

1ST YEAR ON THE LIST

Digital Fashion



With the rising popularity of digital fashion, we may soon see virtual wardrobes that help us catalog and coordinate our physical, digital, and hybrid garments and accessories.

KEY INSIGHT

With more and more of the developed world’s population customizing avatars in virtual realms, and with the fashion industry perpetually under fire for its pollutive practices, the market for digital fashion has a promising future.

EXAMPLES

Some of the world’s best known designers have gotten wise to the virtual revolution. Iconic Italian fashion house Gucci has invested in a number of digital fashion initiatives, from a free digital closet partnership with avatar platform Genies, to an integration with styling game Drest, to an in-house app called Sneaker Garage, where users can use augmented reality to “try on” the brand’s virtual footwear. Other big-name designer labels have similarly seen gaming as their entrée into the digital space, with Hermès launching an equestrian-inspired mobile gaming app, and Louis Vuitton partnering with the massively popular League of Legends gaming franchise. Elsewhere, Dutch brand The Fabricant has established itself as one of the leading digital fashion companies, catching headlines when one of its virtual dresses sold for an eye-popping \$9,500.

DISRUPTIVE IMPACT

The digital fashion market is poised for growth, both for its versatility in online environments and its ability to reduce waste without retailers having to forego sales. Physical garments may soon come with virtual counterparts, allowing users to catalog their wardrobes digitally, and hang on to a version of their garments even after the physical piece degrades. The ability to express oneself freely through virtual styles may help consumers develop more ecologically conscious shopping habits when it comes to real-world items. In time, as AR eyewear becomes commonplace, users may even be able to virtually showcase their digital looks on their person instead of just an avatar—imagine a future in which you select a simple sustainable garment or “canvas” from your physical closet, but select a virtual outfit to project on top of it, one that is visible to anyone wearing smart glasses.

EMERGING PLAYERS

- The Fabricant
- Gucci
- Louis Vuitton
- Dapper Labs

I truly believe we are going to be the first billion-dollar digital fashion company.

— The Fabricant founder Kerry Murphy

1ST YEAR ON THE LIST

Upcycled and Circular Fashion



New production models from fashion retailers look to repurpose existing materials and garments wherever possible, instead of producing virgin materials.

KEY INSIGHT

Once the preferred method of DIY designers and niche clothing brands, upcycling and circular, sustainable fashion has matured to the point where it is being adopted at scale by fashion retailers worldwide.

EXAMPLES

According to analytics firm First Insight, more than half of Gen Z customers surveyed prefer to buy from sustainable brands, and nearly three quarters are willing to pay more for sustainable products. Big name retailers have taken note, innovating on upcycling and circularity to attract this growing customer base and reduce harm on the environment. Fashion industry waste ranges from its sheer output—tens of billions of clothing products are produced each year, even by conservative estimates—to the consumption of water and even coal. From industry leaders like outdoor clothing brand Patagonia, whose award-winning circular production model is founded on designing pieces to last a lifetime with proper care and refurbishment, to high fashion Parisian label Marine Serre, whose line is constructed of roughly half upcycled materials, sustainable solutions are spreading and accelerating across a diverse range of fashion retailers.

DISRUPTIVE IMPACT

Sustainability is the single greatest challenge facing the fashion industry—and also its greatest opportunity. An investment in circular production models now may pay dividends in the future as the next generation of conscientious consumers matures and their purchasing behaviours shape the industry. More retailers are exploring buyback and recycling programs as well, like H&M's Looop program, which disassembles old textiles to create new products without using virgin materials. Brands that are making the foray into digital fashion often cite sustainability as a benefit, and digital designs will complement responsibly produced real-life garments to form the hybrid fashion industry of the future.

EMERGING PLAYERS

- ASOS
- H&M Looop
- Marine Serre
- Patagonia
- Reformation



We don't have to all reinvent the wheel, but brands that don't face these realities of the true cost of apparel and fast fashion, I think they will be left behind.

— Patagonia CEO Rose Marcario

2ND YEAR ON THE LIST

Digital Makeup



By accurately mapping and tracking of the face, AI and augmented reality can produce lifelike digital beauty filters that blend seamlessly with the user's movements.

KEY INSIGHT

Digital makeup exists at the intersection of facial recognition, 3D mapping, and augmented reality. As AR becomes a part of our everyday lives, digital touchups and expressive virtual makeup will define how we choose to present ourselves to the world.

EXAMPLES

Social media platforms including Snapchat and Instagram offer users AR filters that can change their physical appearance in photos and videos. Some are fanciful, giving the user animal attributes or drastically changing their features, but others mimic the effects of makeup, contouring and coloring the face with the aim of improving its aesthetic. Even video conferencing platform Zoom has a feature where users can smooth their complexion for a more desirable appearance. Beauty brands themselves have ventured into the digital space as well. Redken, Avon, MAC and Maybelline offer virtual “try-on” AR apps, saving time and money for those looking to match products to their skin tone when buying online. L’Oreal, meanwhile, has created a line of digital-only beauty products to be used in popular social and video conferencing apps.

DISRUPTIVE IMPACT

Digital beauty is not merely a consumer perk. It can have a direct effect on business. China’s AliPay responded to complaints that customers were put off by their appearance when paying for items via facial recognition camera systems, adding a digital beauty filter to improve the experience. Gaming platforms with customizable avatars and robust marketplaces for in-game purchases are a popular way for beauty brands to test digital products. Unisex skincare label Evenprime created a “skin” for avatars in the fantasy action game Spellbreak, and customers who bought Evenprime’s skin serum in the physical world automatically received access to the digital skin. With gaming becoming increasingly popular among women and girls, despite old-fashioned assumptions to the contrary, the gaming and esports beauty market may soon become a new profit center for cosmetics brands.

EMERGING PLAYERS

- AliPay
- Drest
- Evenprime
- Ines Alpha
- L’Oreal
- Snap
- Spellbreak



Extreme Sunscreen

Mid-future neutral scenario

In the Anthropocene era, the amount of solar radiation emitted by the sun is too intense for relaxing at the beach—or doing mundane activities, like walking to school. Enter climate protection: a range of lotions and salves that glide onto the skin and fend off extreme sun, heat, and wind. Made with synthetic zinc oxide, titanium dioxide and polypodium leucotomos extract, climate protection blocks radiation and temporarily desensitizes the skin to harsh, dry air. It's dangerous to spend time outdoors without coverage. Those who can afford beauty enhancements opt for pricier formulas that include body makeup, to correct blemishes, veins, and scars. For the lips and face, personalized climate protection includes a topical, fast-absorbing collagen that tightens and plumps the skin, though no salve reverses the sun damage caused by extreme climate change in the early 2000's.

3RD YEAR ON THE LIST

Vices



CBD gummies are increasingly available in the U.S.

KEY INSIGHT

From neuroenhancers to sextech, the unique market for digital and high-tech vices is growing.

EXAMPLES

The new crop of vices are digital, high-tech and organic. They were designed to strengthen our mental performance and agility, help us relax, and afford us moments of pleasure.

DISRUPTIVE IMPACT

A bitter election season, fragile economy and the global pandemic resulted in stress and burnout. Two thirds of adults say that the number of issues America is facing is overwhelming to them, according to a study by the American Psychological Association.

In the past year, as lockdowns forced people indoors and reset our social structures, many struggled to navigate self-care. It's no surprise that we're seeking new ways to escape reality or to enhance our moods.

EMERGING PLAYERS

- Doppel
- Emotiv
- New Frontier Data
- Thync Kit
- Bulletproof

Vices



Puff Bar defied FDA rules in January and began selling its products again online.

Neuroenhancers

Neuroenhancement devices aim to record brain waves and send feedback. Some promise to help you become more productive, while others are meant to boost your mood. Australia-based Smart-Cap uses a tracking system with voice warnings and vibrations to keep you alert while on the job. The Muse headband uses neurofeedback to help manage stress and improve athletic performance. The Emotiv Epoc+ and Emotiv Insight and mobile EEG devices monitor your brain activity and analyze cognitive performance. Doppel, which is worn on the wrist, uses electric pulses to augment your energy. The pulsations, which you dial in based on your needs, are supposed to have an effect on your brain similar to that of music. The Thync Kit is a series of electrodes and a triangular device that you stick on to your head—as well as a mobile app synced to your smartphone. It delivers low-grade electric pulses to influence either your sympathetic (fight or flight)

or your parasympathetic (rest and digest) nervous system. Of course, this same technology can be used for nefarious purposes. In China, the military and some businesses now use connected headbands and hats to monitor employee brain activity. This emotional surveillance technology is said to optimize productivity—State Grid Zhejiang Electric Power, based in Hangzhou, reported its profits spiked \$315 million since using neuroenhancer devices and software to mine, refine, and analyze employee brain data.

Nutrigenomics

As genome sequencing becomes more widely available and affordable, some biohackers are using DNA results to nutritionally manipulate their bodies. All nutritional decisions—what foods to avoid, what drinks to consume more of, what vitamins and supplements to take—are based on that baseline sequence and real-time metabolic testing. Biohackers consume different combinations of

foods based on what they need enhanced: performance, focus, or sleep.

Nootropics

If you need to manage stress or focus, you might look to “nootropics,” cognitive enhancement drugs that promise to help keep you calm and attentive. These dietary supplements have been shown to improve cognitive function—even if they’re not officially regulated or approved by the Food and Drug Administration. You may already be taking a few: caffeine, red reishi mushrooms, ginseng, turmeric, ginkgo biloba, and Bulletproof coffee are all popular, while natural supplements like creatine, L-theanine and Bacopa monnieri are also being marketed to help promote mental clarity, focus, and information retention. Synthetic compounds, like Adrafinil and Noopept, last longer and take effect within minutes. By some analyst estimates, the nootropics market could reach \$11 billion in America alone by 2024.

Grinder Biohacking

Most body-machine interfaces, like Elon Musk’s Neurolink, aren’t ready for the general public yet, but that hasn’t stopped some people from experimenting. Grinder biohackers implant RFID tags, computer chips, magnets, data transmitters and sensors in their bodies. Their aim: transverse the human-machine divide, and become more seamlessly integrated with technology.

CBD-Infused Products

Consumers can get CBD in post-workout smoothies, hand lotions, and even morning coffee. Cannabidiol, otherwise known as CBD, is a chemical compound found in the resinous flower of cannabis. While it’s a component of marijuana—one of hundreds, actually—it is far less psychoactive than the better-known THC, if at all. In other words, it doesn’t really get you high. As of January 2021, 14 states, Washington, D.C. and three territories have legalized cannabis, according to the

Vices

National Conference of State Legislatures, but the federal government’s stance on CBD is murky. It depends on whether the CBD came from hemp or marijuana, and every state follows different local laws. CBD has been touted for a variety of health benefits and has been shown in many studies to reduce seizures, especially in children with epilepsy syndromes. Because the FDA doesn’t regulate CBD, there aren’t yet studies that determine the most effective doses. Most of what’s commercially available in infused products like drinks and snacks is very low, but the market is huge: the CBD industry in the United States will be worth \$16 billion by 2025.

CBD-Infused Drinks

Beverages is a growing vertical within the cannabis industry. As restrictions loosen on recreational marijuana use, commercial beverage companies are launching new CBD-infused products, like sparkling water, tea, sports drinks and alcoholic

beverages. Constellation Brands, which makes Corona beer, and Lagunitas (a subsidiary of Heineken), are both investing in new techniques to infuse their products with CBD. In some markets, Lagunitas also offers drinks with 10mg of THC.

Cannabis Supply Chains

The supply chain for cannabis is challenging, and due to federal regulation, the largest logistics companies—Amazon, Fedex, and UPS—cannot legally service vendors. Cannabis brands must become their own first party distributor and must own all of their own logistics systems (vehicles, warehouses, packaging) or else use specially-licensed third-party vendors. That latter category is catalyzing new business growth. Local dispensaries are supporting startups that can take orders, authenticate users, and ensure safe and legal delivery to consumers. Eaze and Greenrush are the biggest players in medical marijuana delivery. Wayv, a B2B cannabis logistics firm, launched its Dy-

namic Distribution platform, which helps companies in California list themselves as third-party distributors for other brands, and automatically runs compliance checks. This will enable cannabis brands to someday move products within their states more easily.

Cannabis Compliance Systems

With the industry heavily regulated, it can be difficult for dispensary companies with business units located in different states to keep track of compliance. New A.I.-powered platforms are helping dispensaries meet these sometimes complex compliance regulations.

Specialized Cannabis CRM Platforms

Unlike traditional CRM or customer databases, marketers in the cannabis space have additional regulations to contend with. Baker is an automation platform that caters to dispensaries, combining

e-commerce, distribution, inventory management, texting, and loyalty programs.

Banking for Cannabis Dispensaries

Banking is a big hurdle for dispensaries and their parent companies. Servicing the cannabis industry would expose traditional financial institutions to federal prosecution. Green Thumb Industries, which operates 50 stores, earned \$8 billion last year. But it doesn’t have access to banks like JPMorgan and Wells Fargo; instead, it must rely on a constellation of small community banks. However with Democrats in charge of the White House, Senate and House, new legislation could make banking easier for dispensaries.

Vaping and E-cigarettes

In February 2021, lawmakers held a hearing to determine why the FDA failed to regulate vaping sooner. The Centers for

Disease Control and Prevention estimates that 3 million American teenagers vape either tobacco or marijuana, and a newly-identified lung disease called EVALI, short for “e-cigarette, or vaping, product use-associated lung injury” is growing sharply among that cohort. Puff Bar, which was ordered last year to take its fruit-flavored vape products off the market, defied FDA and resumed online sales in January, saying that it no longer uses nicotine derived from tobacco. Instead, the manufacturer uses synthetic nicotine made in a lab. Juul Labs, which dominates the e-cig market and is largely blamed for America’s vaping epidemic, voluntarily discontinued its flavored products, with the exception of tobacco and menthol flavors. Many competing brands including Bidi Stick and Blu, offer disposable, pre-charged, pre-filled vaping devices, and they’re cheaper than Juul pods.



Play

3RD YEAR ON THE LIST

eSports



Chess grandmaster Hikaru Nakamura has more than 1 million followers on Twitch.

KEY INSIGHT

The video game industry prospered during the COVID-19 pandemic. While organized competitive gaming has arguably existed for decades, advancements in gaming technology, accessibility, streaming capabilities, and popularity have led to an astronomical rise in its commercial potential and perceived legitimacy in recent years.

EXAMPLES

Online chess became a streaming obsession last year, due in part to Netflix hit “The Queens Gambit” and to a new generation of streamers on Twitch, the online gaming platform. Between January and September, viewers consumed more than 40 million hours of live-streamed chess. The League of Legends World Championships clocked more than 139 million hours of viewership. Twitch, the primary streaming portal for eSports in the Western world, logged a staggering 17 billion hours worth of content last year, a full 83% higher than its previous record in 2019. (Twitch was acquired by Amazon in 2014.) When Rep. Alexandria Ocasio-Cortez (D-NY) joined high-profile Twitch gamers for a round of “Among Us,” the stream broke records: 435,000 viewers watched to see who was the imposter.

eSports continued



DISRUPTIVE IMPACT

Even before the pandemic, 2020 was set to be a blockbuster year in gaming and eSports. New consoles from PlayStation and Xbox weren't just minor upgrades to hardware, they were generational leaps with drastically improved graphics processing and motion control. eSports tournaments weren't held in person, but plenty of tournaments were held and without football games and boxing matches to bet on, eSports betting found wide new audiences last year. In 2020, eSports companies raised more than \$2 billion, up 115% in value from 2019, according to Quantum Tech Partners. As audience numbers for eSports continue to climb, platforms will compete to outbid each other for media and streaming rights for events like League of Legends World

Championships and Fortnite concerts. eSports will soon rival television as a form of mainstream entertainment because of its interactive and immersive nature. Advertisers are taking notice. Nike sponsors several professional teams. As the sport matures, so will concerns about fair play. E-doping is already an issue in professional eSports leagues, where Adderall and Ritalin are banned substances and using a cheat-code can get you banned for life.

EMERGING PLAYERS

- 100 Thieves
- Bethesda Game Studios
- Catalyst Sports & Media
- Bayes Holding
- Overwatch League
- Twitch
- Y Media Labs

1ST YEAR ON THE LIST

eSports Training Academies



The Collegiate Star League offers college sSports scholarships.

KEY INSIGHT

As the eSports ecosystem grows, new academies are launching to recruit and train prospective professional players and coaches.

EXAMPLES

Amateurs hoping to make the leap to professional eSports can’t just excel at certain games—they need to understand the gaming business, how to manage their time, and how to develop content and interact with fans. Several colleges and universities, including Ohio State and George Mason, offer undergraduate degree programs in eSports.

DISRUPTIVE IMPACT

eSports pros earn upwards of \$250,000 a year, while performance coaches can earn \$100,000 or more. Given the market size and projected growth, amateurs hoping to play professionally are seeking practical training. Davon Williams, a computer scientist with the U.S. Army Network Enterprise Technology Command, has launched the Centry Academy of Gaming and Esports (CAGE), an online school that plans to offer degrees in eSports specializations: coach, player, streamer and announcer.

EMERGING PLAYERS

- High School Esports League
- National Association of Collegiate Esports (NACE)
- League of Legends
- Centry Academy of Gaming and Esports

1ST YEAR ON THE LIST

Gaming Subscription Wars



Microsoft Game Pass features hundreds of titles.

KEY INSIGHT

Games pose a unique business challenge: when a company has no new console or blockbuster title, players hop over to other platforms. New subscription models hope to keep consumers loyal—and away from competition.

EXAMPLES

Subscription models from Apple, Google, Sony and Microsoft are changing the traditional dynamics of games. After spending hundreds of dollars on consoles, players have to shell out \$20 - \$60 or more on individual games. In a world where mobile phone games cost a fraction of that price, gaming companies have reconsidered subscriptions as a way to generate revenue over longer periods of time. Google launched its game streaming service Stadia in August 2019, with subscriptions to its portfolio of games. Microsoft's Game Pass launched in 2017—it's like Netflix, but for games. For between \$5 - \$15 per month, subscribers get access to hundreds of games, including hot new titles on the day of release.

DISRUPTIVE IMPACT

The same challenges streamers are facing will befall gaming companies in the very near future. Game fans don't have unlimited budgets, and they'll need to choose between subscription packages.

- EMERGING PLAYERS**
- Microsoft's Game Pass
 - Google Stadia
 - PlayStation Now
 - Apple Arcade

2ND YEAR ON THE LIST

Infinite Gameplay



Fortnite launched in 2017 and quickly became one of the world’s most popular games.

KEY INSIGHT

The most popular video games today have one thing in common: they never end. Rather than traditional games with a beginning, middle and end, many of these video games are more like online worlds, where players can participate whenever and for how-ever long they like, with success measured in achievements instead of a single, finite objective.

EXAMPLES

Infinite gameplay means you never have to log off, and you’ll never defeat the final boss. In these never-ending games, play-ers can also take part in hybrid real-world experiences like going to a concert or even buying real estate. The Sims and Minecraft are examples of longstanding games that allow players to build their own realities. More recent titles like Fort-night and League of Legends are univers-es that players can log into at any time for a fully immersive and interactive break from the real world. Classic games like Super Mario, Pokemon and Grand Theft Auto are being redesigned and re-released in this unrestricted format to the delight of gamers everywhere.

DISRUPTIVE IMPACT

How do you “win” a game if it has no end? Newer game design elements perfect addiction triggers and dopamine rewards to shape and alter our psychological state and behavior. Our lives will be increas-ingly gamified, as never-ending games merge with the activities that already form part of our lives. Connected ex-ercise platforms, such as Peloton bikes, use built-in game elements (badges, contests and leaderboards). Meditation apps like Headspace nudge and reward us (somewhat paradoxically) to engage with them. Workplace optimization tools also encourage us to strive for new achieve-ments, with progress and rewards being symbolized in digital form.

EMERGING PLAYERS

- EVE Online
- Roblox
- Fortnite
- League of Legends
- Minecraft
- Twitch

2ND YEAR ON THE LIST

Sports Tech



Riddell's InSite training helmet collects and analyzes on-field head impacts.

KEY INSIGHT

Elite athletes are using more and more sophisticated tech tools to improve training and performance. Stadiums now use audience analysis and drones to improve the live and televised experience. Much of this sport technology could eventually end up in the hands of consumers looking to improve their health and well-being.

EXAMPLES

Professional NFL players are retiring early, citing a history of concussions and the risks of chronic traumatic encephalopathy, or CTE. Last year, seven-time Pro Bowl linebacker Luke Kuechly retired from the NFL at just 28 years old, and he wasn't the first to hang up his helmet before 30—quarterback Andrew Luck retired in 2019 at age 29. As competitive sports become more intense, data-tracking tools could help prevent the kinds of injuries that have led to these early retirements. Football equipment manufacturer Riddell now makes smart helmets outfitted with tiny sensors that transmit impact data in real time. Coaches on the sidelines can see the effects of single and multiple impacts sustained during a game, and they receive alerts if the numbers get too high.

DISRUPTIVE IMPACT

Smart equipment is being developed for nearly every sport. The Wilson X Connected basketball is embedded with sensors and tracks patterns in shooting. Adidas makes a smart soccer ball with integrated sensors that can detect speed, spin, strike, and trajectory when the ball is kicked. Meanwhile stadiums employ drones and video for everything from audience sentiment analysis to cleaning up garbage after games. Italian equipment manufacturer Technogym is developing next-generation machines that incorporate a user's biometric data, which can be tracked before, during and after exercise. Emerging research in reduced-gravity activity is helping athletes re-acclimate after injury. AlterG's anti-gravity treadmill automatically reduces the natural weight of athletes to as little as 20% of body weight in precise 1% increments for low-impact, pain-free movement. Smart sports equipment could reach a market size of \$12 billion over the next five years. The use of advanced technology in both analytics and performance is likely to alter the state of many contemporary sports.

EMERGING PLAYERS

- AlterG
- Babolat
- Puma
- Riddell
- Technogym
- Under Armour
- Wilson

2ND YEAR ON THE LIST

Connected Toys



Sony's connected toy dog Aibo doubles as a smart home assistant.

KEY INSIGHT

Connected toys collect and use data for interactive experiences. While they're fun for kids, lawmakers and academic researchers have raised questions about privacy.

EXAMPLES

Thirty-six years ago, animatronic Teddy Ruxpin bears sang, told stories and even blinked. Priced at \$69.99 (roughly \$175.54 in 2021 dollars), the dolls had audio cassette decks built into their backs; specially-formatted tapes controlled the servo motors for Teddy's eyes and mouth, and also played audio recordings. For about the same price today, Cozmo is a small, self-aware, A.I.-powered robot with a base personality, and the more you play with him, the more that personality evolves. Made by San Francisco-based company Anki, the toy expresses anger when he loses a contest, and his eyes turn into upside-down U's to show joy. Facial recognition allows it to remember faces and call people by their names. Sony's Aibo is a lifelike robotic dog that responds to touch—scratch his neck and his tail will start wagging. You can teach him tricks, like fetching a ball and giving a high-five. Aibo also recognizes his owners using computer vision technology.

DISRUPTIVE IMPACT

The upcoming generation of connected toys will use more data and will include even more personalization. Advancements in computer vision, voice and sound recognition, and spatial computing will result in richer, more interactive experiences. As connected toys evolve, they will rely less on mobile devices and will instead connect to the cloud. This means increased bandwidth needs—and, very likely, new privacy concerns. In the U.S., 92% of children now have an online presence by the time they are 2 years old, according to AVG. Tech companies and toy manufacturers are still learning how to balance childrens' privacy, which is required under the Children's Online Privacy Protection Act (COPPA), with play.

EMERGING PLAYERS

- Bandai Namco Holdings
- AWS
- Sony
- Wonder Workshop

2ND YEAR ON THE LIST

Kids Fitness Games and Toys



Nintendo's Ring Fit Adventure teaches kids how to do basic exercises.

KEY INSIGHT

Parents, increasingly concerned that their children aren't getting enough exercise, are looking to toys and games that nudge kids into more active lifestyles. They're also borrowing from the quantified-self movement to monitor kids' health and wellness.

EXAMPLES

Approximately one in three children in the U.S. are now considered to be overweight or obese, according to the U.S. Centers for Disease Control and Prevention. Researchers point to a lack of physical activity as a contributing factor. As a result, games and toys that encourage healthy behaviors are an attractive market for toy developers, fitness trackers and game designers. The Gululu interactive smart water bottle and health tracker for kids encourages them to drink more water. The bottle includes an LED screen with a preloaded game. The more water kids drink, the further their character will get in the game. Parents can monitor their children's hydration in real-time using a mobile app.

DISRUPTIVE IMPACT

Nintendo's Ring Fit Adventure is a connected fitness add-on for the Nintendo Switch console. The game takes the player on an athletic adventure through worlds, villages and gyms. Cute monsters, dispatched by arch-nemesis Drageaux, challenge players to battles: simple yoga poses, squats, crunches and planks. During the quest, players jog or run in place. Kids who play the game spend an average of 30 minutes in active movement. On the horizon: massively multiplayer online fitness games, in which kids can connect with each other and go on active adventures together.

EMERGING PLAYERS

- Bandai Namco Holdings
- Garmin
- Nintendo

1ST YEAR ON THE LIST

Protecting Little Gamers



Parents and privacy advocates are increasingly concerned about the data being collected as children play with connected toys and games.

KEY INSIGHT

Connected toys and games require data to work properly, and privacy experts are concerned about how children’s data are being collected, used and safeguarded.

EXAMPLES

In the U.S., the Children’s Online Privacy Protection Act (COPPA) makes it illegal to collect data from children under the age of 13 without first obtaining a parent’s consent, and in 2017 the Federal Trade Commission updated COPPA guidelines to specifically include toy manufacturers. For connected toys, the terms of service are shown during set up, but most people don’t read the fine print. As a result, they are agreeing to data sharing, whether they realize it or not.

DISRUPTIVE IMPACT

The privacy risks posed by connected toys mirror those adults face whenever using phones, smart cameras and speakers, and other connected devices. But our tolerance for data exposure shifts when children are involved. The smart toy industry is growing rapidly. Some estimate the market could be worth more than \$18 billion by 2023, but privacy regulation is lagging behind technological innovation.

EMERGING PLAYERS

- Federal Trade Commission
- Mozilla
- U.S. Public Interest Research Group



3RD YEAR ON THE LIST

Digital Addiction



Digital addiction affects children as young as 2 years old.

KEY INSIGHT

Digital products rely on habit-forming features for success, but a growing body of research highlights the negative impacts that those sticky features can have on mental health and well-being.

EXAMPLES

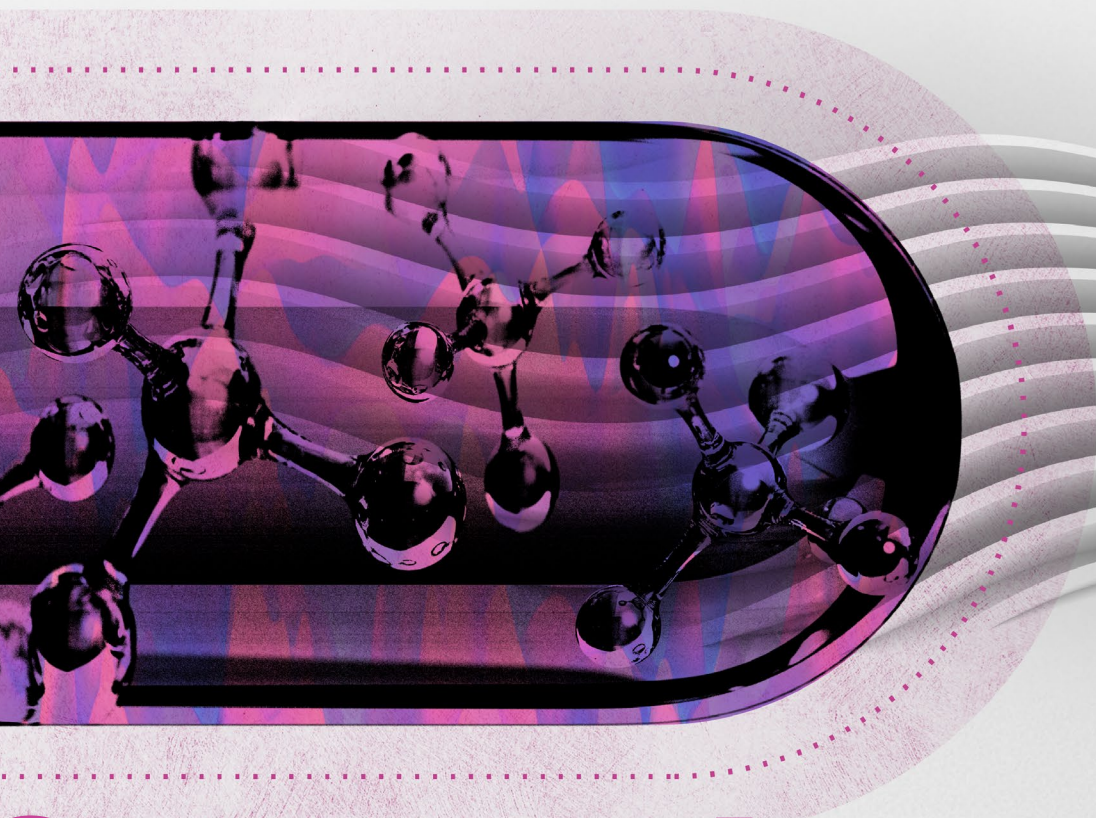
The World Health Organization added gaming disorder to the next edition of the International Classification of Diseases in May 2019, making it one of the few behavioral health addictions to gain formal recognition. In the tech realm, companies are responding with design changes to reinforce healthy device use. Instagram experimented with removing public like counts to discourage users from comparing themselves to others. Several startups are pursuing mini-smartphones designed with smaller screens and stripped down interfaces to encourage users to look at their devices less often. Google and Apple continue to develop features that help users monitor their digital well-being and screen time.

DISRUPTIVE IMPACT

As concern about digital addiction increases, consumers will become less tolerant of so-called “dark patterns” that use psychological cues to induce greater consumption. Every business model for media hinges on commanding the attention of an audience. As social attitudes toward technology shift, product designers should be mindful that they’re not perceived as eliciting detrimental behavior or harming the physical and mental health of their users.

EMERGING PLAYERS

- Center for Humane Technology
- Twitch
- TikTok
- Snap
- World Health Organization



Digital Drugs

Mid-future pessimistic scenario

There is more than one way to alter your state of mind when perception-altering technologies are the norm. We use biohacking to give ourselves an excessive rush of dopamine, we use diminished reality for sensory deprivation induced hallucinations, and we use dissolving bioelectronics as a stimulant. Party-goers test their limits. Researchers rush to find antidotes for those that trigger psychosis, loss of neural functions, and permanent brain damage. Digital addiction takes on a whole new meaning. A prolonged dose of reality is the only prescription.

Application



STRATEGY

Covid-19 forced many companies to recalibrate their strategies, or postpone their annual planning cycles. This had a dramatic acceleration on digital transformation efforts, which in some companies had only just begun. Even before the world reopens and employees are vaccinated, chief strategy officers must make critical decisions about whether to champion a distributed workforce or to recentralize operations. Strategy executives should find a balance between near and long-term upskilling, operations, and technology implementation.



INNOVATION

The intersection of work, culture and play unlock tremendous opportunities for innovation teams. From new product development, to experimentation in distributed office structures, to completely reimagining fashion, games, beauty and toys, creative risk takers are in a position to shape the future of their industries. Chief innovation officers should lean in to all this disruption and champion thinking across longer-term time horizons within their organizations.



R & D

In the realm of digital vices, R&D teams have plenty to investigate. The future of work will continue to take shape over the next few years. For example, what might a decentralized office look like in five years? What will the infrastructure and technology needs be? When it comes to neuroenhancers and CBD, investors are enthusiastic about the possibilities. Rather than waiting to see what regulations pass, R&D teams can begin preliminary research on questions and hypotheses that could deliver stronger business outcomes in the future.



RISK

Chief risk management officers found that their typical risk profiles shifted in the past year, and not all companies were prepared. Strategy will be more agile and dynamic going forward, especially as work, play and culture intertwine. With work from home policies in flux, widely available enhancers and vices, and an endless stream of digital distractions, an organization's ability to manage risk this year could be a vulnerability. Or a strategic differentiator.

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

Is our company tracking disruptions outside of our immediate industry?

Which trends require a deeper understanding?

2

With regard to digital vices, what is our position on transparency, ethics, and accountability?

Do our employees understand this position? Do our customers?

3

Will our organization benefit from continued remote work?

How can we reimagine our physical and digital workspaces?

Selected Sources

<https://www.corenetglobal.org/stay-informed/newsdetail.aspx?ItemNumber=43022>

https://www.ey.com/en_us/workforce/how-employers-and-employees-are-envisioning-the-reimagined-workplace

<https://www.techrepublic.com/article/how-remote-working-poses-security-risks-for-your-organization/>

<https://www.shrm.org/about-shrm/Pages/default.asp>

<https://hr.mit.edu/worklife/center>

<https://www.vogue.com/article/virtual-styling-app-drest-e-commerce>

<https://www.thedrum.com/news/2019/08/08/inside-gucci-s-gen-z-bet-avatars-the-latest-chapter-luxury-s-digital-epiphany>

<https://www.theverge.com/2019/9/23/20875541/louis-vuitton-league-of-legends-skins-summoners-cup-case>

<https://www.cnbc.com/2020/02/05/nike-to-dress-2020-olympic-athletes-in-uniforms-made-of-recycled-shoes.html>

<https://www.allure.com/gallery/hair-makeup-nail-brands-virtual-try-on>

<https://techcrunch.com/2019/07/03/alipay-beauty-filters/>

<https://www.voguebusiness.com/technology/digital-only-beauty-from-gaming-skins-to-zoom-makeup>

<https://newzoo.com/insights/articles/women-account-for-46-of-all-game-enthusiasts-watching-game-video-content-and-esports-has-changed-how-women-and-men-alike-engage-with-games/>

Authors



LEAD AUTHOR
Marc Palatucci
Senior Foresight Associate
Future Today Institute
mpalatucci@futuretodayinstitute.com

Marc Palatucci is a Senior Foresight Associate at the Future Today Institute, with research specializations in new realities (AR/ VR/ MR/ DR), digital fashion, future of work and learning, retail and e-commerce. He co-leads the MBA course in strategic foresight at the New York University Stern School of Business. Palatucci serves on the World Health Organization’s Learning Strategy Advisory Group and is a Senior Deputy to the World Economic Forum’s Platform for Shaping the Future of Media, Entertainment and Culture. He holds an MBA in Emerging Technology from New York University’s Stern School of Business and a

BA in Linguistics and Languages from NYU’s Gallatin School of Individualized Study. Palatucci serves as editor-at-large for an arts, fashion and culture magazine and collaborates with writers, designers and producers on films, TV shows and commercials about science, technology and the future.



FTI CONTRIBUTOR
Amy Webb
Founder and CEO
Future Today Institute
awebb@futuretodayinstitute.com

Amy Webb pioneered FTI’s data-driven foresight methodology that is used within hundreds of organizations globally. Her focus is to transform organizations as they prepare for complex futures. She advises CEOs of the world’s most-admired companies, three-star admirals and generals, and the senior leadership of central banks and intergovernmental organizations. She leads FTI’s technology research initiatives on AI, 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 Universi-

ty’s Säid School of Business, was elected a life member to the Council on Foreign Relations and is a member of the Bretton Woods Committee. She is a member of the World Economic Forum where she serves on the Global Future Council on Media, Entertainment and Culture and the Stewardship Board of the Forum’s Platform for Shaping the Future of Media, Entertainment and Culture. Webb is the bestselling author of several books about strategic foresight and emerging technologies. A lifelong science fiction fan, she collaborates closely with writers and producers on films, TV shows and commercials about science, technology and the future.



Authors



FTI CONTRIBUTORS

Sam Guzik
Foresight Affiliate
Future Today Institute

Sam Guzik is a Foresight Affiliate specializing in technology, media, 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 thinking about the business model 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.



Elena Giralt
Foresight Affiliate
Future Today Institute

Elena Giralt is a Foresight Affiliate at the Future Today Institute, where she leads research in blockchain, cryptocurrencies, decentralized media and technology. She holds an MBA from New York University's Stern School of Business and a BA/BS in Political Science, French and Middle Eastern Studies from Santa Clara University.



Leah Zaidi
Senior Foresight Associate
Future Today Institute
lzaidi@futuretodayinstitute.com

Leah Zaidi is an award-winning futurist with specializations in systems thinking, worldbuilding, science fiction prototyping and experiential futures. She is an Associate Editor of the World Futures Review. She holds an MDES in Strategic Foresight and Innovation from OCAD University and a BA from York University.

Authors



EDITORIAL
Jennifer Alsever
Editorial Director
Future Today Institute
jalsever@futuretodayinstitute.com

Jennifer Alsever is the Future Today Institute’s Editorial Director. 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
Future Today Institute
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



CREATIVE
Emily Caufield
Creative Director
Future Today Institute
ecaufield@futuretodayinstitute.com

Emily Caufield is an award-winning designer and illustrator. Serving as FTI’s creative for more than a decade, Caufield applies design thinking to visually communicate complex trends, scenarios and foresight research. Caufield designed all aspects of this year’s trend report. She is a graduate of Boston University’s College of Fine Arts.



Julia Durgee
Artist and Futurist

Julia Durgee is a rare left and right-brained MBA with creative, strategic, analytical, and digital experience at world-class brands. She illustrated the portraits that appear in this year’s trend report.



BUSINESS DEVELOPMENT
Mel Blake
Business Development
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.

Why FTI

We answer your most challenging questions using data, creative inquiry, and strategic foresight.

- What are plausible deep (20+ years), long-range (10+ years), and near-term (2+ years) futures?
- What scenarios describe our futures?
- What's happening outside my industry that I should know?
- What companies, startups, and partners make up our future value network?
- What new products, services, or businesses should we build?
- Which tech trends should we monitor? When should we act?
- How can we build an early warning system to see the next disruptive event?
- How do we reduce uncertainty about our futures?

We support 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. Advisory services include signal mapping, trend identification, scenario development, risk modeling, visioning, and strategic planning.

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

The Future Today Institute
33 Irving Place
10th Floor
New York, NY 10003

hello@futuretodayinstitute.com

267-342-4300

www.futuretodayinstitute.com

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 2021 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 14th annual Future Today Institute Tech Trends Report. We are making it freely available to the public. This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

You are free to:

Share

Copy and redistribute the material in any medium or format, including in your organizations and classrooms.

Adapt

Remix, transform, and build upon the material for your own research, work, and teaching.

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.

ShareAlike

If you remix, transform, or build upon the material, you must distribute your contributions under the same license as you see here.

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.

Additional Restrictions

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



This is volume 4 in the Future Today Institute's 2021 Tech Trends Report. Each volume covers a different set of topics.

To find additional volumes, visit
www.futuretodayinstitute.com/trends



