



12 Tech Trends To Watch Closely In 2021

2021

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Intro

"Unprecedented"; "extraordinary"; "once-in-a-lifetime." There's no overstating the case for how 2020 has scrambled our lives and inflated the role of technology. It has moved front and center in almost every adaptation we've made to a year of living through a pandemic.

From resilience in the C-suite to bringing the hospital to the home, technology in 2021 will draft off the accelerated trends brought about by social distancing measures and stay-at-home orders. We'll see wellness imbued in building design as well as more immersive – and branded – retail experiences in a new virtual "metaverse" dimension.

There are also technology trends on the immediate horizon that have bubbled up largely outside of the extraordinary 2020 experience. AI is now table stakes for companies, and the new race will be to imbue these algorithms with emotional data that differentiates and improves the customer experience. Crypto is officially mainstream (perhaps helped along by a year of economic uncertainty and bored, home-bound crypto enthusiasts), so much so that we see payments companies embracing bitcoin as the new rewards points currency.

Exclusivity and futuristic tech havens built from the ground up are also taking off, while psychedelic medicine could this year be where medical cannabis was less than a decade ago.

In 2021, much will depend on the pace of vaccination and how quickly or slowly we find our way out of the pandemic. As we do, technology's centrality across our behaviors is more assured than ever before. And while some individuals may embrace a post-pandemic luddite retreat, for organizations, 2021 will likely be a year of technological refinement and retooling, as lessons learned on the fly inform a more thoughtful, less frantic embrace of the technology trends reshaping industries.



1. Chief prepper officer

Resilience will become a more prominent corporate function as anxious companies steel themselves against unprecedented external disruptions.

Persistent threats like climate change, cyber warfare, and much more could turn the world upside down – again. Companies shaken by the pandemic will start prioritizing resilience and turn to emerging tech as they look to onshore operations, build robust supply chains, and ready themselves for the next big crisis.

Industry leaders like Bill Gates warned for years that a severe pandemic was coming, but nobody knew when it would happen and, as such, many businesses were caught off guard and had to scramble to flesh out remote work strategies, diversify suppliers, and build e-commerce alternatives to brick-and-mortar stores.

But pandemics are far from the only large-scale threat the world will have to contend with.

The prospects include:

- Extreme weather increasing in severity and frequency due to climate change.
- Cyberattacks crippling electricity grids or other infrastructure.
- Major volcanic eruptions blocking out the sky and grounding flights.

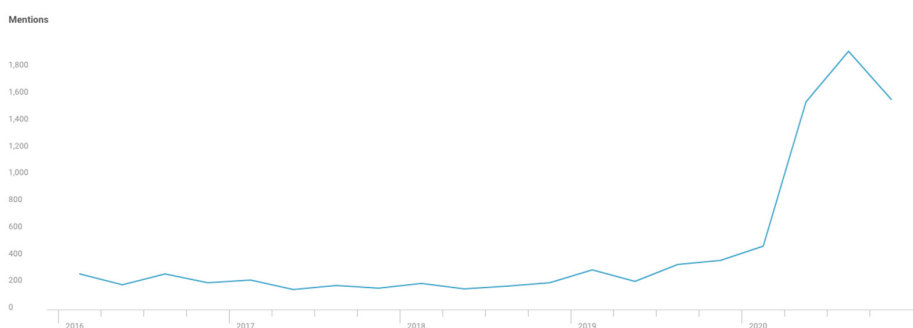
Depending on the scale, any one of these events, and many more, could jolt the global economy overnight.



Given this deluge of risks, and shaken by the colossal ongoing ramifications of Covid-19, more corporations are becoming preppers. The term “resilience” was mentioned a record number of times on earnings calls last year as execs discussed responses to the pandemic, and trends like “digital transformation” and “onshoring” – often seen as ways to help counter volatility – have taken on new urgency.

Resilience became a corporate buzz word in 2020

Mentions of “resilience” in earnings calls, 2016 – 2020



Source: cbinsights.com

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One approach companies are taking is rethinking supply chains, either through bringing operations closer to home or broadening geographic distribution to limit reliance on a single country. Apple has made moves to make more of its devices in Vietnam, while Foxconn, one of its biggest suppliers, announced last year it would invest \$1B to expand in India to help it diversify away from its China-based factories affected by trade sanctions and coronavirus lockdowns.

Many businesses are also turning to tech like AI to gain a better understanding of their operations, predict demand fluctuations, and respond more quickly to changing circumstances.



Startups in the space are gaining traction. Supply chain visibility company [project44](#), for instance, raised a \$100M mega-round at the end of 2020. Meanwhile, [RELEX Solutions](#), a [CB Insights Retail Tech 100 winner](#), has raised \$224M in total disclosed funding for its AI-driven platform for demand forecasting and inventory management.

Optimize retail for every future

Stay competitive by making your retail operations data-driven, autonomous, and adaptive with RELEX's Living Retail Platform.

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Source: [RELEX Solutions](#)

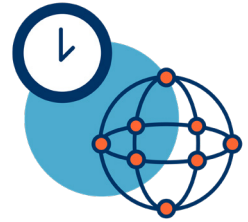
Some food companies are thinking about supply chain resilience from a different angle by turning to [alternative proteins](#) after [being bruised when Covid-19 upended livestock value chains](#). Compared to rearing animals, alternative protein supply chains can be shorter and established closer to densely populated cities where a lot of food is consumed.

Energy production is another area where some corporates are looking to protect factories and value chains from uncertainty. Manufacturing sites that run off locally installed renewables, like Tesla's solar-powered "gigafactories," needn't worry quite as much about a cyber attack or hurricane bringing down an electrical grid — though a persistent ash cloud from a volcano could cause a few problems.



Source: Tesla

Diversity of options, with a splash of redundancy, will be essential to riding out the worst storms. Aspiring chief prepper officers might want to keep that old landline installed.



2. The quantum time bomb

As powerful quantum computers emerge, businesses will be forced to secure data faster than these computers can decrypt it.

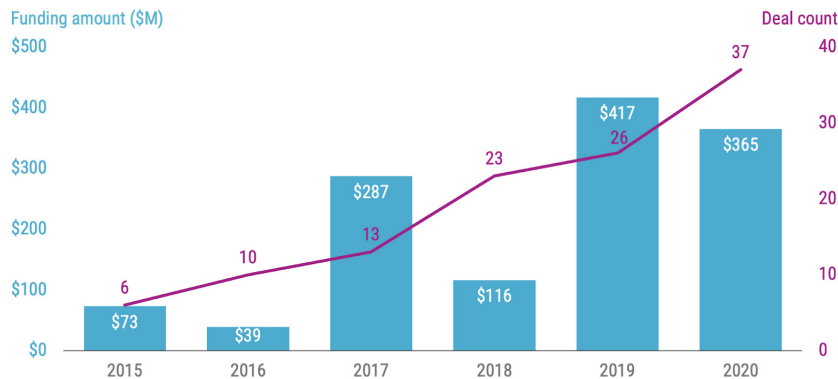
Quantum computers are becoming exponentially more powerful and more widely available.

In 2019, Google became the first quantum computer maker to achieve “quantum supremacy,” which refers to running a calculation on a quantum computer dramatically faster than any conventional computer could ever manage. The tech giant said it solved a problem in just a few minutes that would take a classical supercomputer 10,000 years to complete. Just over a year later, a team in China claimed to also have achieved quantum supremacy, this time completing a computation in 200 seconds that would otherwise take about 2.5B years – 100T times faster.

More broadly, equity deals to quantum computing startups set a new record of 37 rounds last year, an annual increase of 42%, as the number of players in the space grows.

Quantum computing deals are on the rise

Disclosed deals & equity funding (\$M), 2015 – 2020



Source: cbinsights.com

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Though [quantum computers could soon transform industries](#) like healthcare, finance, and logistics, the industry's rising momentum is creating an arms race to secure data faster than quantum computers can decrypt it.

This is because a powerful enough quantum computer could quickly overcome common internet encryption protocols like RSA, which use prime factors of large numbers to protect online data.

This could cause problems on a scale far beyond even today's slew of high-profile data breaches. A hacker with a decent quantum computer could access sensitive materials like emails, e-commerce payments, medical records, and more as they are shuttled around the web. Even some blockchain networks – which are seen as relatively secure and are quickly being adopted by enterprises – could eventually face serious challenges to the integrity of their records.

In response, new encryption methods to counter quantum computers are starting to emerge – including some being developed by major tech players like IBM and Microsoft. Referred to collectively as “post-quantum cryptography,” these techniques tend to be built around problems that quantum computers aren't expected to have many advantages in solving.

The US-based National Institute of Standards and Technology (NIST) is planning to recommend post-quantum cryptography standards next year to help organizations adapt, a much-anticipated move that will fuel implementation and help support interoperability. In the meantime, the UK government's National Cyber Security Centre recently recommended that enterprises start planning for post-quantum cryptography by identifying systems to prioritize for a transition, though warned against anxious companies rushing to adopt non-standardized approaches – a potentially tempting option for industries like finance which have a lot of money riding on the security of their online transactions.



Some are also spying an opportunity. Startups like [ISARA](#), which has raised \$27M in total disclosed funding, and University of Oxford spinout [PQShield](#), which raised \$7M in seed funding in July 2020, are among the growing number of companies competing to help businesses move to post-quantum cryptography.



[Quantum-safe cryptography: the next generation of cybersecurity](#)

Source: ISARA

Many industry observers think that today's encryption will be good enough for a decade or more, but others fear an unforeseen breakthrough could significantly cut into that timeline. In any event, the complexity of updating IT infrastructure is a further incentive to move quickly and update to a new encryption protocol that will soon be necessary.

The stakes of a quantum computer undermining many of today's commonly used encryption standards are high — countless everyday e-commerce transactions and even sensitive government communications could be vulnerable — and the damage could be much more widespread than today's headline-grabbing data breaches. Imagine millions of shops, hospitals, and banks around the world that could no longer ensure the privacy of their online systems.



3. Simulating empathy

Businesses will prioritize building AI technologies that can interpret and respond to human emotions as they look to connect with consumers.

Over the last decade, artificial intelligence has gone from buzzword to a must-have business competence. From retail to healthcare to financial services, AI is penetrating nearly every industry, with advances in deep learning, computer vision, and more paving the way.

AI, though, has largely been challenged when it comes to recognizing and reacting to human emotion. In fact, the AI Now Institute at New York University called for a ban on the use of emotion recognition tech “in important decisions that impact people’s lives and access to opportunities” in its 2019 report.

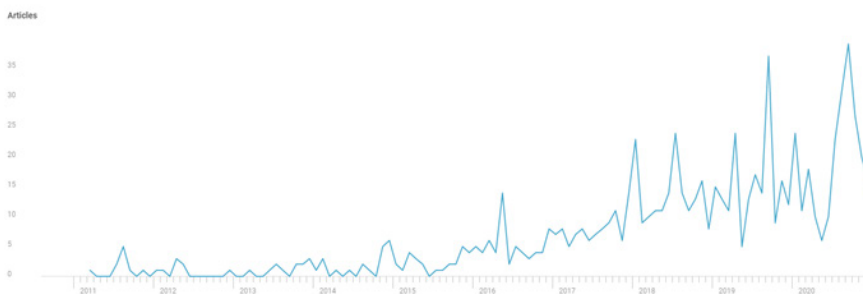
But the attempt to use AI to recognize and respond to emotion, or emotion AI, isn’t a new concept — and in 2021, as political and social pressures continue to push tech companies to account for a wider range of human experiences, emotion AI will become an increasing priority.

The idea is largely associated with American scholar and inventor Rosalind Picard and her early research on the topic — also known as affective computing, or “computing that relates to, arises from, or deliberately influences emotions.” Today, the [\\$87B global market](#) for affective computing has far-reaching potential, and interest in the space has been gradually building.



Affective computing gains media attention

Articles mentioning "affective computing" or "emotion AI," 2011 – 2020



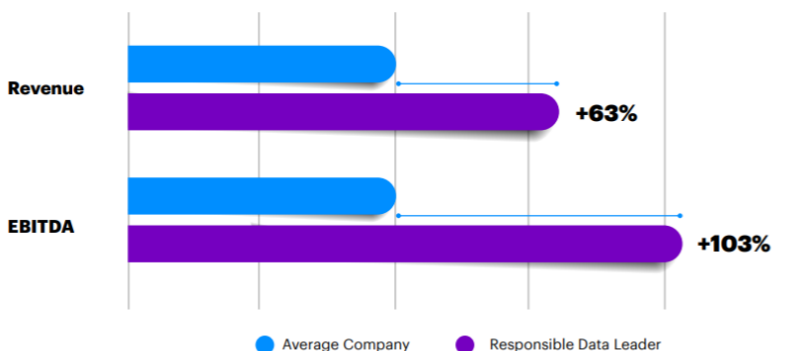
Source: cbinsights.com

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Machines employing emotional artificial intelligence attempt to interpret human emotion from text, voice patterns, facial expressions, and other non-verbal cues – and in many cases, simulate those emotions in response. In tapping into unspoken behaviors and reactions, businesses can leverage this “emotional data” to increase their gains and better cater to customers.

Figure 1. Emotional data and responsibility: By the numbers⁴

Gains in total revenue and EBITDA from responsible use of emotional data



Source: Accenture

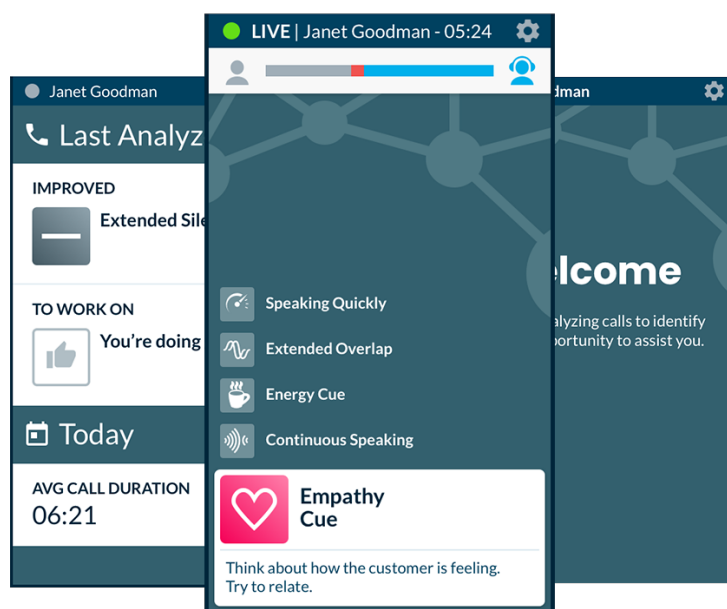


Emotion AI company [Affectiva](#), for example, has found that advertisers are becoming increasingly effective at drawing out emotional responses from consumers:

“From our work with 70% of the world’s largest advertisers and 28% of the Fortune Global 500 companies, we’ve found that emotionally resonant ads improve sales results.”

— GRAHAM PAGE, GLOBAL MANAGING DIRECTOR OF MEDIA ANALYTICS AT AFFECTIVA

The tech could also change how companies interact with customers. Companies like [Behavioral Signals](#) and [Cogito](#) use emotion AI to analyze elements of speech, like tone and vocal emphasis, to best match service agents and customers across industries.



Source: Cogito



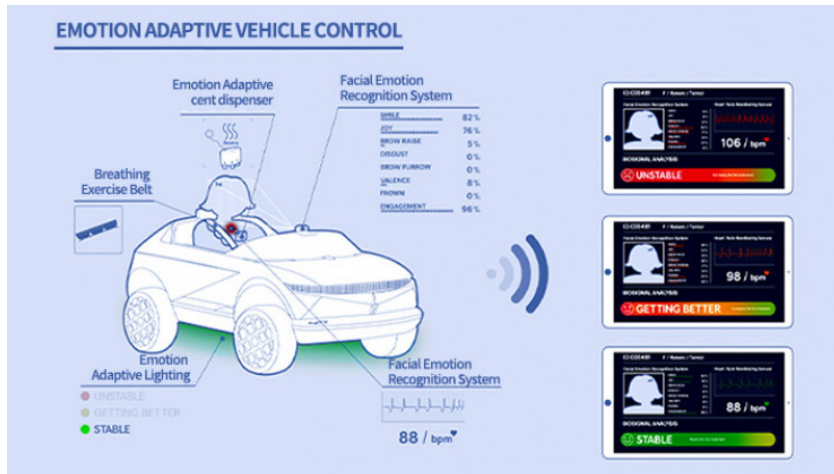
Widespread adoption of the tech could also feed into industries like medicine.

For example, researchers are using deep learning techniques to capture facial expressions of pain to help detect discomfort, an especially useful approach for when patients cannot verbally communicate. Others are leveraging AI emotion detection software to determine levels of joy or negative emotion of facial palsy patients, pre- and post-surgery.

In another example, Amazon's health and wellness tracker Halo integrates voice analysis and machine learning to analyze how positive or energetic users sound based on emotions like happiness, sadness, or excitement in their voice.

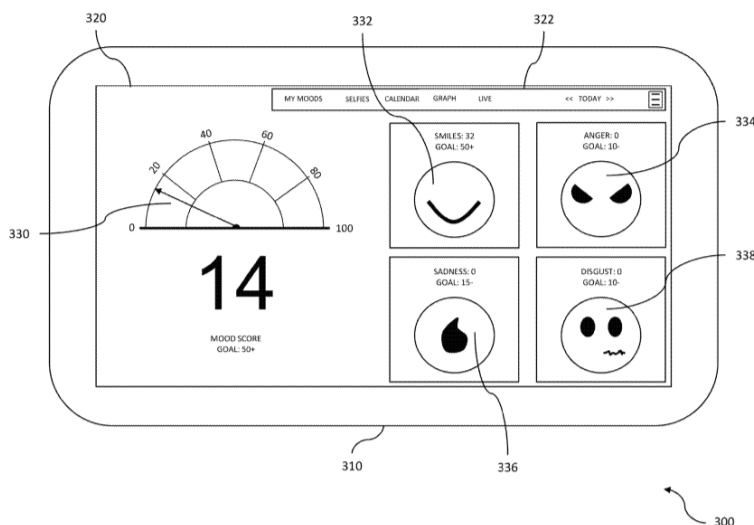
While still in the early stages of development, emotion AI tech for the automotive industry also has tremendous upside potential. Computer vision is already being [leveraged for driver monitoring](#), where systems are being built to help identify driver fatigue, for example. Now, some automakers' increased priority on assessing emotion, from stress to anger, could add another layer of insight to improve road safety and occupant comfort.

Hyundai, for example, is developing Emotion Adaptive Vehicle Control (EAVC) technology in partnership with MIT that can optimize the environment of a vehicle based on passengers' emotional states. The automaker recently unveiled a concept car designed to transport children in hospitals that uses AI-based tech to monitor facial expressions, heart rate, and respiratory rate, along with other factors such as car acceleration, to adjust vehicle systems like lighting, climate, and music.



Source: Hyundai

Affectiva has also been working on an in-cabin sensing solution, called Automotive AI, since 2018. The company has partnered with car manufacturers like BMW and Porsche, and it has numerous patent grants related to the assessment of emotion. Its most recently granted patent, titled "Image analysis for emotional metric evaluation," looks to analyze "emotional context" from facial images – and could see applications across the in-vehicle experience.



Source: USPTO



Emotion AI has the potential to change the way we operate across industries. Though as with any AI, privacy and transparency concerns, as well as the risk of bias and ethical considerations, play a huge factor in its development.

For example, Amazon's AI-powered recruiting tool reportedly penalized resumes that included the word "women's." Google's algorithm for detecting hate speech on social media was found to disproportionately flag Black users' tweets before it was corrected. The room for error when it comes to something as subjective as one's emotional state is large.

But emotion AI – if used with caution – could benefit both businesses and consumers alike.

Recently, IBM (in partnership with Airbus and the German Aerospace Center) relaunched an "AI-powered astronaut assistant" named CIMON. Beyond scientific assistance, CIMON is expected to act as an "empathetic companion" while in space – which could lead to outsized mental health benefits for astronauts who are on already stressful, and potentially lonely, missions.



Source: IBM



Moving forward, companies developing emotion AI tech will need to navigate the complexities of handling emotional data (especially when accounting for multiple reactions at once, like in a car full of passengers, for example) – which is far more sensitive and intangible than other forms of personal data – to account for cultural differences in emotional expression and the potential for bias in their algorithms.



4. Trip treatment

Technology will help usher psychedelic medicines into the mainstream.

The so-called “psychedelic renaissance” is gaining momentum across the US, as regulators, investors, and the public increasingly embrace psychedelic medicines as a promising treatment tool for patients who haven't had success with traditional drugs.

In November 2020, Washington DC decriminalized psychedelics, while Oregon became the first US state to legalize psilocybin, the active compound in “magic mushrooms,” for use in supervised therapies.

Clinical trials studying the health effects of psychedelics and hallucinogens are also picking up, with 32 trials beginning in 2020 alone – a new annual record. In recent years, the FDA has given a nod to the space by granting “breakthrough therapy” status to MDMA and psilocybin for the treatment of PTSD and treatment-resistant depression, respectively.

In 2021, tech companies and pharma incumbents will take advantage of the shift in opinion and home in on bringing these medicines to market.

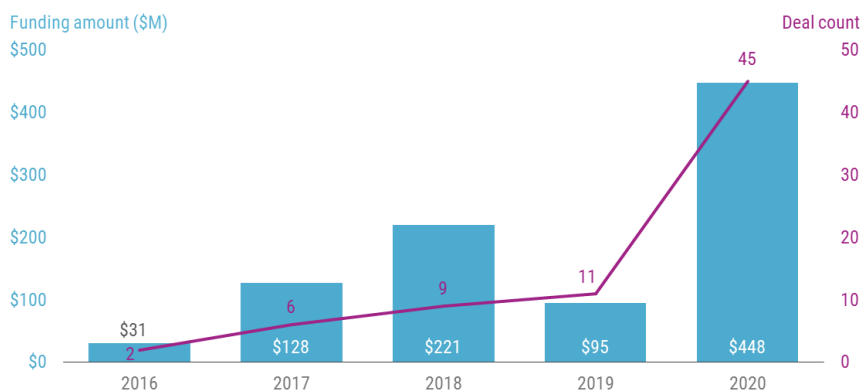
These players face an uphill battle. Psychedelics carry decades-old stigma and are generally classified as schedule 1 or 2 substances. Even in Oregon, the legalization of psychedelic mushrooms doesn't translate to immediate opportunity – the law merely stipulates a 2-year period for a regulatory framework to be defined.

Nevertheless, investors are flooding into the space. 2020 saw landmark VC funding going to private tech companies in psychedelic medicines, with deals increasing 4x year-over-year (YoY) and [equity funding up nearly 400%](#) to reach \$448M.



Psychedelic medicine financing soared in 2020

Disclosed deals & equity funding (\$M), 2016 – 2020



Source: cbinsights.com

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As these medicines go to market, technology will be critical in facilitating end-to-end care outside of supervised therapies.

Reacting to Covid-19, federal agencies announced relaxed guidelines to help patients access mental healthcare remotely. For example, the FDA temporarily waived requirements for [digital therapeutics](#) – software solutions that can help augment or replace traditional therapies – being used to treat psychiatric disorders, effectively allowing developers to market eligible devices without receiving clearance first.

In response, companies like [ATAI Life Sciences](#) and [Mind Cure Health](#) have introduced [new digital therapeutics](#) devoted to psychedelic medicine research and delivery. These aim to make treatment accessible to a wider range of patients by centralizing remote monitoring and counseling in user-friendly platforms. Health providers and tech developers can also use these portals to access critical patient data outside of supervised therapies in order to adjust treatment in real time.

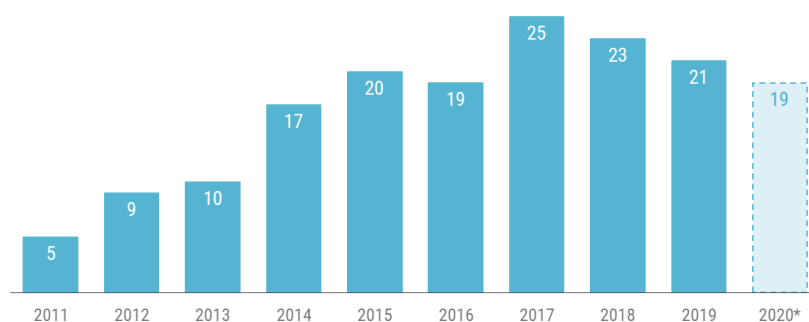


Researchers are also tapping tech companies to accelerate research in the field. Life sciences company [Cybin](#), for one, recently partnered with neuroimaging tech provider [Kernel](#) to measure brain activity during psychedelic experiences. Meanwhile, [Revive Therapeutics](#) and [PharmaTher](#) are collaborating to use AI to discover novel uses for psychedelic compounds.

As psychedelic medicines break into the mainstream, expect big pharma to get involved, especially in instances where psychedelic medicines stand to replace already commercialized drugs like anti-depressants. Johnson & Johnson, for one, has made moves here by commercializing a ketamine-derived nasal spray for treatment-resistant depression. There has been a [steady stream of patents](#) in recent years staking out intellectual property (IP) in this space.

Psychedelic medicine patents are trending up

Number of psychedelics-related patents filed annually, 2011 – 2020



Source: [cbinsights.com](#) *2020 data may be incomplete due to publishing delay.

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Expect more M&A here as a way to bring technology solutions in house. In January 2021, for instance, biotech company [Entheon Biomedical](#) acquired [HaluGen](#), which offers a genetic pre-screening test to predict how patients will respond to psychedelic treatments.

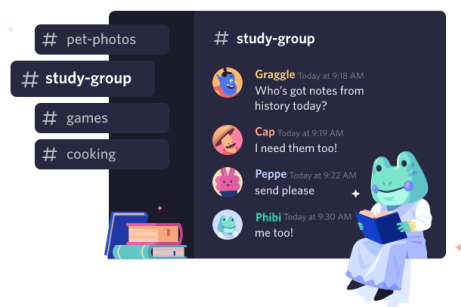


5. The rise of exclusivity

Exclusivity networks will become the future of social media.

Exclusivity drove Facebook's early viral growth, with access open only to students at certain elite colleges. Later, early experiments in creating VIP tech-enabled communities, such as Ello, flared and failed.

Now, exclusivity seems to be making a comeback and is poised to be central to the next wave of social networks. Already we have seen [Discord](#) chats and other private venues flourish, and partially private apps like [Clubhouse](#) are gaining popularity. But this is just the beginning.



Source: *Discord*

An invite-only place with plenty of room to talk

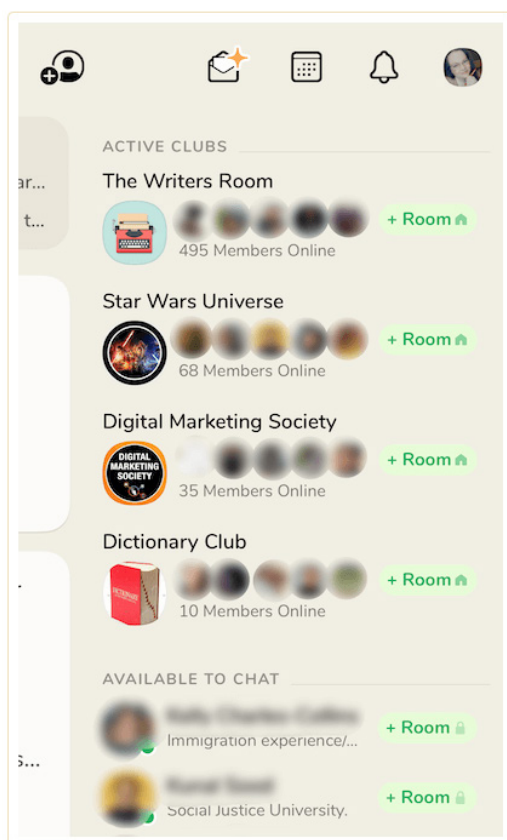
Discord servers are organized into topic-based channels where you can collaborate, share, and just talk about your day without clogging up a group chat.

In 2021, watch for social networks building value through the quality and strength of their connections — as well as through the appeal of exclusivity — rather than the network effects of scale. Entrepreneurs could use everything from crypto tokens to subscription tech to build community-based businesses that deploy algorithms and marketing tech to vet entrants. The idea is less to get people to join and more to keep people out.



Clubhouse, for example, is invite-only. The app lets users chat in audio-based “rooms” that typically have a theme. Members can join book club discussions, debate politics, host rap battles, and much more – but Clubhouse’s buzz has come from the members themselves.

Philanthropist Felicia Horowitz hosts Saturday night “dinner parties” on the app. The parties often bring in over 100 people, including big names like CNN host Van Jones, Dallas Cowboys linebacker Jaylon Smith, and even Oprah Winfrey. Talks hosted on the platform are not recorded, which adds to the appeal. Meltem Demirors, an executive at CoinShares and a Clubhouse member, says, “It’s all ephemeral. It creates this cool urgency.”



Source: Social Media Examiner



The platform had around 600,000 registered users as of December 2020, which feels like an intimate dinner party compared to Facebook's 2.74B monthly active users. Though Clubhouse is still in beta, its celebrity-filled tech roster has been enough to build up hype – and draw in a \$100M investment from Andreessen Horowitz at a \$1B valuation in January 2021.

But Clubhouse is far from the first social media network to make a name for itself by limiting membership. The invitation-only [ASMALLWORLD](#), a network for elite travelers, launched in 2004 and has been called a “MySpace for millionaires.” Today, the site's 60,000+ jet-setting members can connect with each other and find luxury hotels, restaurants, and events wherever they are in the world, depending on their membership tier – which can cost anywhere from \$105 to \$27,000 a year.

In 2021 and beyond, privacy will become a bigger focus for exclusive social networks. Clubhouse has run into issues with conversations being recorded by users and leaked onto other platforms. Tech analyst and Clubhouse user Jeremiah Owyang told the Wall Street Journal, “100%, they [users] should expect it could become public, just as you would any other social channel.” As more invite-only networks pop up, privacy and keeping content just between members could become a key differentiator.

Privacy and exclusivity, of course, come with a cost:

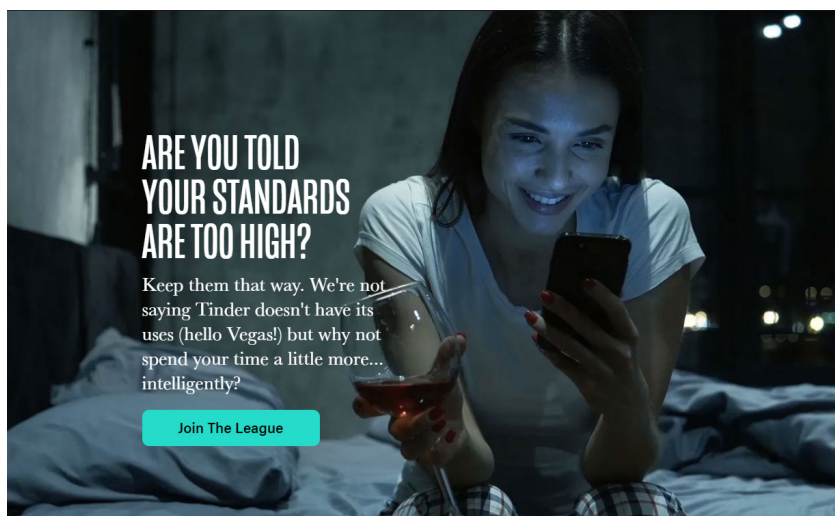
- Users who want to post photos on photo-sharing app Rich Kids have to pay around \$1,070 per month.
- The Marquee, a professional networking app for the wealthy, costs about \$1,363 per year.

As privacy becomes more important, these membership fees could increase to ensure that what's said in the club stays in the club.



The appeal of exclusivity extends to the dating world, too.

[The League](#), for example, is an invite-only dating app that targets successful professionals with degrees from prestigious universities.



Source: *The League*

[Raya](#) operates in a similar way, though its demographic is “people in creative industries,” or celebrities. The app has been referred to as “Illuminati Tinder.” Hopeful users must fill out an application, which is “assessed based on algorithmic values and input from hundreds of committee members throughout the world.” As exclusivity becomes more popular, watch for the admission processes into these elite networks becoming more rigorous — or at least more expensive.

Raya launched in 2015 and has kept a low profile since. As more elite social networks pop up, limiting media attention will be key in solidifying their exclusive reputations. Staying out of the mainstream and prioritizing privacy will help these apps attract and build a reputation.



Another more difficult challenge for these platforms is the presence of hate speech and extremist groups. Clubhouse, for example, has received criticism for alleged hate groups organizing on the app. But there are also issues of prejudice and abuse under the guise of “devil’s advocate” discussions. This kind of content is more difficult to flag, and because of its potential to be promoted by powerful users on the app, it is more dangerous. Exclusive networks will need to figure out ways to effectively moderate this kind of content while still maintaining the aura of private, members-only conversations.



6. Society-as-a-service

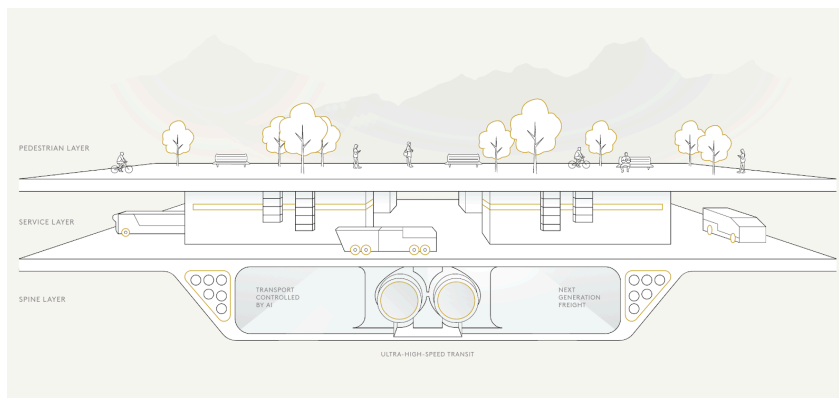
Silicon Valley types will move beyond dreams like smart cities to the literal creation of communities built from the ground up.

Silicon Valley is at once celebrated and ridiculed for its future-forward culture and tech-centric ethos. But that tech-enabled existence has often been tacked onto preexisting and old-fashioned urban environments. Now, as the Silicon Valley true believers migrate from their namesake home in California to burgeoning US tech hubs like Austin and Denver, some are looking at building a true tech paradise from scratch.

Marc Lore, who founded Jet.com and then headed up Walmart's e-commerce efforts, recently announced that he was leaving the retail giant in part to build a city with "a new model for society," envisioned as having "the vibrancy, diversity, and culture of New York City combined with the efficiency, safety, and innovation of Tokyo and the sustainability, governance, and social services of Sweden."

These grandiose visions of tech urbanism are catching on.

Saudi Arabia, a major contributor to SoftBank's startup investment pot, is building a \$500B tech-driven region named Neom where residents can purportedly expect flying taxis, holographic teachers, and glow-in-the-dark beaches. The region will also house a more than 100-mile-long city called "The Line." Announced earlier this year, the development is envisioned as being run by AI, producing no carbon emissions, and including function-specific layers to avoid conventional street layouts.



Source: Neom

Saudi Arabia is not alone.

Scores of countries around the world are eager to host their own tech-forward cities. Corporations like Toyota and Facebook are building urban landscapes to house workers and test new products. Wealthy individuals are also getting involved. Bill Gates bought around 25,000 acres of land in Arizona a few years ago to break ground on his own vision for a futuristic city.

Others in the tech world have grander designs still. Elon Musk, for one, wants to build a new society on another planet. The Tesla and SpaceX CEO has long spoken of his belief that humans should colonize Mars, but recent moves have brought that vision closer than ever. In December 2020, SpaceX tested its Starship vehicle – which Musk wants to send to Mars by 2022 – at high altitude, an important step toward eventual space flight. His vision for life on Mars includes a self-governing city encased in a glass dome with “an outdoorsy, fun atmosphere.”



Source: SpaceX

Some VCs see a market opportunity amid this swell of city-building activity. Pronomos Capital, for instance, launched in 2019 and has received backing from investors including Peter Thiel and Marc Andreessen to fund Silicon Valley-like communities. One of its aims is to use the regulatory flexibility offered by local governance to mimic the rapid growth of cities like Shenzhen in China, which grew from a fishing town into a major tech hub in just a few decades after being designated as a special economic zone.

As momentum grows, these from-the-ground-up projects will continue to attract controversy. Expensive to establish and often lacking practical plans to fulfill lofty visions, the building of entirely new towns is seen by some as a road to folly — Alphabet, for example, scrapped its billion-dollar smart city in Canada last year after mounting challenges sapped the viability of the project. There's also a risk that existing residents will be put off by the idea of a tech metropolis springing up next door and increasing living costs. But recent tech advances in areas like AI and backing from deep-pocketed investors will undoubtedly help some of these next-gen Silicon Valleys break ground.



A bigger challenge may be confronting perceptions of what building a new community represents. For some of these projects – a chunk of which carry a utopian air – the shared values of the residents wanting a “better” society seem as important to the founders as the underlying tech. Such ideals will likely help attract enthused early inhabitants, but placing too strong a focus on what people think and how they act could make cities difficult to scale, and may even threaten the very freedoms that gave rise to places like Silicon Valley in the first place.

Whatever the eventual fate of today’s ambitious visions, the allure of starting from scratch is unlikely to fade for entrepreneurs dreaming of changing the world.



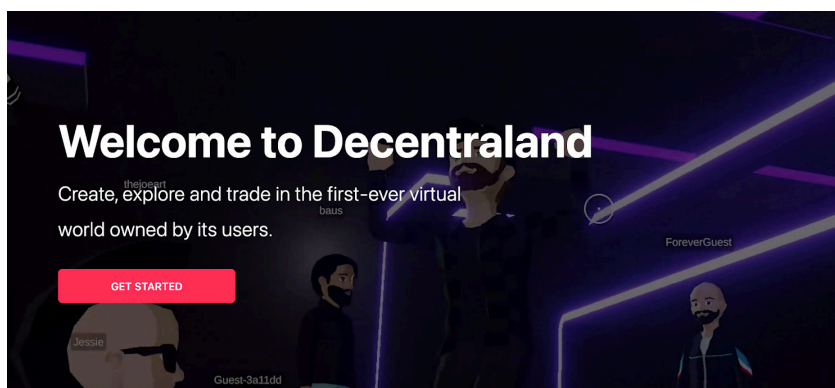
7. The metaverse mall

Shared virtual spaces will redefine how we shop and interact with people and businesses.

As malls flounder, metaverses – or the underpinnings of such – are flourishing.

Malls are meant to be social and a form of entertainment; now, virtual worlds are fulfilling these functions more than ever, spurred by the Covid-19 pandemic. Rather than shopping through a specific retailer's website, imagine rendezvousing with a friend in a Minecraft-like world to hang out and shop at digital storefronts.

Though definitions vary, the metaverse generally refers to the idea of a shared, persistent virtual space, akin to a digital mirror of the real world – but without any of the constraints. Topics of debate around what a metaverse would eventually look like include the degree of interoperability, multiple metaverses vs. a singular one, consistent identity systems, and decentralization vs. monopolization (e.g. will it be owned by big tech or by users, à la Ethereum-based [Decentraland](#)?).



Source: *Decentraland*



Gaming has long been at the forefront of building out what a metaverse could look like.

Massively multiplayer online game (MMO) Fortnite is one of the more successful examples: it has hosted multiple live concerts, screened movies, shorts, and various other programs, launched branded game modes, and more.

But it still falls short of the metaverse ideal of true concurrency due to tech limitations. At Travis Scott's Fortnite performance, for example, the 12.3M concert attendees weren't actually in the same universe, watching the same show in real time. Instead, viewers were split up into 250,000 virtual "copies," each capped at 50 participants, of the concert.



Source: Rolling Stone

Progress is being made, however, and expect more movement on this front to come. In one example, software development unicorn [Improbable](#) is developing SpatialOS, a cloud platform that allows games to support up to 20,000 players in a seamless world.



So, what comes next? E-sports applications and goods are pushing into the mainstream, marking a natural step toward the metaverse.

For example, virtual goods, initially popularized by gamers ([mostly via character skins](#)), have since entered the worlds of fashion, real estate, art, and even pets to become a [\\$190B market](#). Personalized digital avatars have also gained a foothold beyond games like The Sims in the last 5 years, popularized by Snapchat-owned Bitmoji, Apple's Memojis, influencer and celebrity-focused [Genies](#), and most recently, [Roblox's](#) acquisition of avatar company [Loom.ai](#).

On a broader scale, these trends illustrate the rapid convergence of the online and the offline. Among other things, metaverses will enable the serendipity that is often missing in e-commerce interactions. For example, [Aglet](#) — a “Pokémon Go for sneakerheads” that allows players to collect virtual sneakers by walking — plans to eventually allow people and brands to launch their own virtual retail stores in the app.

“I think where we’re going as a world [is] where Nike and Adidas will release products in the real world, and then they’ll throw these into a game. And I think the inverse of that is true in the future. There will be people designing their own brands in these game worlds, and then they’ll be made in reality.”

— AGLET CEO RYAN MULLINS



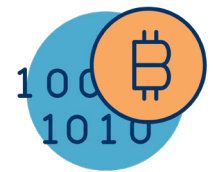
Once the tech is there, the commerce implications are massive, as the metaverse offers unprecedented access and total immersion to consumers – creating a sort of virtual “third space.”

Brands and sellers can thus:

- Operate in a less fragmented marketplace than the internet as we know it.
- Avoid the “marketplace cut” from third-party discovery or selling platforms entirely.
- Enable deeper cross-franchise or fan collaboration where, instead of individual brand marketing opportunities (e.g. each brand has its own app or website), the metaverse’s open world allows for more immersive experiences pioneered by both brands and fans.

Ultimately, spearheading this effort will require massive amounts of cash, engineering talent, and hunger for domination – making big tech firms the most likely contenders to build out the metaverse beyond gaming platforms like Fortnite and Roblox. Tech giants like Microsoft, Facebook, and Amazon are likely to double down on this in the coming years, according to VC Matthew Ball, given each’s persistence in owning a significant portion of the online work economy, social graph, and e-commerce infrastructure.

Though the complete metaverse appears to be years away, in 2021, look for further convergence of the online and offline amid technological advancements that will enable the build-out of the metaverse. In the meantime, retailers should look beyond the near-term and strive to experiment with VR/AR (including the use of virtual humans), games like Fortnite, or various other existing tech capabilities. Offering virtual goods may be trendy for 2021, but in the next 5 years, the trend will likely evolve toward designing fuller, more fleshed-out virtual universes that offer an immersive shopping experience.



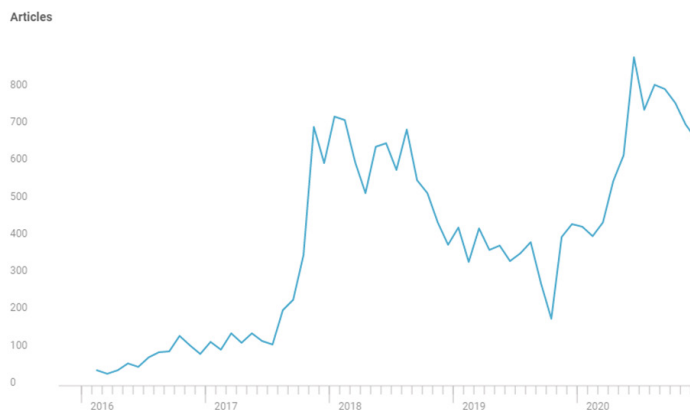
8. Clipping crypto

Crypto rewards will reshape how brands, loyalty programs, and payments companies offer cash back.

Cryptocurrencies are back in the spotlight as some, like bitcoin and ether, hit new all-time highs. Retailers & payments companies are looking to cash in by rolling out rewards and loyalty programs using blockchain technology and cryptocurrencies as an alternative to traditional points or cash-based systems.

News coverage of crypto rewards rebounded in 2020

Articles mentioning "crypto" or "blockchain" rewards & loyalty programs, 2016 – 2020



Source: cbinsights.com

 CBINSIGHTS

Brands, retailers, and payments companies are getting into crypto-based rewards products because there's a growing user base that wants to earn and hold bitcoin and other digital assets.



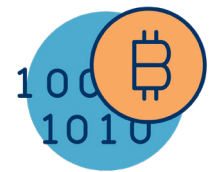
Motivations include:

- As bitcoin's value fluctuates, there is opportunity to make money on these rewards as they accrue. In the case of cashback rewards, consumers would not see the same opportunity unless the cash is invested into an assets or savings account.
- Crypto rewards can be converted into fiat currencies like the US dollar, which can then be used to make purchases at other merchants. This allows the reward value to extend beyond the initial loyalty provider.
- Blockchain-based loyalty networks could also help retailers tap into the ever-growing pool of crypto users and investors.

Switzerland-based startup [Qiibee](#), for example, offers retailers a loyalty program using blockchain tech that allows participants to exchange loyalty tokens for rewards and fiat currencies. Meanwhile, [Bakkt](#) aggregates a consumer's different rewards points into one "wallet," allowing users to convert points, miles, or tokens across a variety of different loyalty programs into cash.

Payments companies are also looking to offer rewards directly in cryptocurrencies, especially as Covid-19 restrictions have suppressed travel and leisure, in turn dampening consumer interest in using points and miles for travel.

Some payments products enable users to spend using cryptocurrencies instead of fiat currencies. However, barriers to adoption for these products are high: many cryptocurrencies are volatile in price, making it less attractive to spend them on goods and services, while mass adoption is difficult when these products require users to hold crypto in the first place.



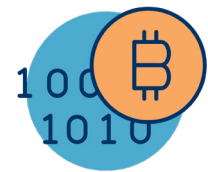
Now, startups and tech companies are starting to offer crypto rewards for purchases without requiring that a user actually spend cryptocurrencies. There are 2 main product lines that are emerging.

One, which has seen growing adoption in the past year, is the e-commerce crypto rewards product. The most popular offering here comes from CB Insights [Retail Tech 100](#) winner [Lolli](#), a shopper rewards platform enabling brands and retailers to offer customers cash back in the form of bitcoin. The browser extension allows users to earn up to 30% cash back at retailers and services like Adidas, Udemy, and Groupon. The company has seen increased traction by bringing on new partners like eBay and Expedia.

This type of product is not just for those interested in cryptocurrencies generally. In 2019, 40% of Lolli customers were new to bitcoin, according to The Block, meaning there's potential for widespread adoption outside of typical crypto owners, especially as loyalty & rewards programs like Lolli create more flexible and digitized rewards for consumers.

The second product line likely to gain traction in the coming year is the more nascent space of crypto rewards cards. These debit and credit cards provide crypto rewards, similar to points or cashback rewards, for purchases made using the card.

The [BlockFi](#) credit card, which hasn't been released yet, is the first announced credit card with crypto-based rewards. The credit card has a \$200 annual fee and offers 1.5% in bitcoin back on all purchases.



An advertisement for the BlockFi Bitcoin Rewards Credit Card. The background is dark blue. On the left, two credit cards are shown: a black BlockFi Visa card with a Bitcoin logo and a silver BlockFi card with a Bitcoin logo. On the right, the text reads: 'COMING SOON', 'The world's first Bitcoin Rewards Credit Card', 'Earn 1.5% back in bitcoin on every purchase. There's no better place to earn interest, trade cryptocurrencies, and get the market-leading BTC rewards credit card.', and a yellow button that says 'Join the Waitlist'. Below the button, there is a small disclaimer: 'Joining the waitlist to apply for the BlockFi Bitcoin Rewards Credit Card (Card) does not guarantee that you will be eligible to receive the card. Geographic, regulatory, and underwriting restrictions will apply. Fees and terms are subject to change, and additional terms of service will apply to the Card.'

Source: BlockFi

The crypto reward trend is not just impacting cryptocurrency users or crypto-focused companies – some of the largest payments companies are also developing new crypto-based offerings.

For example, Square's peer-to-peer payments app Cash App has allowed users to purchase bitcoin since 2018, but in December 2020 it announced that purchases made on the company's debit card, Cash Card, could receive bitcoin rewards. With 30M Cash App monthly active users and 7M Cash Card holders, this could help to boost mainstream adoption of bitcoin and other cryptocurrencies, adding fuel to the fire for crypto rewards.

Crypto rewards may continue to iterate, eventually moving from exchangeable cryptocurrencies to other blockchain-based assets like digital art, digital collectibles, access to virtual events, and more.



9. Repurposing physical space

From fulfillment centers to mall health clinics to vertical farms, reimagining spaces will create an unprecedented opportunity.

With record-level departures from urban hotspots, a pivot to remote working, and the closure of many physical retailers amid stay-at-home orders, space itself has become one of the most pressing considerations for companies and individuals.

As restrictions ease, commercial vacancies and people located away from city centers will reshape how space is utilized going forward. The emphasis will shift to flexibility and versatility.

But the concept of flexible space isn't new. For years, co-working companies like Industrious, Knotel, and WeWork have monetized the space-as-a-service concept, with WeWork incorporating barbershops, ballrooms, and basketball courts into shared workspaces. Similarly, companies like Airbnb have given people an opportunity to repurpose their residential homes as rental accommodations.

Now, Covid-19 is accelerating property repurposing and forcing organizations to transform their vacancies at a rapid clip – and for some, in unexpected ways:

- Companies will rethink the office space as some decentralize using hub-and-spoke models, creating potential for satellite offices in mixed-use buildings or non-traditional spaces.
- Parking lots will be increasingly explored for open-air retail or entertainment. Some are already acting as medical testing sites and drive-in movie theaters.



- Practices like vertical farming – or indoor farming – will see new life as people think about food security and access, allowing companies to imagine unoccupied commercial buildings as spaces for urban farms to flourish.

The opportunities are seemingly limitless and ever-evolving. Restaurants are one example: With a projected loss of \$240B for 2020, according to the National Restaurant Association, and sales remaining at depressed levels, many restaurants have begun to repurpose locations to help keep business afloat.

Total Eating and Drinking Place Sales

(in billions of current dollars)



Source: U.S. Census Bureau; figures are seasonally-adjusted

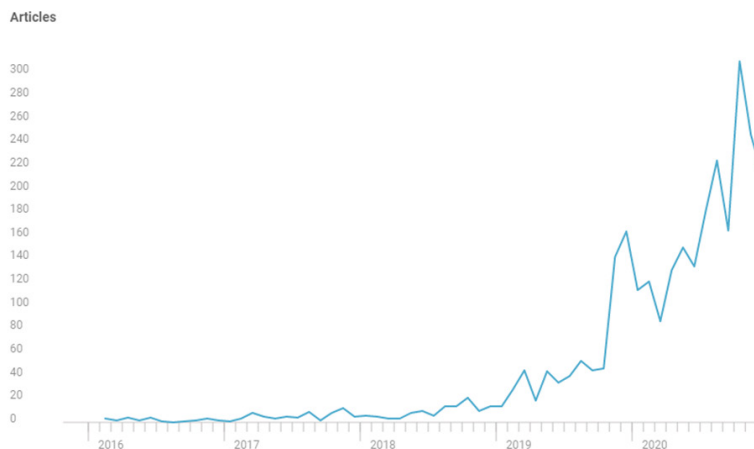
National chains like Panera and Subway have turned some locations into grocery stores to help offload excess inventory and provide in-demand essentials. Other local chains nationwide have jumped on the trend, setting up temporary marts across locations to help offset losses.

With dine-in options largely on hold, many restaurants have pivoted to the “ghost kitchen” model (which was [already gaining traction pre-Covid](#)), transforming either their own physical spaces or other vacancies into delivery-only cooking facilities. Startups are also helping facilitate this: [REEF Technology](#), for one, transforms parking lots and garages into ghost kitchens as part of its services. It raised \$700M in equity funding in November 2020.



Ghost kitchen model gains traction amid Covid-19

Articles mentioning “ghost,” “cloud,” or “dark” kitchens, 2016 – 2020



Source: cbinsights.com

 CBINSIGHTS

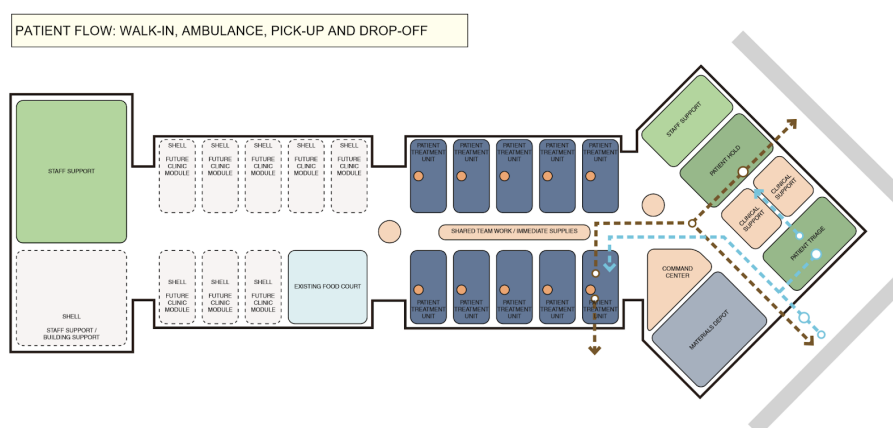
Beyond restaurants, retailers are also transforming their physical stores. Already threatened by the ongoing [retail apocalypse](#) amid a surging digital revolution, more brands are looking for ways to double their emptying stores as fulfillment centers.

Best Buy, for example, redesigned 4 of its stores to test out a fulfillment hub store plan. “Shoppable” areas decreased by about 12,000 square feet, creating more space for pick-up and ship-from-store orders. Whole Foods launched its first-ever “dark store” in September 2020 after experimenting with these delivery-only centers in at least 6 existing stores. Bed, Bath, And Beyond has also experimented with flexible formats, converting 25% of its retail locations into dark stores amid the pandemic.

E-commerce companies are also entering the mix. Amazon is in talks with the largest mall owner in the US, Simon Property Group, to convert vacant department stores into fulfillment locations. The company has already converted out-of-business malls in Cleveland, Ohio, to act as fulfillment warehouses.



Across malls, vacancies are at an all-time high of 9.8%, according to Moody's – surpassing the previous record high of 9.3% in 2011. While repurposing malls has been considered in the past, Covid-19 is accelerating the opportunity to explore these spaces as more viable and immediate options for healthcare. While chapels, cafeterias, parking lots, and even (unsuccessfully) a ship have already been turned into makeshift hospitals, malls offer potential upsides, especially given the amount and variety of space.



Source: EwingCole

Time Equities, which owns a number of malls (among other properties), indicated that one of its Georgia-based shopping centers is increasingly signing leases with doctors and dentists.

Malls and other retailers are also opening up their parking lots, enabling everything from food trucks to virtual concerts to mobile Covid testing sites to pull up. Walmart, for example, launched pop-up drive-in movies across 160 of its parking lot locations.



While the pandemic launched or accelerated many of these shifts, the experiments will lead to significant long-term changes, especially given potential cost and efficiency savings. Satellite offices, specifically, will encourage a more diverse network of talent and enable organizations to be more intentional about their use of space.

The way we use space could also shift operations across the commercial real estate industry, particularly when it comes to lease negotiations and arrangements. It may even open up opportunities on the residential side, where underutilized commercial spaces could be converted into new housing units, community spaces, or educational facilities.



10. Hotelization of the office

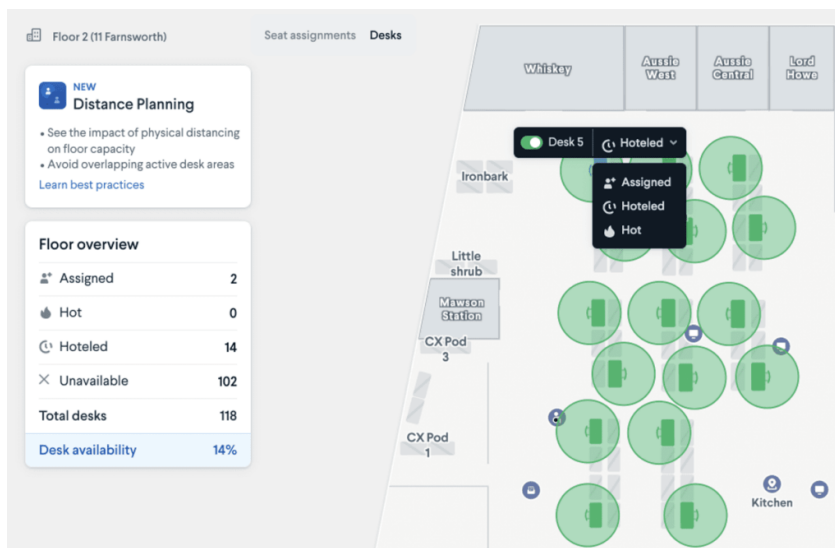
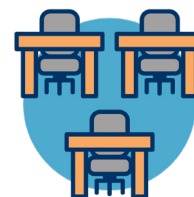
As office culture returns, spaces will be less populated and personal, and the aesthetic will shift away from the collaborative “campus” model.

Over the next year, workers will find themselves returning to an office very different from the one they left last year.

In the short-term, employers are focused on cleaning, sanitization, and air quality, and may look to [disinfection startups](#), [self-cleaning tech](#), and [an array of other solutions](#) to help keep air and surfaces clean and germ-free. But the effects of the past year of lockdowns will extend beyond cleaning and social distancing measures.

More long-term, expect to see offices becoming increasingly like hotels used for short visits, and less like the cushy big tech “campuses” that came into fashion in the pre-Covid era.

To space people out, desk areas may become less personalized. Software companies like Skedda, [Meetio](#), [Robin](#), and iOffice-owned [Teem](#) are helping employers with customizable hot-desking and co-working scheduling solutions. Rather than having their own cubicles or offices, workers may only come into the physical office a couple times a week, after booking work spaces in advance. This can also help organizations save on leasing costs. For larger spaces like conference rooms, cafeterias, and events venues, scheduling software can facilitate booking and “check-in” and “check-out” protocols, as well as manage cleaning between uses.



Source: Robin

Interior office design may also see significant changes. In recent years, office design for tech giants like Google and Microsoft has focused on a cheerful, collaborative campus atmosphere that encourages workers to spend time at work and freely interact with others. Now, as the coronavirus pandemic normalizes remote work, and as concerns about distancing reduce casual in-person interactions, office spaces may no longer be designed to maximize in-office time or facilitate casual employee interactions.

For times when they do want to encourage in-person work, employers will have to find a way to balance the sterility of a clean, safety-first environment with pleasant, attractive spaces. Plants, natural light, and better airflow could all be major design focuses for companies looking to bring the outdoors in and make office spaces more desirable without detracting from cleaning and distancing protocols. Simple measures like touchless doors could make offices feel safe and modern. Together, deliberate tech and interior design choices can make offices more enticing spaces, even in the age of work-from-home and social distancing.



Finally, we may see an increase in companies offering virtual common spaces, beyond the widespread adoption of video conferencing software like Zoom that has already taken place. Augmented reality and virtual reality are [already reshaping education and training](#), and now companies have started to experiment with AR/VR in a work context to help capture a human element even in virtual interactions. [Spatial](#), for example, allows people to interact using 3D avatars. Spatial is compatible with any AR or VR device in addition to standard webcams, and can give users the ability to perform “in-person” rituals like shaking hands and high-fiving.

Ultimately, vaccines and cleaning tech may make offices safer in coming months. But as working remotely proves to be just as (or even more) productive as office work, many companies will see an irrevocable shift in office culture in the coming years. They will need to be prepared for a future where employees treat going into the office less like showing up at their home away from home, and more like a special occasion, like checking into a hotel.



11. Ambient wellness

The continued convergence of health and self-care will unbundle the spa and bring it into homes, shops, and beyond.

The idea of embedding health-boosting tech into consumers' environments to improve their wellbeing isn't new. Anyone who has ever visited a spa knows that the right combination of light, sound, and fragrance has a big impact on mood and relaxation.

Now, the Covid-19 pandemic has brought the importance of holistic wellness into sharper focus, especially in public settings. With a return to normalcy potentially on the horizon, organizations will be hyper-focused on creating environments and experiences that prioritize consumer wellness and draw them back into public spaces.

In 2021, look for ambient wellness to appear everywhere – from the office to the home – with initiatives like:

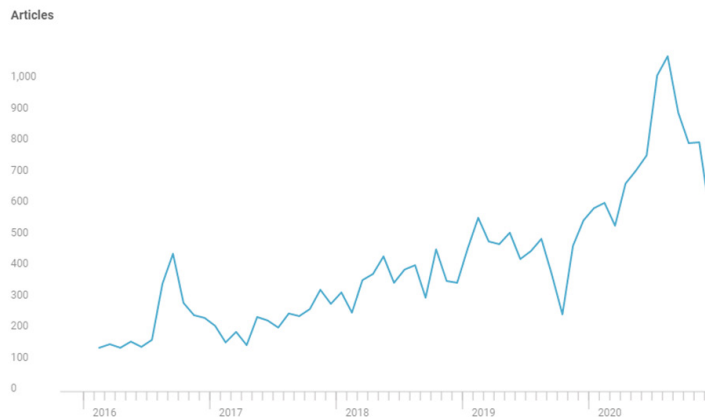
- An increase in designing HVAC and air filtration systems overall, with some retailers and businesses choosing to integrate scent-releasing capabilities to help create immersive customer experiences and to improve relaxation at home.
- Smart personalized lighting systems that could increase employee productivity and satisfaction.
- Sound-masking systems in doctors' offices that emit white noise to keep conversations private and reduce stress in the waiting room.

Media attention for fragrance and aroma tech has steadily [trended upward](#) over the course of the pandemic, especially as consumers have turned to aromatherapy as a form of self-care and stress relief. Additionally, the [global fragrance and perfume market is worth \\$52.8B](#), according to CB Insights' Industry Analyst Consensus.



Ambient wellness tech comes into focus

Articles mentioning “fragrance” or “aroma” tech, 2016 – 2020



Source: cbinsights.com

 CBINSIGHTS

Home scents are leading the charge. This space includes startups like [Pura Scents](#), which offers a smart fragrance diffuser, and [Vitruvi](#), which creates stylish diffusers that use non-toxic and natural scents. Another startup in the category is [Essio Shower](#), which offers an aromatherapy shower diffuser for a spa-like experience at home.



Source: Essio Shower



But the effects of fragrance aren't limited to the home. Retailers use scents in their stores to create brand-specific experiences. For example, Haddad Brands – a children's apparel licensor of Nike, Jordan, Converse, and others – uses scents along with video and music to create immersive experiences in its showrooms. In terms of entertainment, Disney was recently granted a [patent](#) for "scent blending" to add another dimension to immersive rides and experiences.

Even as the pandemic subsides and restrictions lift, wellness-enhancing fragrance products will likely continue to gain momentum and become more personalized for a given room and its intended use. Going forward, look for products that release scents based on consumers' dynamic needs or to create a more enhanced shopper experience.

Light also plays a significant role in wellness. Traditional lighting is not designed to sync up with natural circadian rhythms, and disrupted circadian rhythms can lead to poor sleep, in turn exacerbating a number of illnesses. In 2021, look for smart lighting to become more popular in homes and offices. This could include LED circadian lighting, which is designed to support the body's natural rhythms.



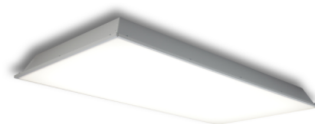
Revolutionary Adaptive LED

Smart color-changing technology, allows a single light to vary from bright, natural daylight (6500 Kelvin) to warm light (2200 Kelvin), as well as any brightness level in between.



Wifi Connected App

The dimmable LED lights are conveniently operated by remote control to create an ideal lighting environment with the touch of a button.



10 years and 100,000 hour life

Virtually eliminate lighting maintenance, lights need to be replaced once every 10 years.



Lighting Automation

Automated programming that changes throughout the day allows Circadian lighting to adjust to your body's rhythm.

Source: *Wellness Habitat*



Tunable LED circadian lighting mimics the pattern of natural sunlight by automatically adjusting the light's color temperature over the course of the day. Brighter light during daylight hours can help stimulate activity and productivity, while dimmer light at night can encourage rest and relaxation. Companies like [Yeelight](#) are developing Bluetooth-enabled smart lighting products that let consumers adjust brightness, color temperature, and color themselves.

This kind of technology could also be beneficial in the office. David Pfund, president of a division within manufacturer The Lighting Quotient, says that personal lighting controls in the office could become common practice:

“There’s been a lot of research showing that, when people have control over their work environment, they are happier. Putting lighting closer to people and giving them dimming control adds to personal satisfaction and productivity.”

Restaurants and retail locations could also use mood-boosting lighting products as they begin to reopen. This concept is not without precedent: In 2016, Starbucks teamed up with Philips to install EnergyUp lamps in 4 cafes in the Netherlands. The lamps mimic natural daylight and reportedly have a “revitalizing effect” after 20 minutes of use. In the post-Covid world, look for more businesses to embrace this technology.



Source: TrendWatching

In retail, lighting can improve the customer experience, which can lead to increased sales and brand loyalty. Controllable fixtures in “live” lighting systems can adjust brightness and color temperature to highlight certain products and create an emotional response in customers.

Sleep is another key category that stands to gain from the ambient wellness movement. About a third of adults in the US don't get adequate sleep, which can contribute to diabetes, cardiovascular disease, depression, and other health issues. Startups are leveraging sensor tech to create products that can sense sleep disruptions and automatically adjust external factors to help users sleep. For example, companies like [Eight](#), [ReST](#), and [Sleepace](#) use mattress-embedded biosensors to adjust factors such as mattress temperature, firmness, and more.

In 2021, with health and wellness top of mind in the wake of Covid-19, watch for companies in the space to integrate their products into multiple aspects of consumers' lives. Sleep tech could enhance consumers' overall mental and physical health at home, as well as in hotels. Meanwhile, smart lighting and fragrance tech could become essentials for the home and, as restrictions are lifted, offices, retail stores, restaurants, and more.



12. Hospital-at-home

To fill the gaps in telehealth, expect more healthcare services in the home, from house calls to remote patient monitoring to at-home lab testing.

After 2020 forced medical providers to go virtual for a range of services, the value of keeping people out of the doctor's office has become evident: the [shift to telehealth](#) has enabled shorter wait times, reduced risk of infection, and enabled more affordable care. In 2020, annual funding to private telehealth companies grew nearly [70% YoY](#), surpassing \$10B.

But the limitations of telemedicine also require a broader reimagining of what medical-level monitoring in the home should look like. As a result, 2021 will be a turning point for the US hospital-at-home movement – 26 years after the model was first conceived.

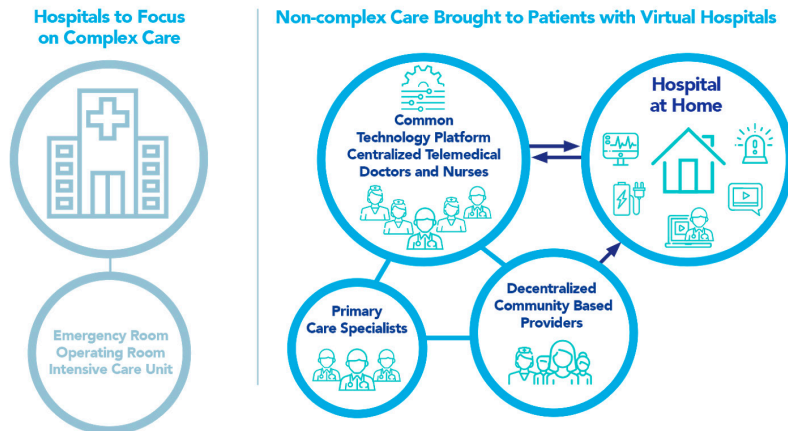
Hospital-at-home programs are designed to deliver hospital-level care to patients in their own homes. Though they're not physically located within a hospital, patients are continuously and intimately connected to their care teams through in-person visits, virtual visits, digital communication channels, and remote biometric monitoring technologies.

More broadly, a range of innovations are bringing care into the home:

- Hybrid virtual/in-person models are being increasingly used to provide on-demand care delivery.
- Smartphones are being employed to remotely interpret urinalysis tests and track wound healing for review by a clinician.
- Lab testing is entering the home, accelerated by the Covid-19 pandemic, as the FDA recently gave emergency use authorization to Ellume's over-the-counter, fully at-home Covid-19 test kit, in addition to greenlighting over 25 mail-in Covid-19 tests.



VISION – Health Care Comes to Patients



Source: Medically Home

A growing body of evidence justifies the model's value. Hospital-at-home programs have consistently demonstrated their ability to provide high-quality care, improve patient outcomes, address social determinants of health, enhance patient satisfaction, and reduce costs. For these reasons, they've become firmly established in the UK, Canada, Australia, and several other countries with government-run health systems.

“If home hospital were a drug, everyone would buy it.”

– DR. DAVID LEVINE, “HOME HOSPITAL” CO-DEVELOPER, BRIGHAM & WOMEN'S HOSPITAL

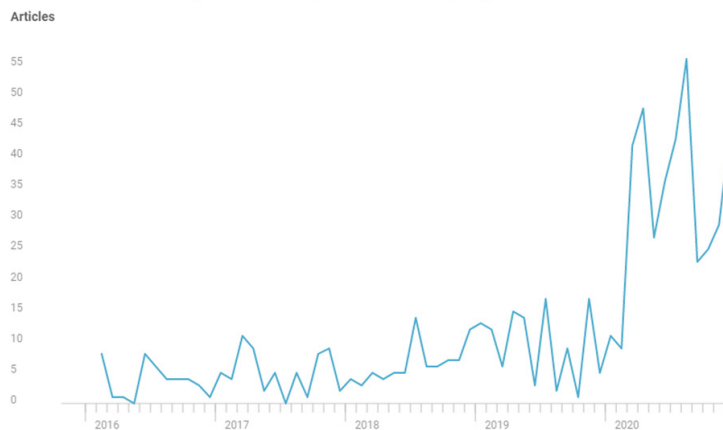
These programs have struggled to take off in the US due to demand, payment, and implementation barriers. However, the onset of Covid-19 – alongside the rapid growth in telehealth capacity – has led to renewed focus on the viability of these options.



Reflecting this, mentions of “hospital at home” have jumped in the media and on earnings calls.

Pandemic fuels discussion of telehealth-enabled hospital-at-home care

Articles mentioning virtual “hospital-at-home” programs, 2016 – 2020



Source: cbinsights.com

 CBINSIGHTS

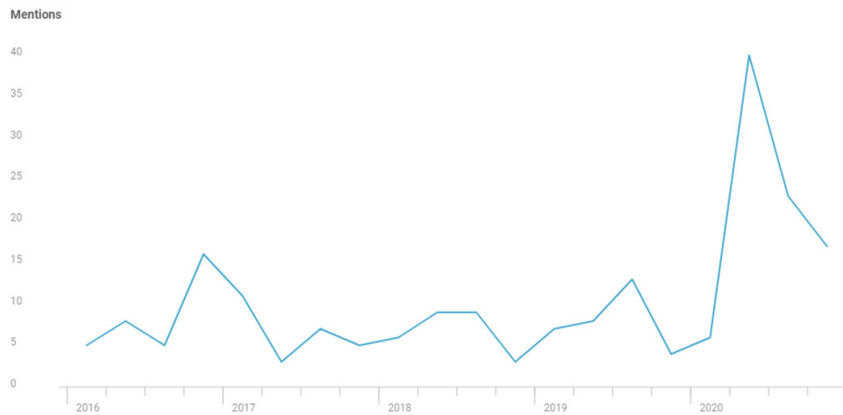
To help expand pandemic-related surge capacity and facilitate hospital-at-home care, the Centers for Medicare & Medicaid Services (CMS) launched an Acute Hospital Care at Home program. By offering direct logistical support and reimbursement, the program aims to give hospitals greater flexibility in treating patients at home.

CMS has already granted 7 waivers to major hospitals and health systems to employ the program, and executives are optimistic that CMS could eventually turn this into a more permanent solution.



Execs become more vocal on hospital-at-home care

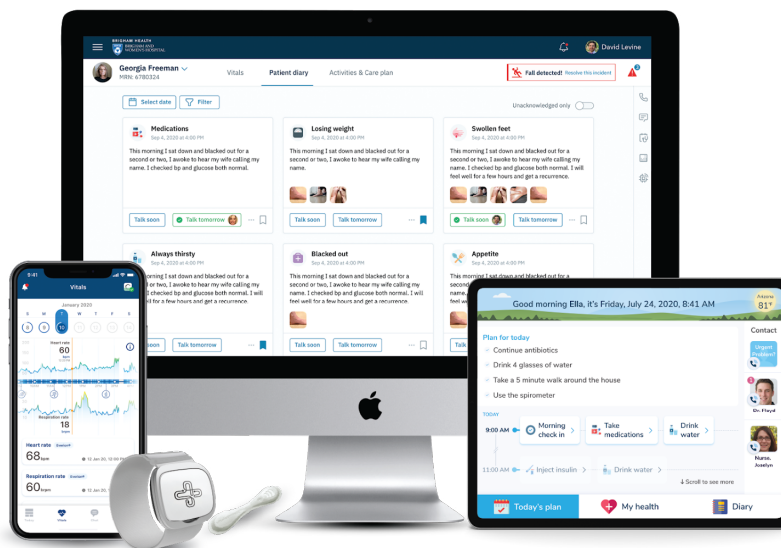
Public company earnings call mentions of "hospital at home," 2016 – 2020



Source: cbinsights.com

CBINSIGHTS

Companies like [Medically Home](#), [DispatchHealth](#), [Contessa Health](#), [Biofourmis](#), and [Current Health](#) are partnering with hospitals and health systems to manage logistics, provide technology, and coordinate hospital-at-home care.

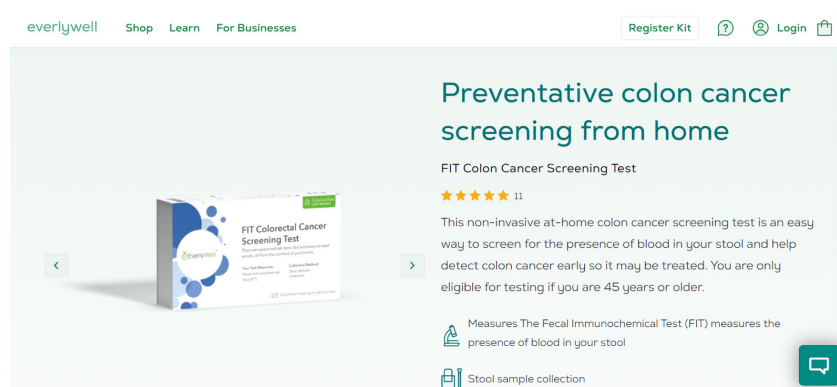


Source: Biofourmis



Beyond developing hospital-at-home programs, some companies are focused on making lab testing easier by enabling sample collection at home. D2C startups like [LetsGetChecked](#), [23andMe](#), and [Modern Fertility](#) offer mail-in lab testing and at-home tests for everything from general wellness – like STI and vitamin deficiency testing – to genetic screening to fertility testing.

Taking it a step further, healthcare systems like Kaiser Permanente and the federal Veterans Health Administration are deploying a mail-in lab test that checks for blood in stool, bringing colorectal cancer screening capabilities home. In another example, Humana has partnered with [Everlywell](#) to offer at-home screenings for colon cancer as well as for kidney function and blood glucose levels.



Source: Everlywell

Moving forward, advances in microneedles for self-administered specimen collection could add another layer to the hospital-at-home trend. Whereas most blood draws are conducted in person by a trained medical professional, patients could collect their own samples from home with easy-to-use microneedle devices. The samples can then be mailed to a lab or – in some cases – analyzed on the spot.



CONVENIENT



MORE COMFORTABLE



LESS STRESS

BLOOD COLLECTION WITH THE TAP OF A BUTTON

Patients go to the doctor more than a billion times a year to have their blood drawn with a needle or finger lancet, which requires an in-person interaction and typically involves discomfort and anxiety for the patient.

Source: TAP

While [Seventh Sense Biosystems'](#) TAP wearable blood collection device is the only commercially available option, at-home blood collection via microneedle will transform at-home testing as the tech develops. Over 400M blood draws occur each year in US hospitals, but at-home blood draws promise to allow more patients to stay home for a more convenient and comfortable testing experience, expanding the reach of hospital-at-home care.

Looking ahead, the integration of at-home lab testing with telehealth services and home healthcare visits will be especially relevant for senior populations, which face greater mobility difficulties and vulnerability to disease. The Population Reference Bureau projects that the number of Americans aged 65+ will nearly double from 52M in 2018 to 95M by 2060 – and the senior care sector will face pressure to grow at a similar pace.

Between aging patient populations and rising patient expectations, the lower risk and greater convenience of hospital-at-home programs could make them a crucial part of healthcare delivery, even long after the effects of the Covid-19 pandemic have subsided.



Through the duration of the public health emergency this year, expect to see an increase in partnerships between startups, corporates, and health systems in the hospital-at-home space. In the longer-term, mainstream adoption of hospital-at-home care will likely depend on greater traction of value-based payment models and permanent regulatory actions taken by CMS and other government agencies.