

# Decentralization & Blockchain

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Blockchain, cryptocurrency, DeFi, decentralization, and NFT trends influencing business, government and society.



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# Macro Forces and Emerging Trends

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

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

Each trend offers six important insights.

## 1. Years on the List

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

## 2. Key Insight

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

## 3. Examples

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

## 4. Disruptive Impact

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

## 5. Emerging Players

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

## 6. Action Scale

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

### ▶ Watch Closely

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

### ▶ Informs Strategy

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

### ▶ Act Now

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

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Decentralization & Blockchain

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15TH YEAR ON THE LIST — 1

## Social and Digital Payments



Apple's new Tap to Pay feature will make it easy for businesses and individuals to accept payment and exchange funds with a tap of devices.

KEY INSIGHT — 2

Tech companies are leveraging APIs and digital infrastructure to provide seamless, interconnected financial services. Financial institutions, payment providers, and consumer-facing companies are integrating with tech platforms and e-commerce to acquire more customers and fend off competition.

EXAMPLES — 3

For well over a decade, companies such as Venmo and PayPal, which now have hundreds of millions of users, have worked to bring social payments to consumers all over the world. Consumer-to-consumer (C2C) purchases are increasingly enhanced through services like Shopify, which save a buyer's payment details and make it simple to repeatedly purchase products online without entering any new information. A new announcement by Apple in February 2022 could move C2C and consumer-to-business (C2B) one step closer together. The tech giant launched Tap to Pay on iPhone—a capability that will enable individuals to exchange funds simply by bringing their smartphones closer together. Apple believes this new app will lead to businesses accepting contactless payments as well, without the need for additional equipment.

DISRUPTIVE IMPACT — 4

This area is rapidly evolving as payment capabilities migrate from apps to devices. Visa is working with auto companies such as GM and Honda to launch connected car payment capabilities including Visa Token Service, CyberSource Payment Management, Token ID, and Visa Direct. Car-based payments could streamline transactions such as paying for curbside groceries or meals, gasoline or electric charges, or parking.

EMERGING PLAYERS — 5

- Affirm
- Ant Group
- Apple
- Amazon
- Baidu
- Green Dot
- Google
- PayPal
- Shopify
- Venmo
- Visa
- WhatsApp
- Zelle/Bank of America

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# 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.

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Decentralization & Blockchain

SCENARIO

Consumption Quota · Pessimistic Near-Future

## Consumption Quota

China and the US are neck and neck for the world's largest GDP in 2025. GDP is a global vanity metric that countries use to assert dominance over one another. The world's largest GDP is a coveted spot to have in terms of negotiating global trade agreements and geopolitical policies.

Gross Domestic Product optimizes for consumption. It's a calculation that combines public and private spending and investment. In a world where everything is disposable, producible, purchasable, citizens now also have a civic duty to spend.

During World War II, many governments rationed certain products like automobiles, gasoline, silk, shoes and food like meat, dairy, coffee and sugar. In the future, governments like the US and China might do the opposite - setting consumption quotas on citizens to ensure their rank in the global economy.

Universal Basic Income and other guaranteed income programs are ubiquitous. Citizens are punished for not spending fast enough since their digital wallets are publicly visible and tracked.

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

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

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

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

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

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

A handwritten signature in black ink that reads "Amy Webb".

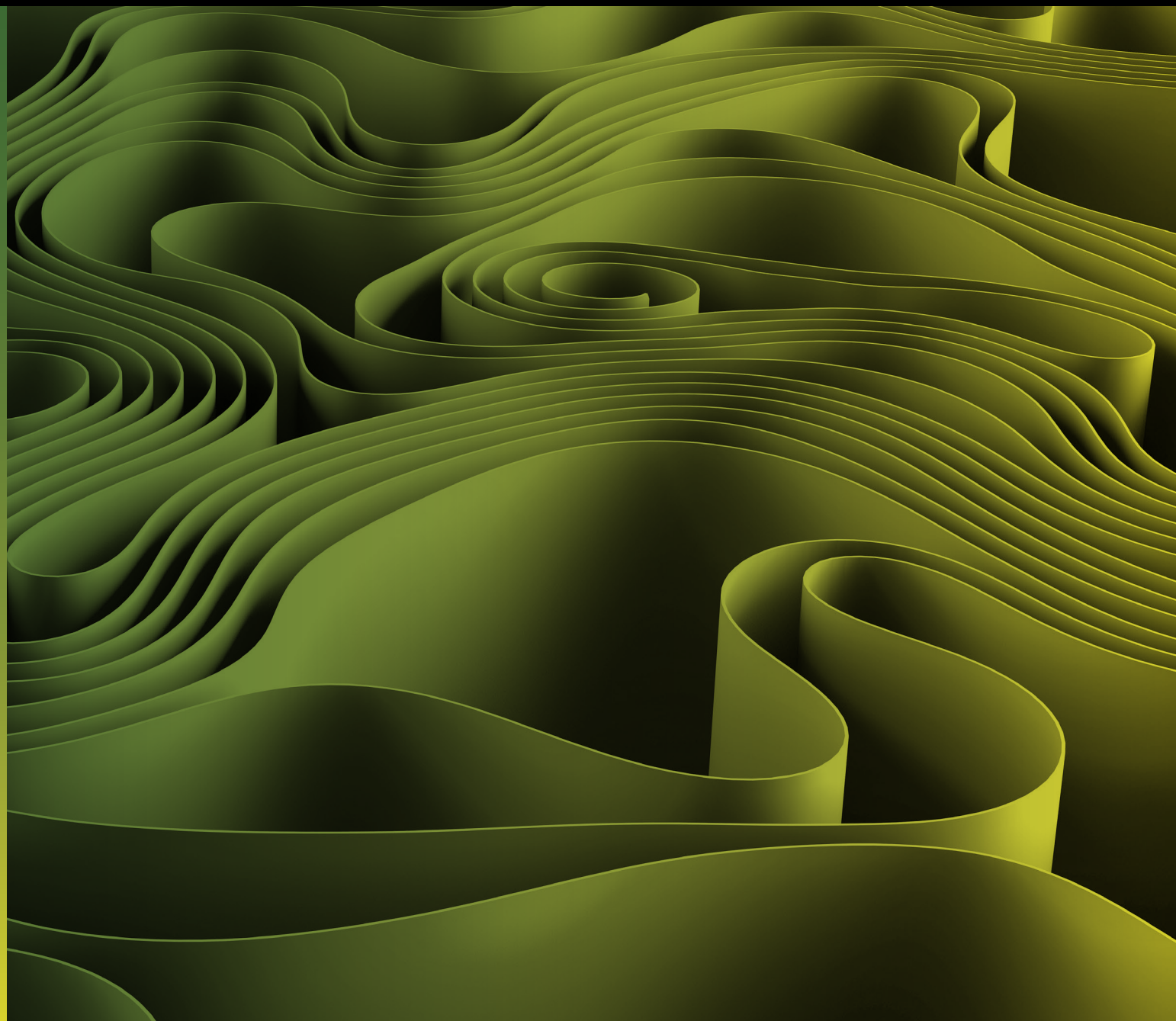
**Amy Webb**

CEO

The Future Today Institute



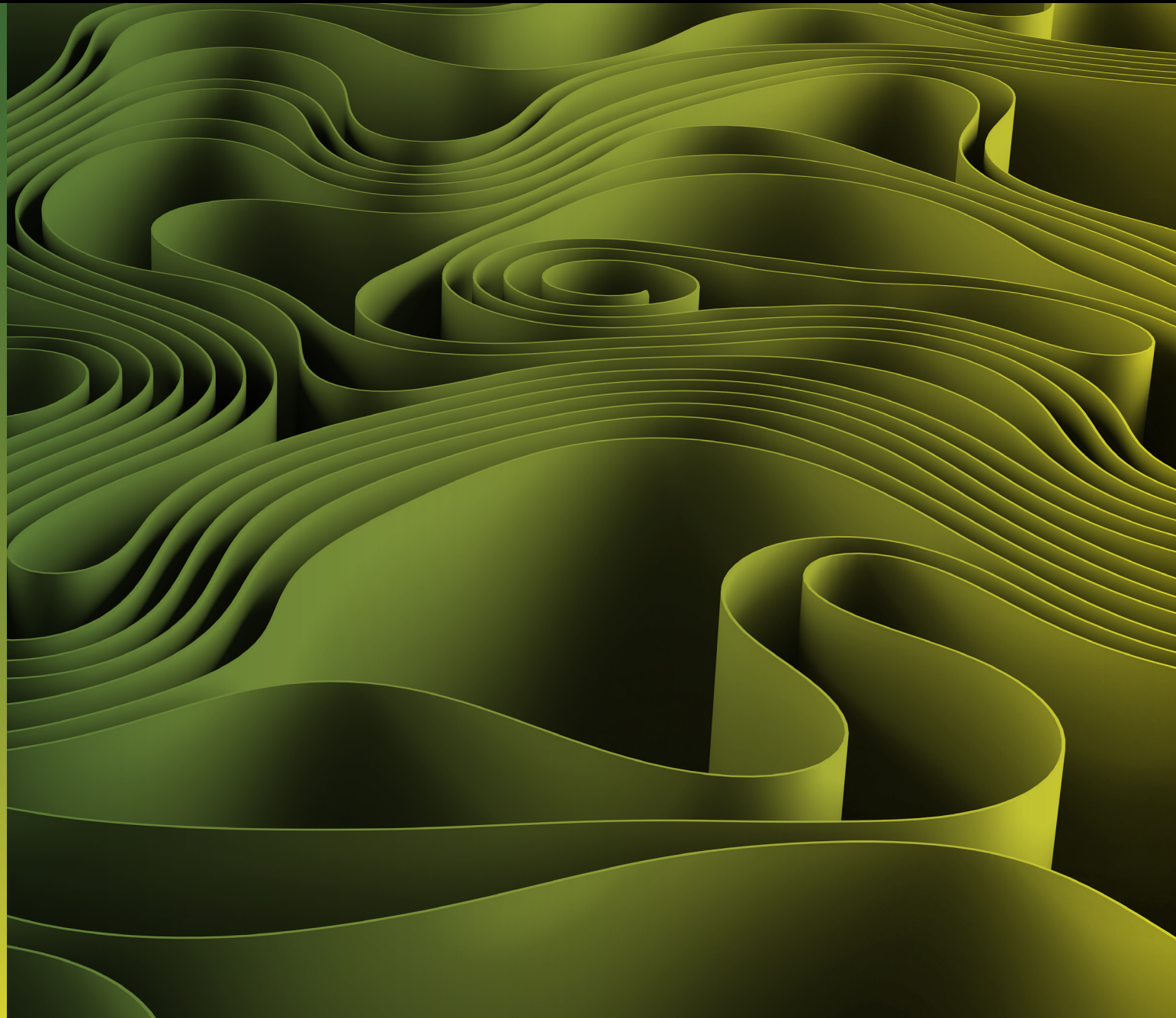
*The material presented in this report is intended for informational purposes only and should not be considered investment advice, or a recommendation to buy, sell, or hold any particular cryptocurrency, digital asset, or security.*





This is volume 10 in the Future Today Institute's 2022 Tech Trends Report. Each volume covers a different set of topics.

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



# Key Insights

- \* In the near future, money will be programmable—and more things could become money-like, with quantifiable, liquid, and fungible qualities.
- \* The financial ecosystem is undergoing a transformation as blockchain technology and open-source protocols introduce alternatives to existing regulatory and capital controls.
- \* Due to the surge of interest in non fungible tokens (NFTs), developers are making digital wallets easier to use by wider groups of consumers.
- \* Ethereum has become the dominant blockchain now underpinning thousands of decentralized applications and is the primary contracting platform for NFTs and decentralized finance (DeFi). Ether, which underpins the Ethereum network, is emerging as the dominant collateral in DeFi.
- \* China will push for the broader use of its digital currency, the e-CNY, within and outside of the country.
- \* Visa had a monopoly on payments at the Olympics for 36 years, and in 2022 China's e-CNY was the preferred payment inside the Olympics bubble.
- \* Decentralized databases, powered by blockchain, could enable secure and transparent community dashboards on everything from water quality to city budgets, improving public trust and civic engagement.
- \* The bimonthly paycheck may soon be a thing of the past. Earned wage access (EWA) lets employees receive part of their earned wages in between paychecks.
- \* Banks and insurance companies are using artificial intelligence, telematics, and big data to automate credit risk modeling and update the way credit scores are calculated.
- \* Blockchain-based applications are being used to track the origins of content online, and permanently store original assets, improving the ability of consumers and businesses to authenticate information. This is a powerful tool for combatting censorship and misinformation.
- \* Decentralized autonomous organizations (DAOs) will continue to grow this year. As of March 2022, DAOs have more than \$10 billion of assets under management.
- \* Crypto tokens and blockchain networks are being developed so that fans can own portions of their favorite brands.
- \* Cryptocurrency developers have created software to decentralize the stocks and securities exchange process, allowing individuals to trade directly with one another without relying on a centralized third party to determine prices and settle the trades.





# Currency

2ND YEAR ON THE LIST

# Stablecoins



Tether remains one of the most popular stablecoins, despite controversy surrounding the company.

## KEY INSIGHT

While most people are familiar with Bitcoin, another category of cryptocurrency—stablecoins—is the most widely used. Stablecoins are “pegged” to another asset or a basket of underlying assets. This creates price stability, allowing people to transact with digital facsimiles of commodities and currencies.

## EXAMPLES

By far the most popular stablecoins are Tether and USDC, which are both pegged to the U.S. dollar. While Tether is the most widely used stablecoin, it is also surrounded by controversy as it has faced lawsuits and failing audits related to its cash reserves. Tether’s value proposition is that it is “tethered” to the value of a dollar, and for every Tether in circulation, Tether Ltd., its parent company, has a dollar in its cash reserves. Interestingly, the controversy has not hampered investor interest or global adoption. In November 2020, Visa announced a partnership with Circle to develop a credit card that uses USDC. The regulatory landscape for this innovation is still evolving. In late 2020, U.S. Rep. Rashida Tlaib (D.-Mich.) introduced the STABLE Act, which would require companies issuing stablecoins to obtain a banking license. In 2021, Treasury Secretary Janet Yellen and Federal Reserve Chair Jerome Powell both called for stablecoin regulation. SEC Chair Gary Gensler has been particularly vocal about his criticism of stablecoins.

## DISRUPTIVE IMPACT

Stablecoins, specifically those pegged to the dollar, give people and businesses around the world access to trade in a universal means of exchange without going through traditional financial hurdles. This has had positive impacts for people who want to store their savings in a stable asset instead of a local currency suffering from inflation. It’s been a useful tool for faster, more affordable remittances. This also raises regulatory concerns for circumstances where stablecoins are used to evade currency controls and sanctions.

## EMERGING PLAYERS

- Binance
- Circle
- Coinbase
- Meta (formerly Facebook)
- Gemini
- Tether
- Visa

1ST YEAR ON THE LIST

# Hometown Coins



Communities and cities are beginning to explore how creating their own cryptocurrency can unlock new opportunities and benefits.

## KEY INSIGHT

Community currencies, also known as scrips, have allowed cities, towns, and even neighborhoods to experiment with their own monetary policies for centuries. Now, with the advent of blockchain, there is a resurgence of local currencies and exploration of their potential.

## EXAMPLES

Miami is the first city in the United States with crypto on its balance sheet thanks to MiamiCoin, a project that establishes crypto treasury funds for a city and allows anyone to contribute. The MiamiCoin treasury raised \$4.5 million in 40 days, and the Miami City Council voted to use the funds to mitigate climate change, serve underprivileged communities, and provide incentives for tech entrepreneurs. A similar effort is underway in New York City. In Kenya, the Sarafu network has almost 48,000 registered users engaging with a local virtual currency.

## DISRUPTIVE IMPACT

Backed by smart contracts and accessed on smartphones, local currencies can lead to more resilient and diverse economies. International development aid was over \$150 billion in 2020; distributing it through local currency networks instead of food donations or grants could reduce waste and corruption. Projects like MiamiCoin demonstrate how municipalities can raise funds without hiking taxes or going into debt. Hometown coins can support local initiatives like backing small businesses, reinvesting in city infrastructure, and attracting talent.

## EMERGING PLAYERS

- CityCoins
- Miami
- Grassroots Economics

3RD YEAR ON THE LIST

# CBDCs



The People's Bank of China launched a pilot app that provides access to its digital currency, the E-CNY.

Image credit: Costfoto/Future Publishing via Getty Images.

## KEY INSIGHT

While digital payment rails have exploded in popularity in recent years, the majority of innovation has occurred in the private sector. Central bank backed digital currencies—CBDCs for short—are blockchain-backed tokens issued and managed by central banks. More and more, governments are researching issuing digital currencies of their own in an effort to modernize the monetary system.

## EXAMPLES

CBDCs could update some of the most antiquated areas of global finance. China is the undisputed leader in CBDCs, successfully executing multiple large-scale pilots including at the 2022 Olympics. The rest of the world is following suit, with countries like Nigeria releasing frameworks and white papers for their own projects. The U.S. Federal Reserve has partnered with MIT on Project Hamilton, an in-depth research study in this area, but has yet to commit to issuing a U.S. CBDC. Not everyone is a fan. Controversial whistleblower Edward Snowden has called CBDCs “cryptofascist currencies,” since many implementations of this technology would give states greater surveillance and control of individual citizens and their transactions.

## DISRUPTIVE IMPACT

CBDCs give citizens a public alternative to digital payment infrastructure, in theory allowing for transactions and financial services without exorbitant fees. They could streamline global flows of currencies and foreign exchange markets. The World Economic Forum’s policymaker toolkit for helping central banks investigate CBDCs calls them a potential tool for improved safety and resilience in payments systems; competitiveness of payments systems; better data transmission and reporting to central banks; and financial inclusion.” CBDCs could also expedite the distribution of emergency relief funds after natural disasters or health pandemics. In the case of humanitarian aid, digital currencies are easier to track and monitor. For that reason, critics say that CBDCs also present privacy and surveillance concerns. China is spearheading efforts to establish global standards for CBDCs in order to make them interoperable and compatible.

## EMERGING PLAYERS

- People’s Bank of China
- Central Bank of Nigeria
- Central banks
- MIT Digital Currency Institute
- World Economic Forum



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Decentralization & Blockchain

# Payments & Settlements

13TH YEAR ON THE LIST

# Social and Digital Payments



Apple's new Tap to Pay feature will make it easy for businesses and individuals to accept payment and exchange funds with a tap of devices.

## KEY INSIGHT

Tech companies are leveraging APIs and digital infrastructure to provide seamless, interconnected financial services. Financial institutions, payment providers, and consumer-facing companies are integrating with tech platforms and e-commerce to acquire more customers and fend off competition.

## EXAMPLES

For well over a decade, companies such as Venmo and PayPal, which now have hundreds of millions of users, have worked to bring social payments to consumers all over the world. Consumer-to-consumer (C2C) purchases are increasingly enhanced through services like Shopify, which save a buyer's payment details and make it simple to repeatedly purchase products online without entering any new information. A new announcement by Apple in February 2022 could move C2C and consumer-to-business (C2B) one step closer together. The tech giant launched Tap to Pay on iPhone—a capability that will enable individuals to exchange funds simply by bringing their smartphones closer together. Apple believes this new app will lead to businesses accepting contactless payments as well, without the need for additional equipment.

## DISRUPTIVE IMPACT

This area is rapidly evolving as payment capabilities migrate from apps to devices. Visa is working with auto companies such as GM and Honda to launch connected car payment capabilities including Visa Token Service, CyberSource Payment Management, Token ID, and Visa Direct. Car-based payments could streamline transactions such as paying for curbside groceries or meals, gasoline or electric charges, or parking.

## EMERGING PLAYERS

- Affirm
- Ant Group
- Apple
- Amazon
- Baidu
- Green Dot
- Google
- PayPal
- Shopify
- Venmo
- Visa
- WhatsApp
- Zelle/Bank of America

1ST YEAR ON THE LIST

# Conditional Money



With Bolsa Família, as cash transfers are digitized, recipients' behavior can be more closely monitored and controlled.

## KEY INSIGHT

International aid often comes with conditions for the recipient's behavior such as how the funds are used, and so do the funds parents give to children. Now, apps and payment services are making it possible to automate such conditions, allowing for monitoring and spending controls of sub-accounts. In the near future, money itself may enforce controls for how it can or cannot be spent.

## EXAMPLES

Greenlight is a startup with more than 4 million users that offers a debit card with parental controls and a mobile app. Parents can block certain stores and impose spending limits and rewards based on behavior. In the world of humanitarian aid and international development, conditional cash transfer (CCT) programs have been widely successful, distributing cash payments as individuals meet specific milestones in areas such as education and health. Bolsa Família is a longstanding successful CCT program. As cash transfers are digitized, recipients' behavior can be more closely monitored and controlled.

## DISRUPTIVE IMPACT

As these two signals converge, it's likely we'll see a world where money behaves differently depending on the wallet it's stored. In individual exchanges, the sender could ensure that the recipient spends the money on the intended items—for example, a parent sending money to a child at college to purchase textbooks. We could also see businesses begin to place conditions on expenditure as well, however—in one possible use case, homeowners insurance companies could place restrictions on claim payments to ensure that the money actually goes toward replacing the damaged or lost items.

## EMERGING PLAYERS

- Gates Foundation
- Greenlight
- Bolsa Família

## 1ST YEAR ON THE LIST

# Earned Wage Access



Solutions like Instant Financial's allow employees to immediately access a portion of their pay after every shift.

## KEY INSIGHT

The bimonthly paycheck may soon be a thing of the past. Earned wage access (EWA) lets employees receive part of their earned wages in between paychecks. EWA differs from a payday loan since it is usually offered through an employer or connected to a payroll processor at lower fees or completely free of charge.

## EXAMPLES

Gig work companies like Uber and Lyft pioneered EWA by letting their drivers access their earnings daily for a fee. In 2019, Square was awarded a patent for instant payroll deposits. About a dozen startups including Clair, Green Dot, Instant Financial, and Earnin are actively developing products in this space, promoting financial inclusion and targeting gig workers, hourly earners, freelancers, and contractors—a growing segment of the labor force.

## DISRUPTIVE IMPACT

Immediate access to payroll will directly lead to more employee surveillance and monitoring. Amazon recently came under fire for its draconian “time off task” productivity metric, and yet as more employees ask for EWA benefits, employers will likely put in place additional measures to track their work.

## EMERGING PLAYERS

- Clair
- DailyPay
- Earnin
- Green Dot
- Instant Financial
- Payactiv
- Square

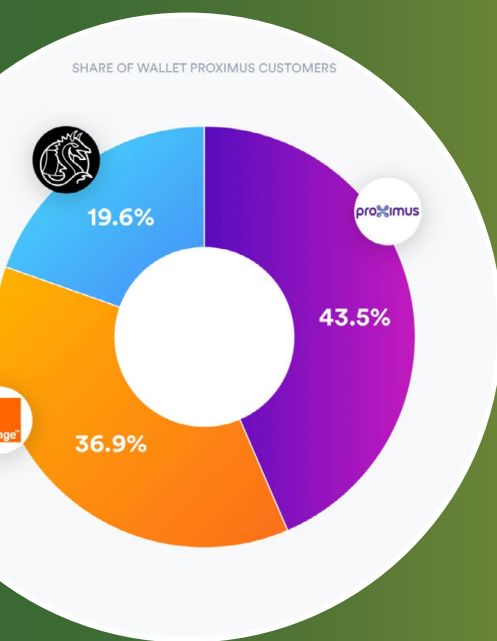




# Banking

## 1ST YEAR ON THE LIST

# Open Banking



Part of Cake's integration offers insights to business customers by leveraging millions of anonymized transactions. Utilizing open banking APIs, Cake can bring together unique data and insights that would otherwise be unobtainable or prohibitively expensive to secure.

## KEY INSIGHT

Open banking enables secure interoperability between third-party organizations and financial institutions, allowing for the creation of tools, products, and platforms that pull together data from various financial institutions into one location.

## EXAMPLES

Efforts to implement open banking began in earnest around 2019, when countries including Australia, Canada, and the U.K. implemented practices and directives that allowed banks to make consumer data available upon request, most often via APIs. The CMA9, the nine largest banks in the U.K. per the Competition and Markets Authority, have been mandated to implement open banking in the region, and announced in early 2022 that the number of open banking users in the U.K. had recently surpassed the 5 million user milestone. Since the inception of this practice, the United States has seen a multitude of startups emerge that aim to pull together financial information for the convenience of users.

## DISRUPTIVE IMPACT

Open banking enables the creation of banking-as-a-service offerings today. Many of these help users make better use of their financial information, and offer analysis that assists with budgeting. Several apps aim to help users trim the fat from their budget, by marrying their financial data with usage data from other apps to suggest which subscriptions to cancel. In the short term, the main benefit is convenience and optimization. In the longer term, however, this technology could enable seamless financial transactions in virtual or highly connected interfaces, in a way that feels invisible and automatic for the user.

## EMERGING PLAYERS

- AIB Group UK
- Bank of Ireland
- Barclays Bank
- Cake
- FIS
- Fiserv
- HSBC Group
- JHA
- Lloyds Banking Group
- Mint
- Nationwide Building Society
- NatWest Group
- Northern Bank
- Personal Capital
- Plaid
- Santander U.K.
- Simplifi

9TH YEAR ON THE LIST

# Alternative Credit Scoring



Companies are leveraging artificial intelligence and new data sources to evaluate credit.

## KEY INSIGHT

Banks and insurance companies are using artificial intelligence, telematics, and big data to automate credit risk modeling and update the way credit scores are calculated.

## EXAMPLES

Today, credit reporting agencies including FICO and Experian offer alternative credit scoring products that use payment data from monthly utility bills and deposit account information. Startups are getting into the space, too; Spin Analytics reads data first and then runs models as needed. It's just one example of the AI-powered automated credit risk modeling services that are now being studied by central banks and tested at commercial banks including BBVA and Crédit Agricole.

Personal insurers are seeking new methods of assessing risk as states increasingly ban the use of credit scores in modeling and price setting. California, Hawaii, Massachusetts, and Michigan already banned the use of credit scores for setting auto insurance rates, and the state of Washington added a ban in 2021. Companies are responding—Root Insurance uses the accelerometer in mobile phones to assess customers' driving and issue a quote.

## DISRUPTIVE IMPACT

Most alternative credit scoring mechanisms today focus on other financial indicators, such as income or monthly expenditures. However, more sophisticated AI or automated methods that could emerge as a result of improved data or connected devices could begin to draw from behavioral or more personal characteristics. In many historical cases, use of AI in credit modeling has increased bias against marginalized groups, typically due to misinterpretation or application of demographic data. Automated processes that are based on behavior and not demographics could result in more equitable outcomes.

## EMERGING PLAYERS

- Experian
- FICO
- Kabbage
- Root Insurance
- VantageScore
- Upstart
- TomoCredit
- Zest AI



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Decentralization & Blockchain

# Web 3.0

# Web 3.0

## Web 3.0 Explained

In the 1990s, most of the web was “read only.” The average consumer could seek out and read information using a browser like Netscape or Internet Explorer. The goal of this early commercial internet, or Web 1.0, was to present content and products to consumers, much like a catalog.

The second iteration of the web, or Web 2.0, gave rise to read, write, and publish capabilities. Blogger and LiveJournal kicked off the platform era, where any consumer could upload content (including videos and audio), sell items, and build communities. Social media sites soon followed, and Facebook, Twitter, and YouTube became dominant players. This era consolidated market share among just a few big tech giants, which now wield tremendous power.

Conceptually, Web 3.0 is intended as a return to the decentralized iteration of the internet in which individual users have more autonomy and control of their privacy and data through the use of blockchain technology to enable new types of transactions and authentication of ownership. Think of Web 3.0 as the next step on a longer continuum, which enables broader computer-to-computer interactions over the internet and easier human-to-machine experiences.

## Key Web 3.0 Developments

Web 3.0’s foundation in blockchain will enable individuals to build out their own connected spaces and assets in ways that previously weren’t possible. Advanced techniques in data mining, natural language processing, and text analytics will make gathering and understanding unstructured data much easier. Machines will collaborate directly with one another and, eventually, teach one another.

Companies like Blockstack and Cosmos are building networking products that will unlock a new generation of applications and services. Reddit co-founder Alexis Ohanian’s VC firm, Seven Seven Six, announced in early 2021 a partnership with Polygon, a technology solutions company that specializes in Ethereum-compatible protocols, to develop new Web 3.0 solutions. Other first movers, such as Reddit and Twitter, are actively investing in new Web 3.0 applications in order to be prepared for the evolution.

## Web 3.0 Applications

The metaverse, a buzzy term since Meta’s late 2021 announcement, will be highly dependent on the Web 3.0 infrastructure. Tokenization, proof of ownership, seamless financial exchange, and provenance authentication—all primarily blockchain-based capabilities—will drive the development of the metaverse. Likewise, the advancement of smart cities, smart contracts, and emerging Internet of Things capabilities will not be possible without Web 3.0 software and infrastructure. Just as cloud computing revolutionized how businesses manage and store information, blockchain and distributed computing will enable a new wave of innovation for information technology and databases, as well as for how consumers and businesses interact and engage.



**Web 3.0 enables people, organizations, and systems around the globe to be seamlessly interconnected while acting independently, allowing for more equitable access to asset ownership and investment.**

4TH YEAR ON THE LIST

# Provenance and Authentication



Content provenance applications are being used to track the origin of information and validate its authenticity and accuracy.

## KEY INSIGHT

Blockchain-based applications are being used to track the origins of content online and permanently store original assets, improving the ability of consumers and businesses to authenticate information. This is a powerful tool for combating censorship and misinformation.

## EXAMPLES

The Coalition for Content Provenance and Authenticity (C2PA) released version 1.0 of its technical specification in early 2022. This protocol provides guidance to content creators on how they can generate tamper-evident media by selectively disclosing certain pieces of information about their content. Many companies are coming together under the C2PA including Arm, Microsoft, and Twitter, in order to combat misinformation online and create easy ways for consumers to detect whether content has been tampered with and trace it to its original source. The C2PA protocol leverages a technique called hard binding, in which an asset and its details and descriptors, as well as its source of origins, are cryptographically bound together. Any alteration to the asset would result in a mismatch that changes the underlying mathematical algorithm, making it possible to detect if the content has been tampered. The News Provenance Project traces the origins of journalistic content

and detects doctored or manipulated images and videos.

Permanent archival is another process made possible by blockchain technology—this open, decentralized, permanent archive of data occurs through protocols such as Arweave. Arweave describes itself as a collectively owned hard drive that allows users and developers to store data forever.

## DISRUPTIVE IMPACT

This type of technology can be used for convenience—never reaching a broken link on the web again—but it can also prevent censorship or suppression. Governments and large corporations routinely delete, alter, or censor online information, but blockchain lets us create a shared permanent ledger from which nothing can be deleted. By adding original content or an index to the blockchain, journalists and media companies can make their content permanent, verifiable, and traceable.

After censorship by WeChat, Chinese activist Yue Xin at Peking University used the Ethereum blockchain in 2018 to publish a letter that detailed a pattern of abuse and intimidation from school administrators. This method was effective in archiving it; however, transaction costs of Ethereum or other cryptocurrencies could make the cost of archiving large bodies of information prohibitively high. In contrast, LikeCoin is a decen-

# Provenance and Authentication



Content provenance applications are being used to track the origin of online content such as news and files and archive them accurately.

tralized publishing infrastructure built for content archival. In mid-2021, when Radio Television Hong Kong began deleting content that covered protests in 2019, users quickly backed up episodes from RTHK. Those episodes were then archived through LikeCoin, which only stores metadata but backs up its content on the InterPlanetary File System, or IPFS—a peer-to-peer file sharing service—to publish and preserve otherwise censored content, such as news articles and Wikipedia pages.

## EMERGING PLAYERS

- Coalition for Content Provenance and Authenticity
- Content Authenticity Initiative
- The News Provenance Project
- Adobe
- Arm
- BBC
- Intel
- Microsoft
- Truepic
- Associated Press
- Internet Archive
- The New York Times
- InterPlanetary File System



**There's a critical need to address widespread deception in online content—now supercharged by advances in AI and graphics and diffused rapidly via the internet. Our imperative as researchers and technologists is to create and refine technical and sociotechnical approaches to this grand challenge of our time. We're excited about methods for certifying the origin and provenance of online content. It's an honor to work alongside Adobe, BBC, and other C2PA members to take this critical work to the next step.**

—Eric Horvitz, chief scientific officer and Project Origin executive sponsor, Microsoft





# Regulation Z Prime

In the early 2020s, fintech companies and large banks bought up providers of “buy now, pay later” or BNPL services—and the mechanism became an embedded finance component of online shopping checkout systems. Soon, BNPL became so commonplace that banks now use it as the primary means for extending credit, effectively getting rid of personal lines of credit and loans.

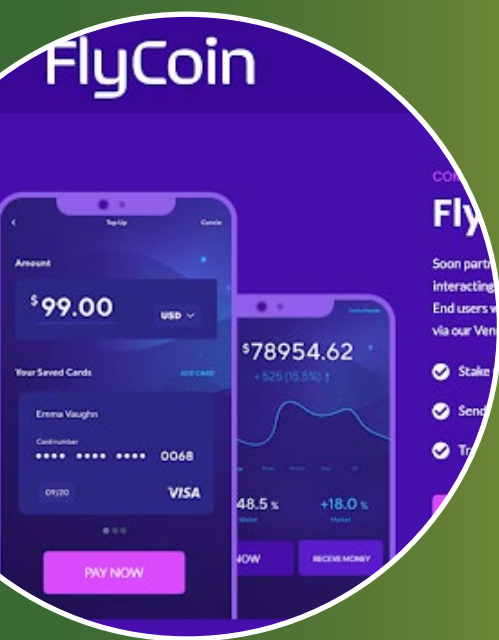
Banks and other financial providers see BNPL as a way to capture revenue with high interest rates that they can apply to unsuspecting consumers who want immediate gratification: Think: that new VR headset right now.

With rampant growth and no regulation, BNPL is pervasive, much like the incessant pop-up ads of the early 2000s. Banks offer BNPL to people who can't afford or understand debt because their creditworthiness models accept anyone who makes any purchase. Much like the mortgage crisis of 2008, lenders wrongly believe they can confiscate the goods purchased as collateral. Because of this zombie collateral, the loans are tranced and redistributed at higher ratings, recreating conditions for the great credit crunch of 2035.



1ST YEAR ON THE LIST

# Token Economics



FlyCoin touts its position as the world's first crypto frequent flyer program. Airlines like regional provider Ravn Alaska are rewarding with FLY coins, which can be used to pay for flights.

## KEY INSIGHT

Token-based business models are developed when a company or entity issues a token that represents usage, utility, value, or a combination of the three. Token economics encompasses everything from incentive mechanisms, supply schedule, distribution, and platform governance. This is gradually revolutionizing how companies finance their operations and do business.

## EXAMPLES

Every cryptocurrency has a specific monetary policy. For example, Bitcoin has a fixed supply of 21 million and a gradually decreasing issuance rate, set at 6.25 bitcoins per block (as of this writing). Ethereum has no fixed supply and a variable issuance rate that depends on network demand. The economic model of these projects helps users estimate price and use cases. Token projects design their monetary policy based on what they are optimizing for. For example, Binance, the world's largest crypto exchange, issued Binance Coin (BNB) in 2017. People who hold BNB can use it for discounted trade rates, exclusive products, and other services. Binance regularly "burns" or destroys coins to regulate the circulating supply.

## DISRUPTIVE IMPACT

The internet has enabled a wide range of new business models such as free-mium, shared-economy, aggregator, direct-to-consumer, and so on. Blockchain and cryptocurrencies are creating even newer business models such as smart royalties, fan ownership, and compounding yield.

Companies are also experimenting with the economics of loyalty. American Express is one such company, which partnered with Boxed in 2018 to experiment with a customized blockchain-based loyalty program. Singapore Airlines likewise tested out a digital miles wallet program for customers. One recent entrant is FlyCoin, which airlines use to reward customers with FLY coins, which can be redeemed to purchase future flights. As loyalty programs evolve, we expect to see more blockchain loyalty platforms emerge that enable customers with these types of rewards to apply across a wide variety of their favorite services.

## EMERGING PLAYERS

- Binance
- Ethereum
- FlyCoin

## 1ST YEAR ON THE LIST

# Decentralized Autonomous Organizations (DAOs)



Constitution DAO consisted of an effort by a group of people to purchase a rare copy of the U.S. Constitution—a move that would have allowed the group to do whatever they wanted with the document once in their possession.

## KEY INSIGHT

A DAO is an organizational model where processes are automated, principles are codified on-chain, and mechanisms exist for members to generate value. Collectively, DAOs have over \$10 billion of assets under management. DAOs exist across various industries including finance, art, media, and law.

## EXAMPLES

The first DAO began with Ethereum in 2016 and lasted only a few months before it was hacked due to an exploited vulnerability in the source code. While the original DAO was short-lived, many other DAOs have proliferated in the years since. The earliest DAOs were treasury management systems, designed to allow token holders to determine the direction of a project, new features, engineering road map, and business strategy. Newer DAOs include freelancer guilds where remote workers can pool their talents to find clients, investment DAOs where members can comanage a portfolio of assets, and media DAOs that have unique incentives to encourage engagement and monetize content. Uniswap, a popular decentralized exchange, formed a DAO when it distributed governance tokens (UNI) to every address that had used the platform before Sept. 1, 2020. Friends With Benefits is a social DAO where token holders can buy season passes for access to exclusive events and content.

## DISRUPTIVE IMPACT

Think of DAOs as co-ops for the web. DAOs facilitate the collective ownership and creation of value. While still in their infancy, DAOs offer promising approaches to classic coordination problems such as managing resources and aligning incentives.

## EMERGING PLAYERS

- Uniswap
- MakerDAO
- Compound
- Friends With Benefits

2ND YEAR ON THE LIST

# Fractional Ownership



In August 2021, over 400 people collectively purchased CryptoPunk 2066 for 1,144.5 ETH, which at the time was worth over \$3.5 million.

## KEY INSIGHT

Fractional ownership is reemerging as blockchain and digital platforms unlock new ways to purchase and own assets. This method for unrelated parties to divide costs and risks in order to collectively own or invest in an asset is most commonly seen in real estate. It's now appearing in fine art, stocks, as well as other industries thanks to the proliferation of business models enabled by smart contracts.

## EXAMPLES

Fundrise is a real estate fintech company based in Washington, D.C., that organized the first crowdfunded real estate development project in the U.S. Otis and Masterworks are two companies that offer fractional ownership for works of art. Schwab and Robinhood recently launched the feature to purchase fractional shares of stocks on their trading platforms. In August 2021, more than 400 people collectively purchased CryptoPunk 2066 for 1,144.5 ETH, which at the time was worth over \$3.5 million. CityDAO is a decentralized community raising funds to buy a parcel of land in Wyoming.

## DISRUPTIVE IMPACT

Most of these companies have a stated mission to democratize investing. While the sharing economy prioritized access over ownership, people are still looking for ways to create and preserve wealth. In theory, more people participating in value creation would lead to more equitable distributions of wealth in the long term. On the other hand, as more people participate in speculative markets, there could be an increase in speculative bubbles and economic instability.

## EMERGING PLAYERS

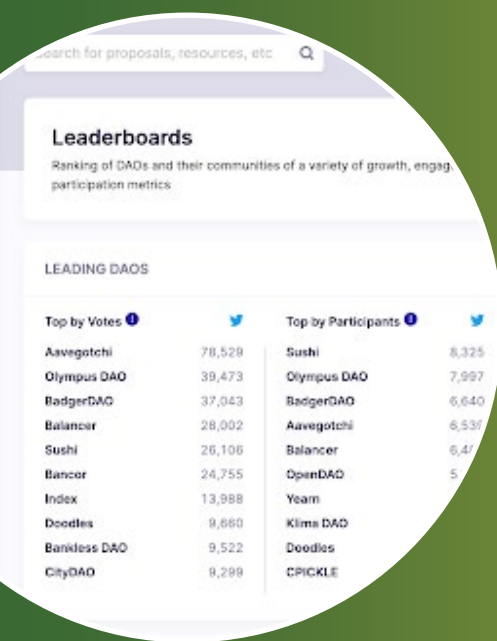
- CityDAO
- Fractional
- Fundrise
- Masterworks
- Otis
- PartyDAO
- Robinhood
- Roofstock
- Schwab

“  
**NFTs represent a first step in the securitization of digital assets. They turn digital data into speculative financial instruments. That shift has enormous implications because computers are in everything, and that makes anything a digital asset—your bank records, your Fitbit data, rings of your smart doorbell, a sentiment analysis of your work email, you name it.**  
”

— Ian Bogost, writing in *The Atlantic*

## 1ST YEAR ON THE LIST

# Tools to Manage Digital Identity and Assets



Boardroom shows a ranking of DAOs and their growth, allowing users to easily see DAO activity as it happens.

## KEY INSIGHT

Decentralized applications and autonomous communities give individuals more control but also require more engagement and understanding to realize their full benefits. A new generation of coordination tools will help individuals manage their assets and identities across applications. Just as Slack replaced email, which replaced paper memos, these tools will change how people work, play, and interact online.

## EXAMPLES

Boardroom and Tally are dashboards that show upcoming governance votes across many DAOs and decentralized projects. Tally also has a leaderboard that ranks the most active voters in the network. Snapshot allows decentralized communities to put up proposals for a vote while tools like Gnosis Safe lets people lock funds in an account that requires multiple signatures. VC firm a16z has open-sourced its process for delegating voting power to more active community members. In this way, the firm is creating a road map for how individuals can have a stake in a community, and keep the community active and engaged while personally taking a less active role.

## DISRUPTIVE IMPACT

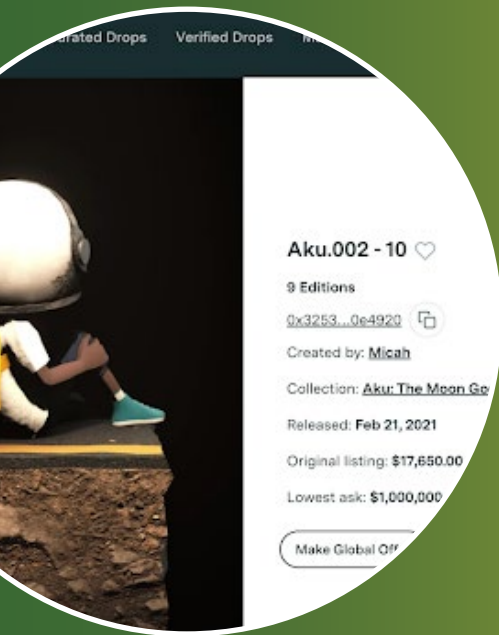
In the near future, people will expect much more control and modularity across devices, platforms, and applications. If Twitter is considering banning a certain politician or celebrity, users will expect to have a vote in that decision. This generation of coordination tools is providing a dramatic improvement in user experience and driving engagement within decentralized projects. It's possible that these tools will be adopted in corporate governance cases or use cases that require a great degree of transparency such as labeling offensive content or misinformation. It is less likely that these applications will find their way to civic systems such as political elections because they rely on completely public votes, and oftentimes votes are weighted by the value in a given wallet.

## EMERGING PLAYERS

- Snapshot
- Gnosis
- Boardroom
- Tally
- a16z

1ST YEAR ON THE LIST

# Fan Ownership Models



High prices like that listed for an Aku NFT on the Nifty Gateway site enable access to unique content that will roll out over time to a limited ownership base.

## KEY INSIGHT

Sports, movies, and music all derive value based in part on the size and strength of their fanbase. Crypto tokens and blockchain networks allow fans to own their favorite brands.

## EXAMPLES

Krause Haus is a collective of basketball enthusiasts raising funds to buy and manage an NBA team. Aku is a young astronaut created by former baseball player Micah Johnson and the first NFT (non fungible token) optioned to become a major feature film. Aku's story is released in chapters and distributed to fans who hold the chapter 1 NFT. Early Aku community members will be rewarded in perpetuity across various vertices. European soccer clubs have raised millions of euros through fan tokens. It hasn't all been smooth sailing in the realm of blockchain-backed fan ownership. Point guard Spencer Dinwiddie attempted to tokenize his \$34 million contract with the Nets and was met with legal hurdles and opposition from the NBA.

## DISRUPTIVE IMPACT

On the surface, fan tokens might seem like a gimmick rewards program for front-row seats, exclusive merch, and unique experiences. If done well, fan tokens can be much more powerful than that—directing important decisions for a brand or creator and earning part of the profits should the brand increase in value overtime. The challenge for many of these projects will be finding regulatory clarity on their token models and avoiding scrutiny from agencies like the SEC.

## EMERGING PLAYERS

- Aku
- Krause Haus
- Galaxy
- Rally

# Consumption Quota

China and the US are neck and neck for the world's largest GDP in 2025. GDP is a global vanity metric that countries use to assert dominance over one another. The world's largest GDP is a coveted spot to have in terms of negotiating global trade agreements and geopolitical policies.

Gross Domestic Product optimizes for consumption. It's a calculation that combines public and private spending and investment. In a world where everything is disposable, producible, purchasable, citizens now also have a civic duty to spend.

During World War II, many governments rationed certain products like automobiles, gasoline, silk, shoes and food like meat, dairy, coffee and sugar. In the future, governments like the US and China might do the opposite - setting consumption quotas on citizens to ensure their rank in the global economy.

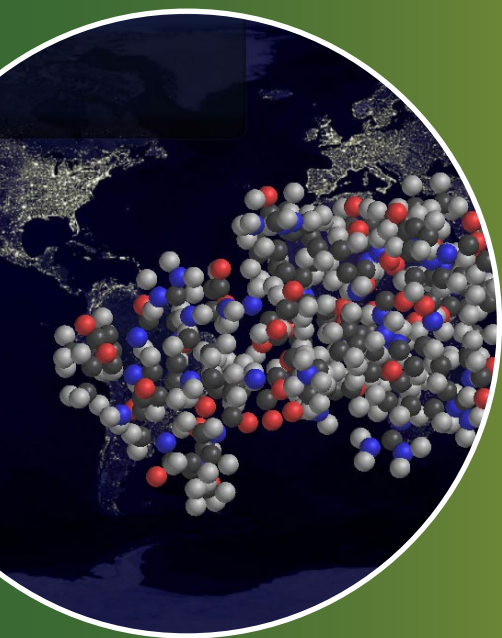
Universal Basic Income and other guaranteed income programs are ubiquitous. Citizens are punished for not spending fast enough since their digital wallets are publicly visible and tracked.





4TH YEAR ON THE LIST

# Distributed Computing Earning Models



## KEY INSIGHT

Large computer problems can be broken down into smaller portions and solved using processing power of multiple standard computers, rather than with centralized supercomputers. Distributed computing technology lets people donate idle processor time on their personal laptops, cell-phones, and other digital devices to support causes or solve socially relevant problems.

It is estimated that the Folding@Home program on COVID-19 research was leveraging over 470 petaflops of computing power.

Source: Stanford University School of Medicine

## EXAMPLES

In 2020, Folding@Home grew to reach 2.4 exaflops—more than the top 500 supercomputers in the world put together—and became one of the fastest computing systems due to increased interest during the COVID-19 pandemic. Folding@Home lets consumers donate idle processing power to fuel disease research via their computers, PlayStation 3s, and some Sony smartphones.

In February 2022, the MilkyWay@Home initiative, which aims to create an accurate three-dimensional model of the Milky Way galaxy, announced that the distributed computing power of its network enabled the measurement of the mass and shape of a dwarf galaxy. Another astro-obsessed distributed computing system, Einstein@Home, uses the computing power it gathers from volunteers to search for weak signals from spinning neutron stars, in order to ultimately make the first direct detections of gravitational-wave emissions from spinning neutron stars.

## DISRUPTIVE IMPACT

Distributed computing systems harness the idle processing power of computers all over the world and are being used to solve tremendous world problems. These distributed systems drive down prices for developers and make it possible for organizations to accomplish greater volumes of research in a much faster time frame. Expect to see more applications in the coming years that allow individuals to contribute to such altruistic projects by donating their time, as well as a greater number of applications that allow device owners to sell their idle processing power, providing them with a new source of income.

## EMERGING PLAYERS

- Berkeley Open Infrastructure for Network Computing
- Einstein@Home
- LHC@Home
- MilkyWay@Home
- MLC@Home
- Rosetta@Home
- Folding@Home
- Stardust@Home
- DreamLab
- Electric Sheep
- Golem Network
- The Great Internet Mersenne Prime Search
- TheSkyNet

2ND YEAR ON THE LIST

# Self-Finding Digital Infrastructure



## KEY INSIGHT

Much of the internet relies on FOSS, free open-source software.

Free open-source software helps source and fund individual distributors that wish to contribute to the development and maintenance of public blockchains like Bitcoin.

## EXAMPLES

Open-source software has often suffered from the “tragedy of the commons” problem in that many people are willing to use a free resource but less willing to maintain it. Open-source development is difficult, and the primary contributors to a project often suffer from burnout and poor compensation. To remedy this, some corporations “sponsor” developers so that they can dedicate their time to development. New mechanisms are surfacing to enable sustainable digital infrastructure.

Gitcoin is a marketplace of bounties for open-source developers who want to contribute to projects and earn income for their work. It caters primarily to the Ethereum blockchain community. Since 2017, Gitcoin has facilitated almost \$40 million of funding to open-source software projects. Other crypto projects such as Zcash earmark a portion of each “block reward” (the amount of new coins that enters circulation with each new block) to go toward community development.

## DISRUPTIVE IMPACT

Many cryptocurrency and blockchain projects depend on open-source development. This industry is also pioneering new funding models that could result in more sustainable and more robust digital infrastructure.

## EMERGING PLAYERS

- Bitcoin
- Ethereum
- Gitcoin
- Zcash



# Decentralized Finance (DeFi)

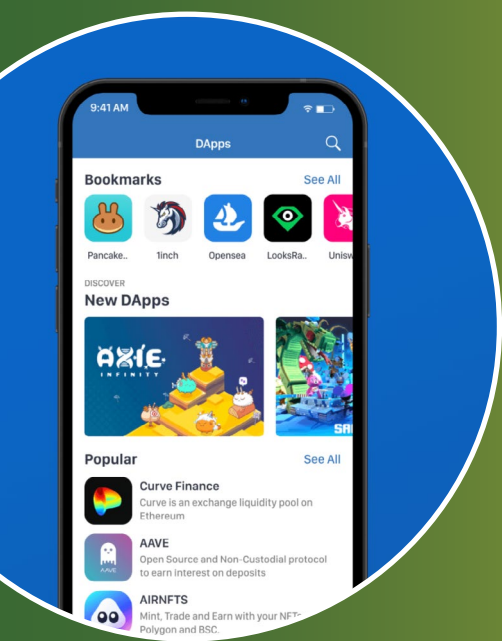
## 1ST YEAR ON THE LIST

# Better Digital Wallets

## KEY INSIGHT

Digital wallets securely store payment information on mobile devices, browsers, and even wearables. Wallets made for Web 3.0 will let you do more than just buy a cup of coffee. They can offer greater levels of autonomy by giving users full custody and control over their digital assets or the ability to sign smart contracts.

Trust Wallet can also be used to access decentralized apps, many of which can leverage or seamlessly interact with the DeFi vehicles (coins) in a user's wallet.



## EXAMPLES

In December 2020, FinCEN was considering implementing heightened rules for “self-hosted wallets,” referring to wallets that are not provided by a financial institution or crypto service, residing instead on a user’s computer or offline. Self-hosted wallets are similar to a physical billfold tucked into your back pocket—as you have money stored there, no one can prevent you from using it. Financial service providers typically ask for personal information when setting up an account in order to adhere to KYC/AML requirements. Metamask is one of the most popular wallets for accessing applications built on Ethereum and related blockchains, reaching over 10 million monthly active users as of August 2021. Its users can sign smart contracts directly from their web browser. Other Web 3.0 wallets specialize in specific protocols or use cases, such as letting users lock funds to provide liquidity to the network and earn interest or participate in governance decisions.

## DISRUPTIVE IMPACT

It is challenging for companies to toe the line between convenience and security, compliance, and user privacy. Web 3.0 wallets offer users more choices for how to store digital assets; however, they also require more tech-savvy to navigate.

Web 3.0 wallets emphasize personal responsibility and self-sovereignty. They tend to save more information on the local device as opposed to a centralized server in the cloud. For this reason, Web 3.0 wallets will likely accelerate and improve the experience around 2FA, password managers, and other security tools. User expectations and behaviors will shift as the experience and design of these applications improve. The value proposition of many of these products is that there’s no Big Brother watching you; the trade-off is that there’s no one to call if you forget your password.

## EMERGING PLAYERS

- MetaMask
- Trust Wallet
- Decred

1ST YEAR ON THE LIST

# Learn to Earn Models

## KEY INSIGHT

Individuals are earning digital currencies by learning how these currencies work. Decentralized platforms benefit from new participants in the network. Micro-payments enable small payouts and blockchain infrastructure allows for a database of verifiable transactions. All of these elements reflect a clear trend of financial incentives around education and product adoption.

Coinbase users can take brief lessons and complete quizzes to earn crypto tokens.

## EXAMPLES

1729.com is a newsletter that pays you instead of the other way around. Each edition generally comes with a task that subscribers can complete, the best submissions earning a few hundred dollars. Rabbothole.gg takes it one step further; the website is a series of quests, challenges, and projects that anyone can participate in and earn crypto upon completion. Coinbase, one of the largest cryptocurrency exchanges, has an educational platform where users can earn \$5 to \$10 in crypto by watching a series of videos and completing short quizzes.

## DISRUPTIVE IMPACT

Verifying digital credentials, whether for education, job recruiting, or social networking, has long been a challenge primarily because there is no standard for who issues the credential and who recognizes its validity. This has led to a cottage industry of learning experience platforms like Lynda.com (acquired by LinkedIn for \$1.5 billion) and learning management systems. For a nascent industry like blockchain, individuals are demonstrating their skill sets simply by showing their wallet address, and the industry is still small enough to coalesce around a standard. It's possible that as the blockchain industry grows, its native standard for credentialing will displace the existing status quo.

## EMERGING PLAYERS

- Rabbothole.gg
- 1729
- Gitcoin
- Credly
- Degreed
- LinkedIn

2ND YEAR ON THE LIST

# DEXes and AMMs



Kyber's Swap interface enables users to quickly exchange coins at the best possible price by giving users access to multiple DEXes at the same time.

## KEY INSIGHT

Cryptocurrency developers have created software to decentralize the stocks and securities exchange process, allowing individuals to trade directly with one another without relying on a centralized third party to determine prices and settle the trades.

## EXAMPLES

Centralized exchanges such as the New York Stock Exchange or Nasdaq facilitate trades of stocks and securities by maintaining a fair, consistent, and transparent process for publishing prices and orders. By decentralizing this process, cryptocurrency developers' software enables investors to trade with each other without a centralized third party. This decentralized exchange (DEX) is usually accomplished through automated market maker (AMM) algorithms.

In traditional finance, market makers provide liquidity in a market by holding both buy and sell positions. In cryptocurrencies and fully electronic markets, assets can be priced based on algorithms instead of the order books used in traditional trading venues such as stock markets. DEXes and AMMs often go hand in hand.

## DISRUPTIVE IMPACT

Pricing algorithms and automated markets are not new, as most of the early applications were in prediction markets and sports betting. Blockchains and digital currencies have led to explosive growth: In 2018 and 2019, the yearly trading volume for decentralized exchanges was around \$2.5 billion. In the first half of 2020, decentralized exchange trading volume had already exceeded \$6 billion. In 2021, monthly trading volume for DEXes was over \$100 billion every single month with over 200 active decentralized exchange protocols.

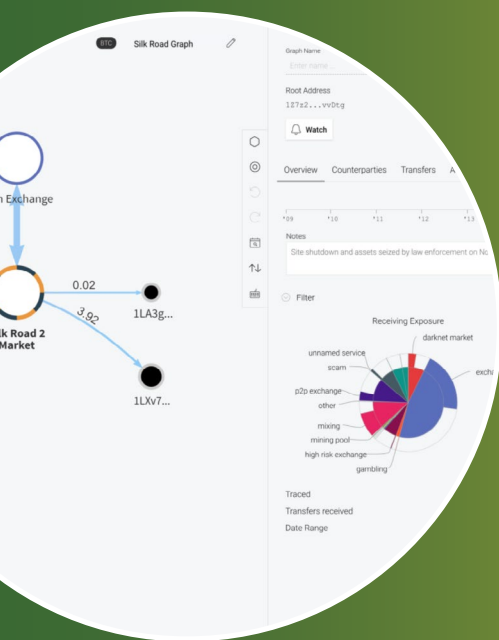
Both of these trends—decentralized exchanges and automated market makers—are part of a larger wave of decentralized finance or DeFi. As more aspects of the global financial system are digitized, there will be a greater demand for modern, impartial, secure systems to settle trades and transactions. DEXes and AMMs are still in the very early days, so bugs, bubbles, and user experience hurdles are to be expected. Still, the underlying innovation in finance is undeniable.

## EMERGING PLAYERS

- Uniswap
- Curve
- Compound
- 0x
- Kyber
- dYdX

## 1ST YEAR ON THE LIST

# On-chain Surveillance



## KEY INSIGHT

Since many digital currencies require a public ledger of all transactions in order to operate, all activity in the network is visible to the public, offering zero financial privacy. As the total market cap for cryptocurrencies nears \$3 trillion, the incentives to monitor on-chain activity grow.

Participants of Chainalysis' Reactor product can investigate cryptocurrency transactions, to make connections to real-world organizations and individuals.

## EXAMPLES

Everyone found out what Mark Cuban was investing in when he promoted his favorite NFT (non fungible token) in January 2021. Because of the nature of Ethereum and Bitcoin, nearly everyone can see the full history of transactions and wallet balance once they discover the wallet address. Context is a company that lets you follow people's on-chain activity to determine which NFTs to invest in next.

## DISRUPTIVE IMPACT

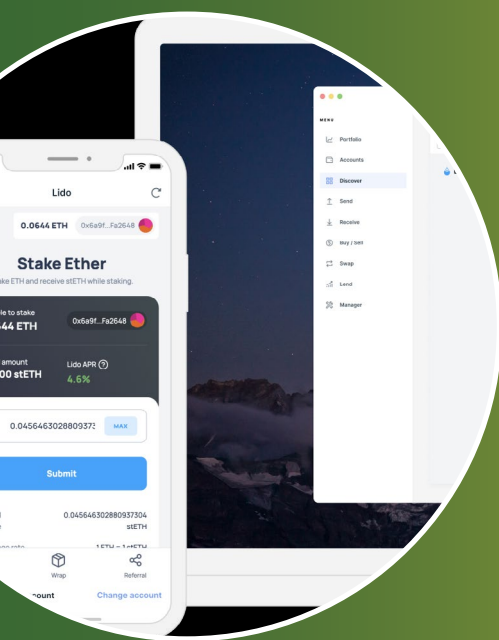
It took BuzzFeed reporters 10 minutes to figure out Joe Biden's Venmo account, and die-hard "Bachelor" fans follow their favorite celebs' Venmo accounts to predict who will receive a rose. Financial surveillance is nothing new; sadly, it seems to be accelerating thanks to digital currencies and fintech. Ironically, a technology born from cypherpunks and privacy advocates seems to be ushering in an unprecedented era of surveillance.

## EMERGING PLAYERS

- Chainalysis
- Context

1ST YEAR ON THE LIST

# Staking



## KEY INSIGHT

Staking allows you to earn rewards based on the cryptocurrencies you hold. Ethereum, the second-largest digital currency after Bitcoin, popularized what's known as the proof-of-stake algorithm for producing blocks.

Investors can use services like Ledger to stake a variety of cryptocurrencies and earn rewards. The process can be as simple as traditionally swapping coins on a decentralized exchange.

## EXAMPLES

The staking mechanism requires users to lock up a given amount of their holdings in order to receive a larger amount after a given period. Staking is beneficial because it adds liquidity and stability to the network.

Staking is the backbone of many DeFi (decentralized finance) models such as yield farming, self-paying loans, and community-owned liquidity. Yield farming refers to the investment strategy of locking in funds to a protocol in order to earn rewards, and reinvesting those rewards in the same or a different protocol to earn more, to chase the highest yield. As of November 2021, the total value of currencies staked or “locked” was \$112 billion, almost 10 times what it was the year before.

## DISRUPTIVE IMPACT

Staking schemes might raise eyebrows for their astronomical APY rates (upward of 8,000%), but the premise is not really different from many interest-based models that make up the current financial services industry.

The disruptive impact comes from the ability for staking to align incentives for participants in a given network.

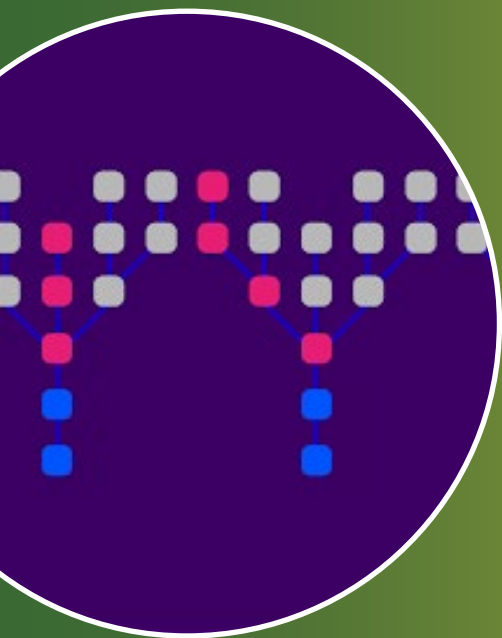
## EMERGING PLAYERS

- Ethereum
- Compound
- Aave



1ST YEAR ON THE LIST

# Smart Oracles



Polkadot says it's facilitating an internet where independent blockchains can exchange information and transactions in a trustless way.

## KEY INSIGHT

Price indexes, stock markets, and other economic indicators are used to determine the health and wellness of economic activity. While these data sources are updated regularly, it's not happening continuously throughout the day. Cryptocurrencies and tokens operate 24/7, making it possible to create smart oracles for economic indicators in near-real time.

## EXAMPLES

In the U.S., the Bureau of Labor Statistics publishes economic indicator reports such as jobs numbers and the consumer price index on a monthly basis. The NYSE operates from 9:30 a.m. to 4 p.m. Eastern time and closes during bank holidays. Projects like Chainlink allow anyone to connect their API to a public network and monetize that data, making market information available 24/7. Projects like Polkadot enable information to flow seamlessly between blockchains. This type of data analytics already happens today to some degree with companies like Oracle and Palantir. They use a combination of external databases, customer data, relational database architecture, and AI to draw business insights for their clients. Now imagine if that level of analytics was made publicly available. Imagine connecting weather information with Amazon pricing information and stock market data to your smart home device.

## DISRUPTIVE IMPACT

Asymmetric information leads to a competitive advantage. Many companies pay top dollar to have their data analyzed and interpreted for strategic insights. Smart oracles built on blockchain enable smart contracts to use real-world data as inputs. Depending on how this trend evolves, we may see a democratization of data analytics or a handful of companies with surveillance programs that rival the U.S. government. From a public good perspective, we may see communities electing to put major datasets on-chain and creating a community dashboard. Either way, big data is only becoming more interconnected and interoperable.

## EMERGING PLAYERS

- Chainlink
- Polkadot
- Palantir
- Oracle

“  
**I don't want new folks entering into crypto to feel like they're transitioning from old Wall Street to new Wall Street. I want the environment to feel approachable and inclusive.**  
”

— Kinjal Shah, senior associate at Blockchain Capital



# Non Fungible Tokens (NFTs)

## 2ND YEAR ON THE LIST

# Non Fungible Tokens



Adoption of NFTs has skyrocketed over the past year, and the tokens are being used to purchase everything from digital art to digital property.

## KEY INSIGHT

Blockchains enable digital tokens that are provably unique and scarce. Digital collectibles saw an early start in areas like eSports, online gaming, and social networks, but have seen an explosion of growth over the past year in artwork and media. The application of these tokens continues to expand across commerce and investing, in addition to extending the breadth of personal art collections.

## EXAMPLES

NFTs have been available to the masses for several years, beginning with the minting of Terra Nullius on the Ethereum blockchain back in 2015. Despite relatively slow growth after that launch, the adoption and sale of NFTs grew exponentially in 2021. Bored Ape Yacht Club was one of the most popular NFTs of the year, with some reaching a price of nearly \$3 million. Many popular companies and public figures followed, with well-known brands such as Christie's and Nike launching their own NFTs, as well as releases by Tom Brady, Grimes, and Snoop Dogg.

Ubisoft and EA began to explore pay-to-play type business models that leveraged NFTs to purchase new game features. In this model, players would receive in-game NFT collectibles. However, many players pushed back due to the environmental concerns that surround NFTs, because of the amount of energy it takes to mine a blockchain, as well as the amount of time it would take for players to earn such tokens.

## DISRUPTIVE IMPACT

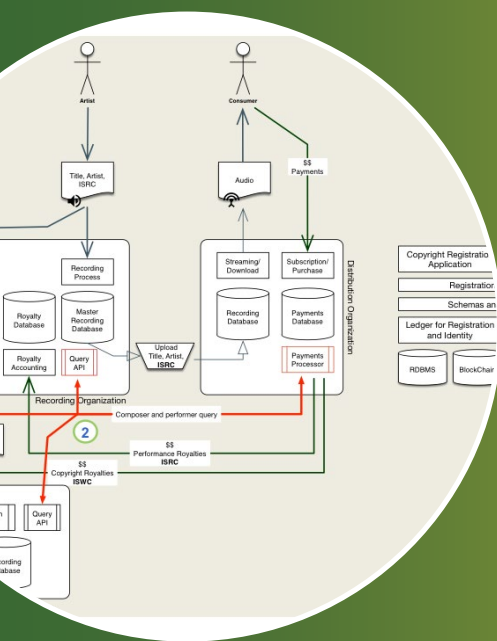
Digital collectables are not the long-term trend here—the infrastructure is. Watch for minting and authenticating assets as one's own in a virtual world—a capability that will be a cornerstone to the development of Web 3.0 and the metaverse. NFTs in the future will likely be used to monetize other types of property. Personal data will benefit from standardized tokenization, by allowing individuals to verify that data is one's own. Additionally, NFTs will be attached to real-world items, such as cars, clothing, or luxury handbags, allowing for an authentication chain that validates ownership, and for future owners of that real property to trace its history.

## EMERGING PLAYERS

- OpenSea
- Christie's Auction House
- Snoop Dogg
- Nike
- NBA
- Roblox
- Rarible
- Gucci
- LVMH
- SuperRare

5TH YEAR ON THE LIST

# Smart Royalties



KEY INSIGHT

Blockchain networks offer new ways to track ownership, licensing, and royalties through smart contracts, or self-executing agreements with terms directly written into lines of code.

The Open Music Initiative is working to solve many royalty payment gaps within the music publishing industry. The red lines are aspects of the OMI's process and API that ensure fair payments to each artist and contributor.

EXAMPLES

Blockchains form the foundational infrastructure layer for new, low-friction ways to automate royalty payments for digital intellectual property. A smart contract, for instance, would automatically pay an artist when her song is streamed or simply track the number of times people share online content, preserving it in a shared public database.

ConsenSys Mesh is debuting an NFT platform called TreeTrunk on the Polygon Mumbai testnet. Tree Trunk collects and distributes royalty payments from secondary sales of NFTs using a method called crypto-lithography, which allows artists to create unique and numbered prints or copies of their work. This method will ensure that artists' material is protected from fraudulent copies, and that artists will receive royalty payments from subsequent sales of their content. Metablaze is releasing a collection product that aims to do the same thing, and incorporates NFT based perpetual royalties set on the Ethereum blockchain.

DISRUPTIVE IMPACT

This type of royalty authentication could be used in a vast array of applications moving forward. Most obviously, content creators will have better mechanisms for maintaining their rights to their content and subsequent payments. Additionally, however, this same model could be applied to any other form of content that could yield a micropayment upon usage—individual likenesses, aspects of personal data and information, new articles and reports that sit behind paywalls, photographs, and many more. Currently, much of the content online is available broadly and publicly, even if the content creator intends for there to be limitations on its use. This type of tracking and verification mechanism could change the nature of accessing and sharing information—and more specifically, the value that information holds.

EMERGING PLAYERS

- Associated Press
- Ethereum
- Mycelia
- Open Music Initiative
- Berklee College of Music
- ConsenSys Mesh

## 1ST YEAR ON THE LIST

# Monetizing Memes



Side Eyeing Chloe, a popular meme for expressing concern or disapproval, sold for 25 ETH in September 2021—just over \$76,000 at the time of sale.

**KEY INSIGHT**

Internet memes are viral images that spread across the web. Chef Salt Bae parlayed his viral moment into a chain of steakhouses, but otherwise the subjects in those images rarely receive any compensation despite their wild popularity. NFTs are empowering meme makers to monetize their original work after it becomes viral.

**EXAMPLES**

In 2021, NFTs of Disaster Girl and Bad Luck Brian sold at a digital auction, commanding \$500,000 and \$36,000 respectively. Many recent popular memes sold have all been purchased by a single buyer. Disaster Girl along with Charlie Bit My Finger, Overly Attached Girlfriend, and Side Eyeing Chloe were purchased by 3F Music, a Dubai-based music producer. The sales did not include transfer of copyright.

**DISRUPTIVE IMPACT**

It might be hard to understand why someone would pay for a picture that is widely distributed throughout the internet, but in the near future, all memes may be monetized. NFTs have the power of making digital images scarce. As a meme becomes more popular or goes viral, there is value in proving that an influencer or brand was an early adopter or one of the first “in the know.” Not only can the subjects of memes capitalize on their likeness, future memes can also be leveraged as a means of distributing tokens or building online communities.

**EMERGING PLAYERS**

- OpenSea
- Bequant
- Discord
- TikTok
- Instagram

1ST YEAR ON THE LIST

# Proof of Everything



## KEY INSIGHT

One characteristic of blockchains is the permanent history of transactions broadcasted on a public ledger. NFTs can act as badges that prove your membership in a group, your attendance to an event, and even certain skills on your résumé.

Collect badges for everything you've attended and store them in your POAP NFT wallet. These digital momentos show others where you've been and what you've experienced.

## EXAMPLES

A POAP badge is an NFT that proves your attendance to an event. Rabbithole.gg is a platform that lets you transform your digital wallet into a Web 3.0 résumé by completing certain tasks. The World Food Program was criticized for a blockchain pilot program that required refugees to scan their irises in order to get their food stipend.

## DISRUPTIVE IMPACT

Digital proofs will become more common as we spend more of our lives in a digital (and therefore borderless) world. Proof of everything also means ubiquitous surveillance and new social norms for establishing trust and building rapport.

## EMERGING PLAYERS

- Rabbithole
- Everything Blockchain



# Knock-on Trends



## 1ST YEAR ON THE LIST

# Crypto Mining Fuels Green Energy



The energy-intensive nature of cryptocurrency mining is driving the industry to search for renewable energy solutions to support the work.

**KEY INSIGHT**

Crypto mining provides security to the Bitcoin network by rewarding computers for validating transactions, but it's widely criticized for being energy-intensive. A new generation of crypto mining companies is focusing on renewable or otherwise green energy to fuel their operations.

**EXAMPLES**

For years, crypto miners have leveraged wind and geothermal and hydro energy as sources for cheap electricity to mine Bitcoin and other currencies. El Salvador mined the first bitcoin using volcanic energy in the summer of 2021. In El Salvador, 22% of the energy comes from geothermal activity such as volcanoes. In the U.S., entrepreneurs are establishing mining operations near fossil fuel plants in order to capture energy that would otherwise go to waste or reduce pollutants entering the atmosphere. HODL Ranch in Texas operates using the state's wind and solar energy, and has an agreement with the state to suspend mining operations when the electric grid experiences a surge in demand. Crusoe Energy Systems sets up mining operations using natural gas near pipelines that would otherwise be burned off in flares. MintGreen, a Canadian cleantech startup, will provide heat to the city of North Vancouver using electricity from mining bitcoin.

**DISRUPTIVE IMPACT**

Bitcoin mining is spurring a conversation on what should count as "green" energy and what counts as energy waste. Beyond bitcoin, this trend will challenge communities to be more creative with how energy grids are designed, managed, and monetized, eventually resulting in a better alignment of sustainability and profit.

**EMERGING PLAYERS**

- Compass Mining
- El Salvador
- Galaxy Digital
- HODL Ranch
- MintGreen
- Riot Blockchain

1ST YEAR ON THE LIST

# Community Dashboards



The city of Asheville, North Carolina, launched a dashboard in early 2022 that provides point-in-time data on homelessness.

## KEY INSIGHT

Governments have reams of information that would benefit their citizens if only it was easier to access and understand. Decentralized databases, powered by blockchain, could enable secure and transparent community dashboards on everything from water quality to city budgets, improving public trust and civic engagement.

## EXAMPLES

Throughout the COVID-19 pandemic, communities worldwide produced dashboards to track outbreaks, infections, and vaccination rates. Some of these efforts were managed by municipal health departments while others were the results of civilian volunteer efforts.

In addition to a slew of COVID-19 and public safety-related dashboards, communities are experimenting with these centralized data hubs for a variety of other applications. In February 2022, the Indiana State Board of Education released a first look at its new dashboard. The hub provides information about the state's public K-12 schools across five key areas: academic mastery; career and postsecondary experiences and credentials; collaboration and communication skills; work ethic; and digital, financial, and civic literacy. The city of Asheville, North Carolina, launched a different kind of dashboard in early 2022, one that provides point-in-time data on homelessness in the city.

## DISRUPTIVE IMPACT

Community dashboards are a likely outcome as movements toward open government and civic tech gain popularity and local newsrooms continue to disappear. As more people have access to public information, more groups can monitor them to ensure accuracy. While people have grown accustomed to the notion of governments surveilling their citizens, citizens surveilling their governments is an exciting new paradigm for accountability and public services.

## EMERGING PLAYERS

- Taiwan
- Indiana State Board of Education
- Asheville, North Carolina
- Virginia Department of Health



**For a long time, Web3 has been very theoretical, but now there is a surge of momentum to build.**

— Elon Musk, CEO, Tesla



# How these trends impact your company



## STRATEGY

Innovative use cases for blockchain abound, but the complexity of the ecosystem remains a hurdle for most companies. Given the meteoric rise of NFT popularity and metaverse buzz over the past year, many organizations have raced to invest, purchasing digital land or assets on which they cannot easily calculate their return. Disorganized experimentation without strategic positioning jeopardizes positive outcomes and returns on investment. Chief strategy officers should take the time to evaluate current internal needs and identify areas of potential investment in blockchain or NFTs that will help them achieve their near- and mid-term goals.



## INNOVATION

Companies interested in blockchain often struggle to find meaningful use cases, but recent developments of new decentralized, blockchain, and/or NFT offerings have revealed a possible solution or offering for nearly any need. Chief innovation officers should work within their organization to identify capability gaps. Is more, and more efficient, data collection needed? Are consumers demanding new ways of interacting? Or does the organization need a new way to deliver value to the market? Once a set of strategic needs has been addressed, a blockchain or decentralized solution likely exists that can be smartly leveraged to help the company see the benefits of such innovation in the near term.



## R & D

Once viewed as falling squarely in the financial services industry, companies across all industries are beginning to see the possible applications of decentralized or blockchain technology. There continues to be a need for experts in a variety of fields to experiment with decentralized solutions and identify current problem areas for which these technologies could be a good fit. Focused investment and experimentation in this space to validate potential success could help companies both learn more about this evolving space and become the first beneficiaries of their own exploration.



## GROWTH

In the longer term, business models will be forced to transform as financial markets are increasingly penetrated by new value mechanisms, smart contracts become the norm for agreements and terms, and methods of value creation evolve. Organizations must begin now to evaluate the various business practices that could be most disrupted by this shift, and identify ways to begin their transition and transformation, in order to be prepared for the changing dynamics as they emerge.

# Key Questions

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

## 1

- ▶ How will blockchain and decentralized finance change the way we conduct transactions with our customers, employees, and supply chain?

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- ▶ How could blockchain-based assets such as cryptocurrency and NFTs be used to create new or added value from our existing business offerings?

## 2

- ▶ What new systems or data collection mechanisms would we need to implement to succeed in this new paradigm?

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- ▶ What new types of data might we be able to collect on our business and our customers using these solutions, which could be converted into deeper insights about our operations and offerings?

## 3

- ▶ What parts of our business are the most ripe for disruption brought about by NFTs, cryptocurrency, digital currency, and decentralized technology?

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- ▶ What can we do today to begin preparing for this new way of doing business?

# Trends in Action

## Benefits of Strategic Foresight

### 33% Higher Profitability

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

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### 200% Growth

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

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### 25% Improvement

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

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

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

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

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

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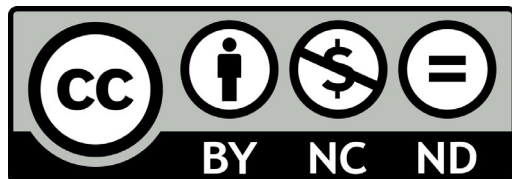
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