



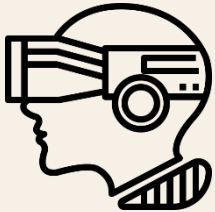
Web3

In the 1990's Web1 was about accessing information. In the mid 2000's to present Web2 users became the product of companies via data collection. Going forward, the idea of Web3 is becoming more of a reality through the use of blockchain allowing users to become the owners of their product/data.



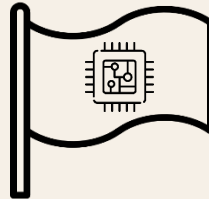
Digital Assets

As the shift from physical to digital assets accelerates, so too does the acceptance that Non-Fungible Tokens (NFTs) can hold value the same way as physical art and other tangible items. An industry is rapidly developing in the digital asset space, driven by the adoption of blockchain, digital currency, and the Metaverse.



Metaverse

The evolution of gaming and the internet, combined with the pandemic lockdowns calling for alternate ways to interact, have led to a strong propelling of the Metaverse. The Metaverse allows for users to interact with each other on the internet in various immersive ways which have the potential to revolutionize the way people socialize, work, and value things.



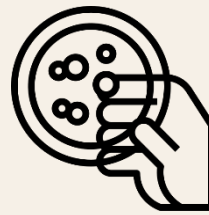
Techno-Sovereign

As geopolitics have shifted from superpower-based leadership, the void is being filled by a new set of players: mega-cap technology companies such as Apple, Meta (Facebook), and Alphabet (Google). These companies operate in a digital space without borders where they essentially make and architect the rules.



Corporate Concentration

Many become fewer, the big consume the small – this is often the natural evolution of corporations. However, the hit of the lockdown during the pandemic heavily handicapped the small, allowing larger corporations to buy both vertically and horizontally.



SynBio

Synthetic biology (SynBio) is a multidisciplinary area of research that seeks to create new biological parts, devices, and materials, or to redesign systems that are already found in nature. As critical investments in infrastructure bear fruit, we believe SynBio could be a disruptive technology.



mRNA

mRNA medicines are sets of instructions that take advantage of normal processes in our bodies to express proteins that can prevent or fight disease - something not possible with other drug approaches. As a result, using mRNA as a drug holds great potential and opens up new opportunities.



Connected Health

The widespread adoption of wearable technology has led to an explosion of information available to better track and treat health conditions. This is making our healthcare system smarter by providing medical and insurance providers more detailed information about patients, and it's helping spawn new industries such as personalized fitness and medicine.



Great Resignation

The pandemic and lockdown has catalyzed how people view their careers. Whether it is a result of work/life balance, switching careers, hours, and/or pay, people in 2021 quit their jobs at record rates. With a shortage of labor, workers now find themselves in the driver seat of negotiating, for the time being.



DeTrust

Transactions are premised on good faith and the belief that other parties will deliver the assets, goods, or services they say they will. As trust between parties erodes due to polarization, globalization, or other factors, new industries and technologies are developing to ensure transparency and accountability between market participants, driven largely by blockchain technology.



Web3



Web3, first coined by Ethereum co-founder Gavin Wood, is an umbrella term for a new iteration of the World Wide Web (WWW) that is based on decentralization and built using blockchain (see *Blockchain, Trends 2016*) technologies. The early days of the Internet in the 1990s were Web1.0 and primarily about data transmission protocol (TCP/IP) and access to information. Then came Web2.0 in the mid-2000s, which brought us social media and e-commerce, but facilitated by platforms (dominated by a handful of companies like Google, Amazon, Facebook, and Twitter) that serve as a middleman between producers and consumers. The current Internet, with its client-server-based data infrastructure and centralized data management, has many unique

points of failure and suffers from recurring data breaches. In Web2.0, individuals don't have much control over their data or how it is stored. Data are typically owned, controlled, and often monetized by the companies in charge of platforms. In contrast, blockchain reinvents the way information is stored and managed. In Web3, data are stored in multiple copies of a P2P (peer-to-peer) network. To the average Internet user, nothing much will change; Web3 is primarily a backend revolution, whereas Web2.0 was a frontend revolution.

Web3 also has implications for how applications are developed or how companies are financed and built. In Web3, dapps (decentralized apps) are built and run on blockchains (decentralized networks of many P2P nodes) and can have associated tokens, which may not only pay for services, but can act like voting shares that govern the applications' development. Blockchain data are public and open, providing purchasers or investors more transparency. This is in contrast to buying equity in private or centralized businesses where many things are not made public. This infrastructure may allow for DAOs (Decentralized Autonomous Organizations) as an alternative way to finance and build what we traditionally thought of as a company.

Digital Assets



Just as the metaverse (see *Metaverse, Trends 2021*) captured headlines in 2021, so too did Non-Fungible Tokens (NFTs). While cryptocurrencies like bitcoin are fungible, meaning that exchanging one bitcoin for another is like exchanging dollar bills, NFTs are non-fungible, meaning it's like exchanging The Mona Lisa for The Starry Night, both valuable assets, but not really the same thing. NFTs represent something unique; they can be digital artwork, physical artwork, and even the ownership interest of a piece of real estate. In that way, they can potentially reduce the need for intermediaries (see *DeTrust, page 6*), but it remains to be seen what value they will ultimately have without some other motivation driving it, whether it's brand affinity (NBA TopShot) or gamifying the process of collecting. GameFi, a merging of the

words Game and Finance, describes the process of creating profit from playing play-to-earn crypto games. In some of these games, the characters you play the game with are NFTs that can be purchased and then improved upon, or leveled up, by playing the game. These "leveled up" characters can then be sold for a profit to another player. Like any new innovation, finding success with NFTs and GameFi will involve picking the right games, or digital communities, not just the right NFTs within those games.

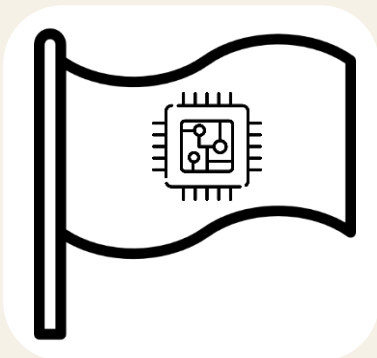


Metaverse



Over the last year, the Metaverse (see *Metaverse, Trends 2021*) has gained significant notoriety as Facebook (now Meta) has made it a key strategic priority. Meta is investing \$10 billion into its Metaverse vision to build out the critical hardware and software infrastructure, as Mark Zuckerberg believes it to be the next major technology platform. Key debates remain about what the future Metaverse will look like. While the amount of time we are all spending in digital worlds is increasing (from Zoom calls to Roblox games), many of these use cases are what we would consider a Metaverse 1.0 user-interface. The next iteration, Metaverse 2.0, we believe will require more lifelike experiences and interaction. Video game developers and companies such as NVIDIA, Unity Software, and Epic Games continue to push the boundaries of making the digital almost indistinguishable from the physical. Real-time 3D capabilities is one of the biggest trends in the media industry and increasingly media consumption is moving from a static, passive 2-dimensional experience to a 3-dimensional experience where the viewer can interact, change and customize the content. Already many television and movie studios are aggressively integrating these real-time 3D capabilities into their content. More ways of engaging in the Metaverse continue to grow from Augmented Reality glasses to Virtual Reality headsets, allowing the user the ability to choose how they will engage in the Metaverse. Humans are social creatures by nature and the last two years of relative isolation during COVID has taught us that virtual environments remain a highly relevant and necessary platform for social interaction.

Techno-Sovereign



As governments around the world continue to battle the effects of COVID, social change and a G-Zero World (see *G-Zero World, Trends 2016*), a new geopolitical player has entered the stage in the form of big technology companies. According to Ian Bremmer of G-Zero Media, the sheer size and influence of these companies rival or exceed most major countries. Meta (Facebook), Apple and Google, for example, routinely talk about having billions of active users on their respective platforms. These companies operate in a digital space without borders where they essentially make and architect the rules. As Bremmer notes, to understand geopolitics and the future of the world, it will be increasingly important to understand not only the United States, Europe and China, but also the priorities and alignment of Big Tech companies. We are witnessing mega-tech companies strategically aligning themselves either as Globalists, National Champions, or Techno-Utopians. It's too early to know what strategy eventually succeeds, but as our world continues to shift more into the digital, Techno-Sovereigns are increasingly moving in as power players across the global geopolitical landscape.



Corporate Concentration



Corporate Concentration is hitting levels not seen in decades. As we enter the second full year of dealing with the COVID pandemic, one of the early observations was that COVID was an accelerant of trends on many levels. Prior to COVID, we noted that as many industries digitize, the competitive dynamics were increasingly becoming winner-take-all, where the winners keep getting bigger (see *Winner-take-all, Trends 2018*). COVID has only accelerated this trend as size and technological competence became even more important. In 2020, larger companies were able to have more financial flexibility as the pandemic hit. Then, in 2021, as supply chains became constrained, larger companies were also able to better manage cost and inventory pressures. This has resulted in many large companies strengthening their competitive positions and gaining more market share. An example: according to JP Morgan Research, as of December 2021 the current size of the top 10 companies in the S&P 500 was approximately 30%, which is a level not seen in recent history since the dot.com bubble, when it was 27%. Of course, many of the companies today in the top ten and top five are in a much more solid position compared to the dot.com timeframe. Nevertheless, size bears watching, since it is rivaling many prior peaks in market history such as the Nifty-Fifty (1972-1973). In China the level of corporate concentration and power has reached a point to where the country has been cracking down aggressively on many industries, citing critical national security interests and the need for “common prosperity.” There have been several periods of large corporate concentration in the past, which were ultimately undone by market dynamics, economic cycles, technological change and regulatory forces. While the big have no doubt gotten bigger throughout COVID, there are also signs of new business formations accelerating while also funding for new companies is hitting unprecedented levels. Time will tell if COVID has structurally changed corporate concentration or if history ultimately repeats itself.

SynBio



Synthetic biology (SynBio) is a multidisciplinary area of research that seeks to create new biological parts, devices, and materials, or to redesign systems that are already found in nature. SynBio builds upon many of the trends we have identified in the past such as gene editing (see *CRISPR, Trends 2017*), advanced computing (see *AlphaFold, Trends 2021*; and *Quantum Computing, Trends 2017*), and organic material grown in a lab (see *Where's the Beef?, Trends 2018*). As critical investments in infrastructure bear fruit, we believe SynBio could be a disruptive technology. In principle, scientists could engineer a patient's own cells to multiply, differentiate into different cells types and even self-assemble into new tissues (even organs!) to repair those damaged through disease or injury. SynBio also offers the opportunity to integrate biochemical components from living systems with inorganic components to create new materials that are able to sense the environment (or internal signals) and dynamically change their properties. Imagine the possibilities for new and improved protective clothing or building materials. SynBio has far-reaching potential for new solutions impacting global healthcare, agriculture, manufacturing, and environmental challenges.



mRNA



mRNA (messenger ribonucleic acid) is a single-strand molecule that carries genetic code from DNA (deoxyribonucleic acid) in a cell's nucleus to its protein-making machinery. mRNA medicines are not small molecules, like traditional pharmaceuticals, nor are they traditional biologics, such as recombinant proteins and monoclonal antibodies. Instead, mRNA medicines are sets of instructions that take advantage of normal processes in our bodies to express proteins that can prevent or fight disease. This mechanism was discovered in the early 1960s; however, it wasn't until more recent advances in nanotechnology and lipid nanoparticles that mRNA medicines could be successfully delivered into cells. The first mRNA vaccines using

lipid nanoparticles were developed against the deadly Ebola virus, but Pfizer's COVID-19 vaccine is the first mRNA product to achieve full FDA approval in the U.S. Already, drug manufacturers are developing mRNA vaccines to protect against other respiratory viruses, such as the flu. In theory, mRNA might make for a better product. In contrast to traditional methods, mRNA vaccines are manufactured relatively quickly, potentially allowing scientists to better match the shots to each season's flu strains. Furthermore, the technology may enable the combination of multiple mRNAs for the development of "universal" vaccines. Using mRNA as a drug holds great potential and opens up new opportunities. mRNA medicines can go inside cells to direct protein production – something not possible with other drug approaches.

Connected Health



With the wide-spread adoption of fitness trackers, smart-watches and other wearable devices (see *Wearables, Trends 2015*) we've never had more information at our fingertips about our daily health. We can track our steps, heart rate, blood sugar, blood pressure, and many more vitals in nearly real time throughout the day. This unprecedented level of understanding about our daily activity levels and general health is leading to a boom in the connected health industry (see *Telehealth, Trends 2021*). This is making our fitness smarter and more accessible as companies such as Peloton have popularized high-quality workouts into our homes. It's making our healthcare system smarter by providing medical and insurance providers more detailed information

about patients. Apple and Fitbit, for example, have entered into partnerships with health insurance companies to share data and explore offering incentives to members. Connected Health is also ushering in a new era of personalized medicine as companies such as 23andMe are able to genetically test an individual's DNA, providing new insight into how to treat patients based on their individual genetic predisposition. Health care is one of the last sectors to have been digitally transformed; as connected health devices and applications proliferate further, that transformation appears closer than ever.



Great Resignation



In 2021, whether they were fed up with a daily commute to the office, or tired of working hard jobs for little pay, or simply using the labor shortage to find a job that better suits their preferences, Americans quit their jobs at record rates. This phenomenon is not a uniquely American one. In China, young workers and professionals are opting into the “lying flat” movement, rejecting the promise of consumer fulfilment and the accompanying struggle for workplace success. In a trend synonymous with the Financially Independent Retire Early movement (see *Playing with FIRE, Trends 2019*), workers around the world are showing a desire for an improved work-life balance, more time for themselves and their families, and more autonomy in their daily life, not to mention the savings produced by a lack of a

commute. In addition to the desire for greater autonomy in their daily routines, workers are also struggling with childcare dilemmas and taking the opportunity to retire early. According to economist Miguel Faria-e-Castro at the Federal Reserve Bank of St. Louis, more than 3 million people have retired early due to the COVID-19 crisis. All these factors have led to a shortage of labor, often referred to by economists as full employment. The current shortage may have placed workers in a relatively strong bargaining position for the time-being, but it’s noticeable that wage growth still trails inflation and over time, companies grow more likely to respond to higher wages with labor-saving investments.

DeTrust



Kenneth Arrow, a Nobel-Prize-winning economist once said, “Virtually every commercial transaction has within itself an element of trust.” Since the pandemic began, many surveys have found that trust was eroded by the shift to remote work, with supervisors trusting employees less and coworkers having the same experience with peers. In fact, as of November 2021, demand for employee monitoring software was 54% higher than it was before the pandemic, according to top10vpn.com. Meanwhile, trust between firms has also eroded as supply chain issues have suppliers questioning their customers’ orders and said customers have unfulfilled demand. Without trust, companies can’t plan or invest for the future, a portion of demand

goes unmet, and bosses can’t focus on their most important tasks, leaving productivity - and by extension growth - lower than it otherwise would be.

DeFi, or decentralized finance, is an attempt to use blockchain technology (see *Blockchain, Trends 2016*) to overcome traditional barriers to trust and remove the intermediaries that have brokered it in the past. Potential use cases include loans, insurance, derivatives, betting, stablecoins, decentralized exchanges, and more. Gavin Wood, co-founder of Ethereum, the main platform DeFi applications are built on today, has recently said, “We want less of that [trust], and we want more truth, which what I really mean is a greater reason to believe that our expectations will be met.” When it comes to financial transactions and applications not under real-world constraints DeFi shows real promise. It remains to be seen how it can overcome recent developments in distrust that stem from lockdowns and different actions taken by sovereign nations that have snarled the supply chain and created artificial barriers to business.



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