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THEMATIC INSIGHT

The Blockchain Future: Security, Trust and Individual Control?

A disruptive technology for society and business beyond cryptocurrencies and non-fungible tokens

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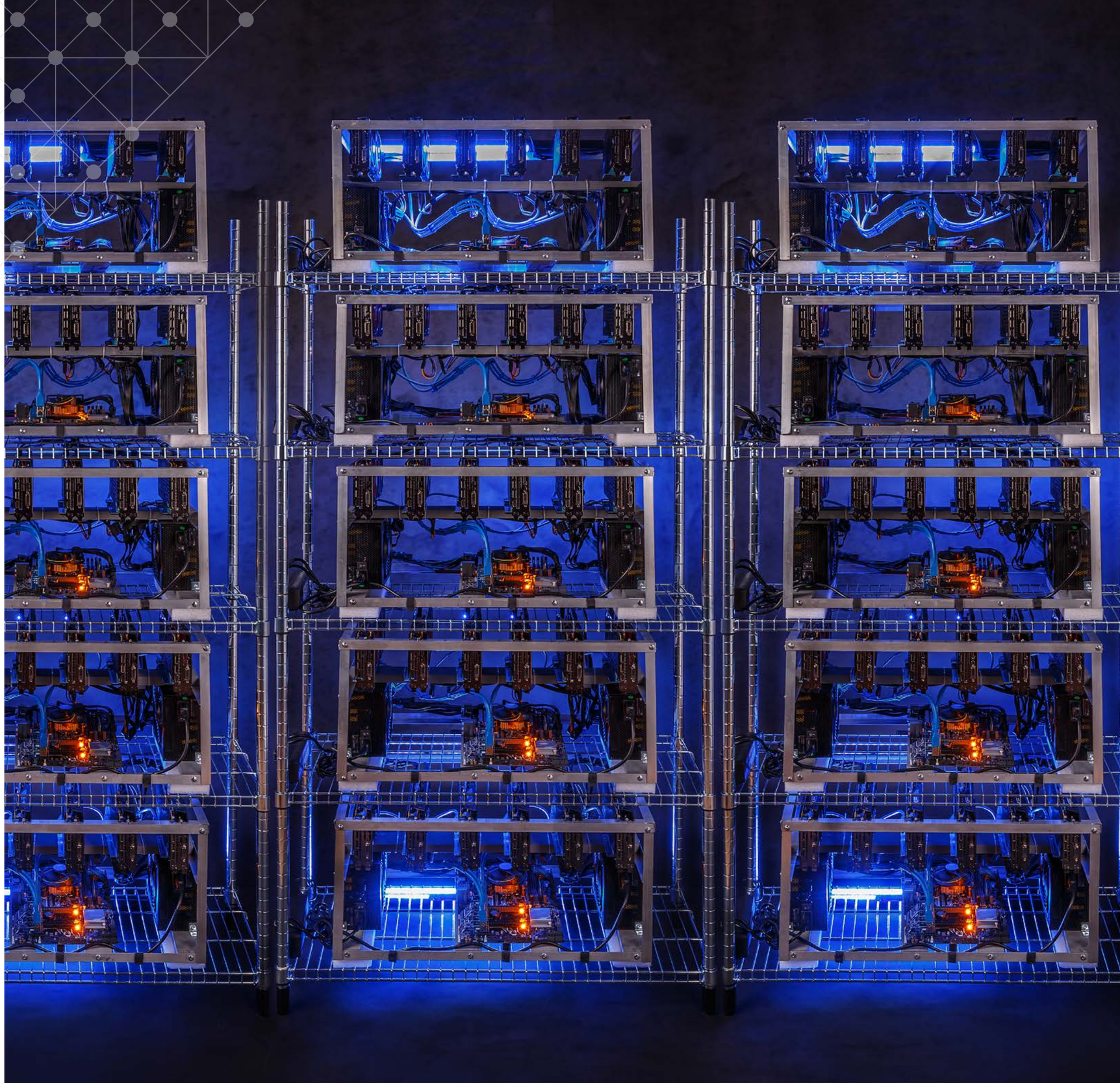
Contents

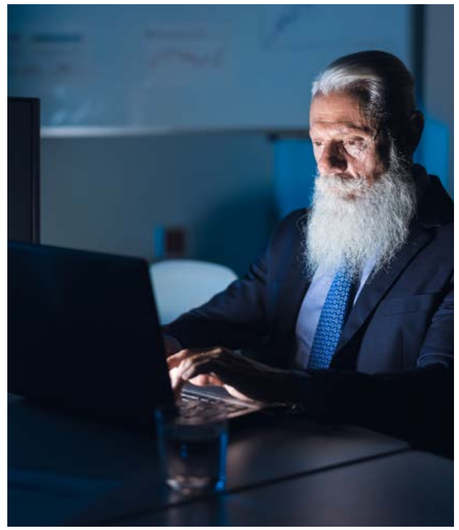
10 Blockchain and the evolution of the cloud



Introduction

Many market observers and investors may have paid too much attention in 2021 to cryptocurrency and NFTs — and too little to the underlying technology such as Blockchain.[1] Typing blockchain predictions into a search engine in mid-2021 yielded pages of links to speculative writing on cryptocurrency valuations and price movements. But discerning what leading thinkers were saying about the blockchain technology itself the foundation that enables decentralized finance, or "DeFi," was rather harder.[2]

In recent years, cryptocurrencies like Bitcoin, as well as NFTs, have dangled the chance of high returns to well-timed speculators and "hodlers," or buy-and-hold investors.[3] Perhaps understandably, we have seen greater interest in the chance of rich winnings from direct cryptocurrency investment than in the more abstract, indistinct potential of blockchain itself. But there are potential transformative possibilities suggested by the underlying technology, particularly in the space of digital security. In the long term, those capabilities may overshadow cryptocurrency and NFTs as a transformative, long-term societal good.



1 A non-fungible token (NFT) is defined as a unit on a distributed digital ledger that can certify the uniqueness of a particular digital asset — and that its future provenance and ownership are transparently trackable. NFTs have garnered recent attention within the media, art, music, entertainment and sports worlds.

2 Also known as DFMI, for decentralized financial market infrastructure.

3 "Hodler" derives from the colloquial acronym HODL: "Hold on for Dear Life."

Digital Security **and Trust**

Blockchain, the engine underpinning cryptocurrencies and NFTs, has remained poorly understood or explained in many quarters, even as crypto-speculation and market valuations surged.[4] There is little reason for such mystique. In simple terms, a blockchain is a database where information is stored over time: a kind of virtual ledger. Information is packaged in virtual "blocks" that get "chained" together. With each new contribution, the "chain" of data assets lengthens. Older blocks embedded in the chain become harder to modify.

There are two main advantages here. First, traditional, static databases can grow less secure over time: Users forget to change passwords, old security protocols age or cybercriminals simply figure out a back-door attack vector. In contrast, blockchain data grows more secure over time, because the chain is constantly growing. Blockchain's other potential win versus older-generation databases lies in the lack of central control. Public blockchain facilities offer any participant a peer-to-peer framework for warehousing and transmitting sensitive information without close bank or tech giant oversight. If Bob sells Carol a car and Carol transmits payment to Bob via blockchain, the transaction is validated by Carol and Bob alone, with no need for a third party.

In their earliest forms, public blockchains did not emphasize transactional privacy, but that is changing. "Public blockchains have matured considerably in terms of privacy and security solutions, leading to a higher level of acceptance among enterprises and likely a larger scale of adoption in the near future," Paul Brody, consulting firm EY's global blockchain leader, said.[5] Meanwhile, "blockchain could potentially change the transactional mechanics of the entire global economy," online IT trade publication TechRepublic has suggested.[6]

4 Kharpal, A. "Cryptocurrency Market Value Tops $2 Trillion for the First Time as Ethereum Hits Record High." CNBC.com, April 6, 2021.

5 Brody, P. "If You Build a Blockchain, Will Anyone Come?" TheBlockCrypto.com, Dec. 11, 2019.

6 "Quick glossary: Blockchain." TechRepublic

Exhibit 1:
Worldwide spending on blockchain solutions from 2017 to 2024

Source: Statista, Blockchain - Statistics & Facts, May 2021

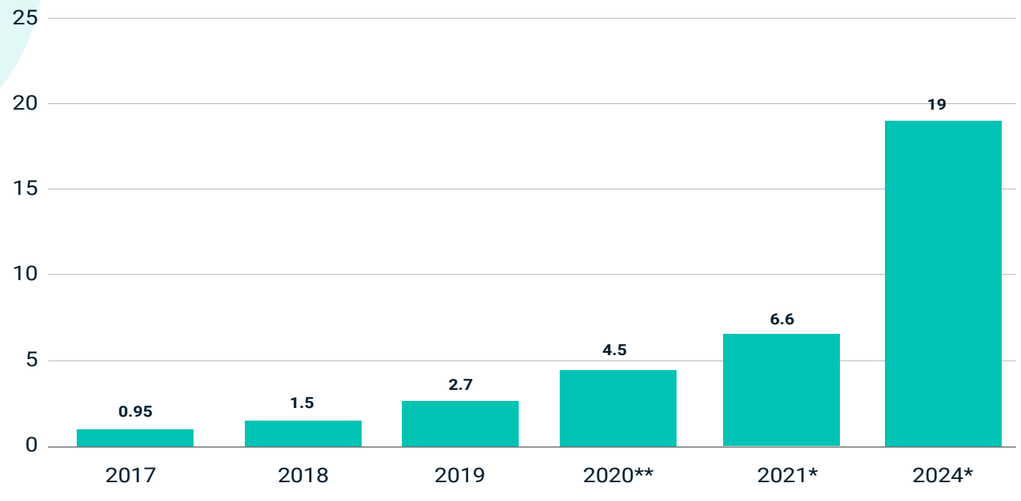
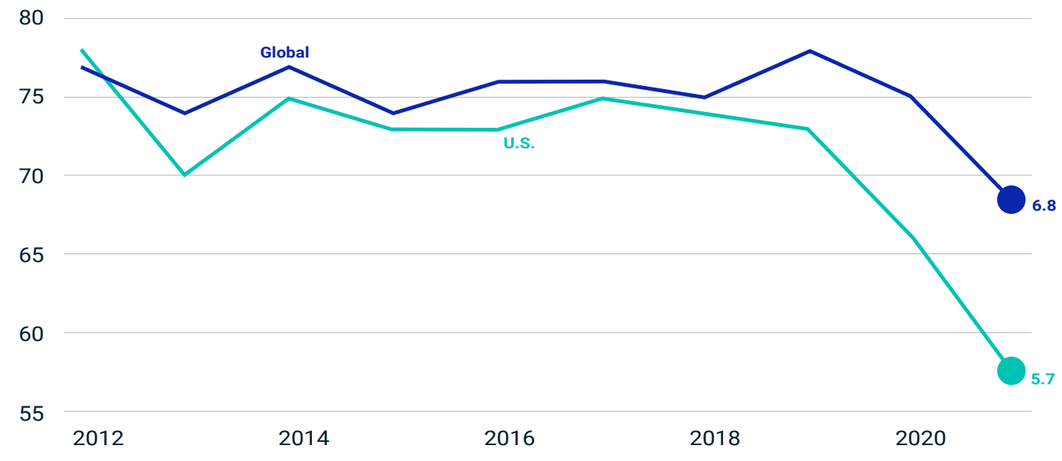


Exhibit 2:
Technology sector trust decline deepens

Source: Edeiman Trust Barometer



The potential utility of blockchain technology exceeds just buying and selling activity. For example, a blockchain solution is used by multinational conglomerate Berkshire Hathaway to secure supply chains in its railroad and jewelry businesses, and by mega-retailer Walmart to streamline complex food distribution systems.[7] "Creating a (traceability) system for the entire food-supply ecosystem has been a challenge for years, and no one had figured it out," according to Walmart's Technology Senior Director Karl Bedwell. "We thought that blockchain technology might be a good fit for this problem, because of its focus on trust, immutability and transparency." (With a blockchain solution implemented, the time required by Walmart, for example, to trace the origins and status of mangoes en route to U.S. stores went from seven days to 2.2 seconds.[8])

In another corporate scenario, the Toyota Research Institute (TRI) is exploring blockchain-centric solutions to the problem of securing autonomous vehicle networks. "TRI believes blockchain may create transparency and trust among users, reduce risk of fraud and (enable) reduction or elimination of transaction costs such as fees or surcharges applied by third-party institutions," Toyota said. "Blockchain technology may allow companies and individuals to securely share and monetize their driving information and access the data contributed by others in a secure marketplace."[9] Walmart and Toyota's uses of blockchain, while tactically different, highlight a common focus on trust and security.

Survey data suggests public trust in Big Tech and its data-hungry platforms is waning. For example, the 2021 Edelman Trust Barometer put trust in the tech sector at an all-time low: U.S. consumers were more wary of Big Tech than of the food and beverage, health, transportation, manufacturing or retail industries, among others.[10] Against such a backdrop, decentralized blockchain solutions may seem attractive. Blockchain could perhaps shift the balance of power in a digital world in which service providers aim to observe and profit from their users' every choice, purchase and expression of preference.

7 Noto, A. "IBM, Berkshire Want Blockchain Tech to Ensure Ethical Jewel Sourcing." New York Business Journal, April 26, 2018.

8 Hyperledger. n.d.. "How Walmart Brought Unprecedented Transparency to the Food Supply Chain with Hyperledger Fabric." The Linux Foundation.

9 Toyota Research Institute. 2017. "TRI Explores Blockchain Technology for Development of New Mobility Ecosystem.

10 Fried, I. "Exclusive: Trust in Tech Craters." Axios.com, March 31, 2021.

Toward a More Personal **and Private Internet?**

Facebook users today are, metaphorically speaking, all too naked. Every "like" they volunteer and every "Shop Now" button they click feeds an algorithm, enriching a proprietary database that tracks everyone's spending as well as social and political personas. Social media platforms monetize that profile data, renting targeted lists to direct advertisers, political campaigns and many more customers. Data monetization is the principal engine of these platforms' profitability, which continues to rise.[11]

To help protect that business model, Big Tech has long sought to normalize this transparency and digital exposure. More than 20 years ago, in 1999, Scott McNealy, co-founder of Sun Microsystems, declared, "You have zero privacy anyway. Get over it!"[12] Legislation like the General Data Protection Regulation (GDPR) in the EU and common consumer use of ad-blocker browser extensions and "incognito windows" suggest, however, that digital citizens increasingly chafe at words like McNealy's. Blockchain may offer a route to proving him wrong. In a blockchain-centric world, a user's transaction records could be well-concealed. The challenge to social media platforms' business models could be profound.

The futurist George Gilder expects blockchain technologies eventually to catalyze the downfall of tech providers that harvest passively provided individual data for profit.[13] "Whereas Google now controls your information and uses it free of charge, you will be master of your own information and charge for it freely," he has stated. "Whereas Google envisions an era of machine dominance through artificial intelligence, you will rule your machines." Gilder predicts a coming, user-empowering "cryptocosm" — meaning "a network whose private keys are held by individuals, not by government or Google," which would disenfranchise Big Tech.

The most important motive for a blockchain-empowered future is not the promise of riches from competing cryptocurrencies, but rather cybersecurity itself. Digital security is challenging in part because valuable information (financial data, passwords, intellectual property, personal or health data) resides in central, vulnerable repositories or is transmitted insecurely. Hackers penetrate corporate networks because they, to paraphrase famed U.S. bank robber Willie Sutton, are known to be "where the money is.[14] "The present-day digital world is a galaxy of private but vulnerable ecosystems that may exploit their users' digital footprint while also suffering regular and severe cyberattacks. A future, "Gilderesque" digital world running on blockchain could be decentralized, communally controlled, better trusted and more secure.

For cryptocurrency investors, though, the 2021 landscape has seemed not only less secure, but also more volatile and uncertain. At a 2019 conference on open-source blockchain network Ethereum, EY surveyed blockchain developers and other professionals and reported that 90% did not believe the public at large understood the purpose of Ethereum.[15] And that was at a time when crypto ownership was much less widespread, just two years ago. To illustrate the disconnect between blockchain and cryptocurrency issues, the crypto sector crashed in May 2021, shedding USD 1.3 trillion in market value. Bitcoin's valuation fell 50% between April and May. Such volatility is perhaps to be expected if the underlying network is poorly understood and valuations seem too often driven by investor sentiment and social media chatter.

The survival of cryptocurrencies as constituted today is anything but guaranteed. In early 2021, CoinMarketCap estimated nearly 8,000 varieties exist, with a precise count unknowable: more continue to be launched at a steady rate, even as incumbents die.[16] Yet crypto in some successor form is likely to persist. More than 80% of central banks worldwide are studying digital fiat currencies, if only as a strategy to keep government tender relevant, and in the spring of 2021, China became the first major economy to issue one: a "cyber yuan."[17,18] The NFT craze, in contrast, seems comparatively more fragile. In 2021, valuations of artworks and even mere internet memes sold as NFTs soared to what art experts called outlandish, unsustainable levels, then plummeted with equal speed.[19] NFT pricing seemed driven skyward by speculators gripped by a fear of missing out — not the best basis for long-term stability. Consulting firm Gartner appears to have confidence in blockchain as well. In 2019 it predicted blockchain technologies would create USD 176 billion in new value for businesses by 2025, USD 3.1 trillion by 2030.[20]

11 Issac, M. "Facebook Nearly Doubles its Profit and Revenue Rises 48 Percent, as Tech Booms." The New York Times, April 28, 2021.

12 Cochran, A. "You Have Zero Privacy. Get Over It." Beacon Senior News, March 3, 2020.

13 Gilder, G. Life After Google: The Fall of Big Data and the Rise of the Blockchain Economy. Washington, D.C.: Regnery Gateway, 2018.

14 U.S. Federal Bureau of Investigation (FBI). n.d.. "Famous Cases and Criminals: Willie Sutton," FBI.gov.

15 Brody, op. cit. Page 3.

16 Wanguba, J. "How Many Cryptocurrencies Are There is 2021?" E-Crypto News, n.d.. https://e-cryptonews.com/how-many-cryptocurrencies-are-there-in-2021/

17 "Will Central-Bank Digital Currencies Break the Banking System?" The Economist, Dec. 3, 2020.

18 Areddy, J. "China Creates Its Own Digital Currency, a First for Major Economy." The Wall Street Journal, April 5, 2021.

19 Cascone, S. "It's Whiplash: After a Record-Setting Run, NFT Artwork Prices Have Plummeted Nearly 70 Percent in Four Weeks." Artnet.com, April 13, 2021.

20 Lee, A. 2019. "How to Position Blockchain Platforms to Increased Adoption," Gartner.

Blockchain and **the Evolution of the Cloud**

As the blockchain concept grows more familiar and accepted, blockchain applications will likely become more commonplace. We may benefit from currently unforeseen creative applications of the technology. But the timetable for arrival of those benefits is unclear.

Consider, as precedent, the decades-long migration of business data from on-premises computer hardware to the cloud. When remote data servers first emerged — before they were termed the "cloud" — few predicted they would enable the emergence of new classes of web-based service providers, such as app-based banks, able to go to market owning minimal hardware of their own. The cloud has transformed business and society in unanticipated ways. Should we not expect the unexpected with blockchain?

Cloud computing did not eclipse old paradigms overnight.[21] The cloud narrative may suggest that a potential blockchain revolution may also take some time to take hold. Some argue that blockchain innovation will take a generation to gain wholesale trust and scale. "Our experience studying technological innovation tells us that if there's to be a blockchain revolution, many barriers — technological, governance, organizational and even societal — will have to fall," wrote Marco Iansiti and Karim R. Lakhani of Harvard Business School in a 2017 article. "True blockchain-led transformation of business and government, we believe, is still many years away."[22]

Yet society and business alike today may be primed to adopt new technologies at more aggressive rates than in the past. This potentially greater comfort level with technological change may support a blockchain-driven transformation of business and consumer behavior on a faster schedule than other past potential "game-changers".

13 Gilder, G. Life After Google: The Fall of Big Data and the Rise of the Blockchain Economy. Washington, D.C.: Regnery Gateway, 2018.

14 U.S. Federal Bureau of Investigation (FBI). n.d.. "Famous Cases and Criminals: Willie Sutton," FBI.gov.

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20 Lee, A. 2019. "How to Position Blockchain Platforms to Increased Adoption," Gartner.

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Dr. Cole is the author of several books, including "Cyber Crisis: Protecting Your Business from Real Threats in the Virtual World" (2021), "Advanced Persistent Threat" (2012), "Hackers Beware" (2001), "Hiding in Plain Sight" (2003), "Network Security Bible 2nd Edition" (2011) and "Insider Threat" (2005). He is the originator of more than 20 patents. He was a member of the Commission on Cyber Security for President Barack Obama, and has been inducted into the InfoSec Hall of Fame.

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