

Exploring the Crypto The Promises and Pitfalls - Critical Analysis

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- Cryptocurrencies, blockchain technology, and non-fungible tokens (NFTs) have captured significant attention and investment in recent years. While they have undoubtedly revolutionized various industries and financial sectors, it is essential to critically assess these concepts and consider potential reasons why they may not work or could potentially fail. This lecture proposal aims to provide a balanced exploration of the strengths and weaknesses of cryptocurrencies, blockchain, and NFTs, fostering a deeper understanding of their implications.
- The main aim is to engage the audience in a thought-provoking discussion on the future of cryptocurrencies, blockchain, and NFTs.

Possible discussion points

- Regulatory issues and legal concerns
- Volatility and speculative nature
- Market bubbles and speculation
- Security vulnerabilities and fraud
- Scalability and performance issues
- Energy consumption and sustainability
- Governance and centralization challenges
- Long-term value and sustainability
- Ethical and cultural considerations

Main problem – no real use cases

- Blockchain - math works, but how about use cases?
- Cryptocurrencies
 - The biggest technological Revolution of the internet / Greatest ponzi scheme of the history
- ICOs
 - Thousands of „get rich schemes“, no real use
- NFTs
 - Millions of „get rich schemes“, no real use
- Web3
 - No functional use case – most are hypothetical
- Smart contracts
 - No functional use case at all so far

Main features of Bitcoin

- **Digital Currency:** Bitcoin is a decentralized digital currency that exists solely in electronic form. It is not physical like traditional money (e.g., coins or paper bills) and operates on a peer-to-peer network.
- **Decentralized Network:** Bitcoin operates on a decentralized ledger called the blockchain. This ledger is maintained by a network of nodes (computers) spread across the world, making it resistant to centralized control.
- **Cryptographic Security:** Bitcoin transactions are secured using cryptographic techniques. Private keys are used to sign transactions, ensuring the integrity and authenticity of each transaction on the blockchain.
- **Limited Supply:** Bitcoin has a capped supply of 21 million coins, which makes it deflationary in nature. This scarcity is programmed into the system, with new bitcoins being created through a process called mining, but at a decreasing rate over time.
- **Digital Asset and Investment:** Beyond being a digital currency, Bitcoin is also considered a store of value and an investment asset by many. Its price has experienced significant volatility, leading to both opportunities and risks for investors.

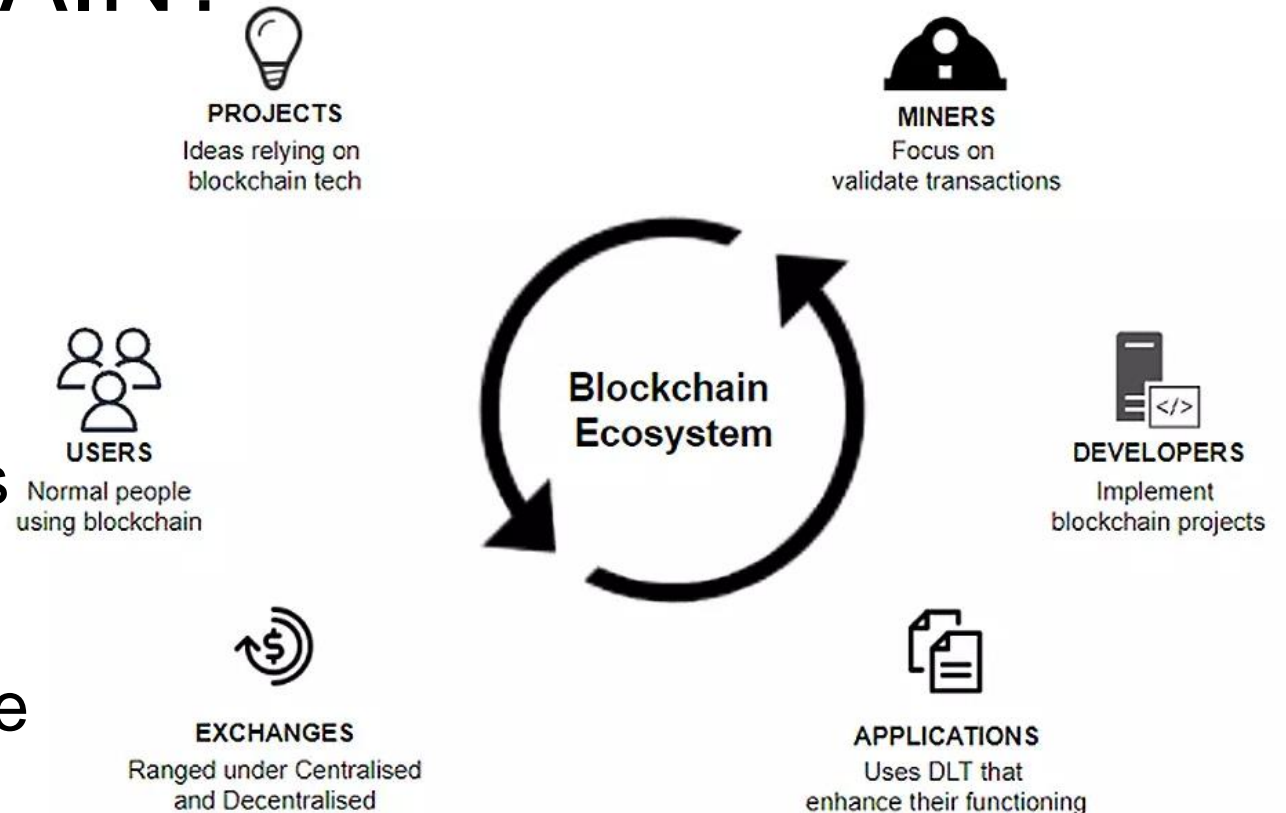


WHAT IS BLOCKCHAIN?

Blockchain is a technology that:

- permits transactions to be gathered into blocks and recorded
- cryptographically chains blocks with a **hash** in **chronological order**; and
- allows the resulting ledger to be accessed **PUBLICLY**.

Is it real technological disruptor or just a hype?





Recapitulation – Cryptography and Hash

Two basic mathematical principles in the foundations of any blockchain

Cryptography

- **asymmetric** – pair of keys: public – encryption / private – decryption
 - In Blockchain is **public** used for „addressing“ and **private** for „authorization“ of transactions.
- **Hash function** - one-way function which gives unique hash value to any given input.
 - In Blockchain is used to „lock“ blocks together.

HOW THE BLOCKCHAIN WORKS

- "Blockchain" is defined as a data structure storing information in blocks forming a chain, where the new blocks are linked to previously generated blocks. It is a sequence of hash-chained records, where a block is a digital container for transactions, contracts, property titles, etc.

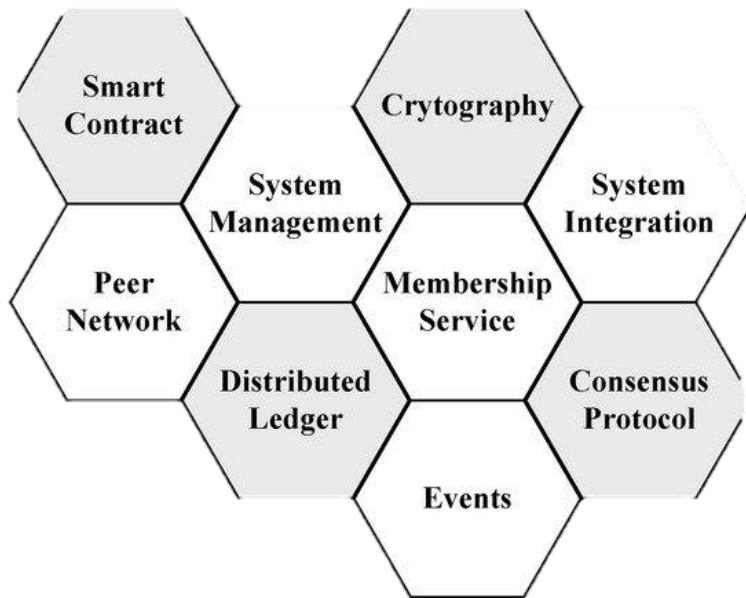


Figure 1 Major components in blockchain systems.

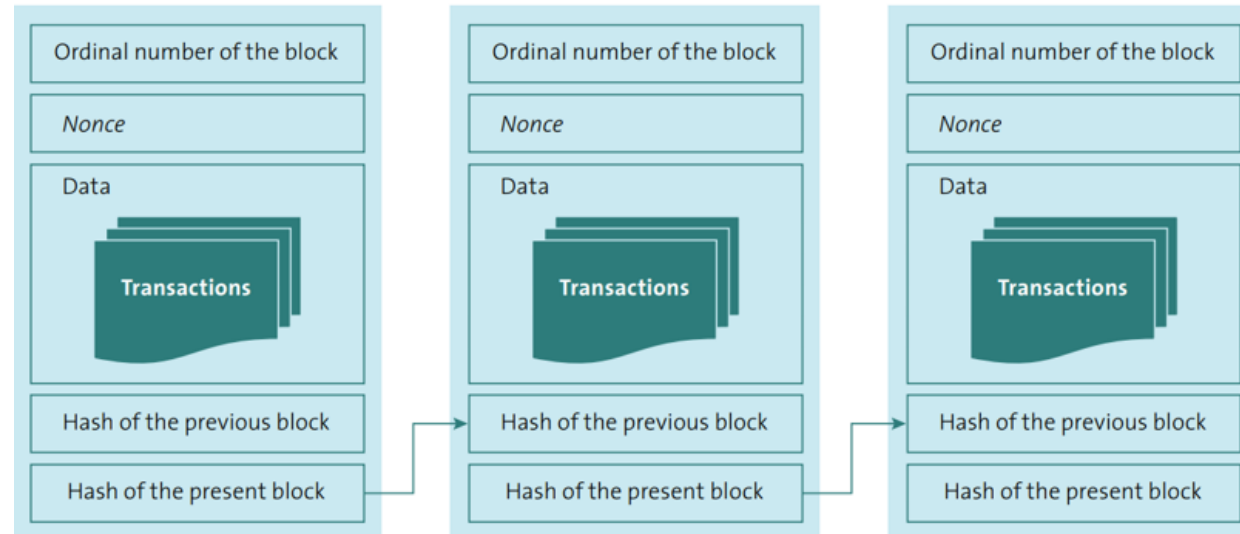


Figure 2: Process of building blockchain



BLOCKCHAIN PROMISES

Increased trust in value exchange

- gives users assurance that information stored, such as certificates, has not been changed
- can reduce transactional obscurity, insecure states, and dubiousness by providing complete transaction disclosure and the supplementation of homogeneous and verified facts across all network members

Resistance to censorship and immutability

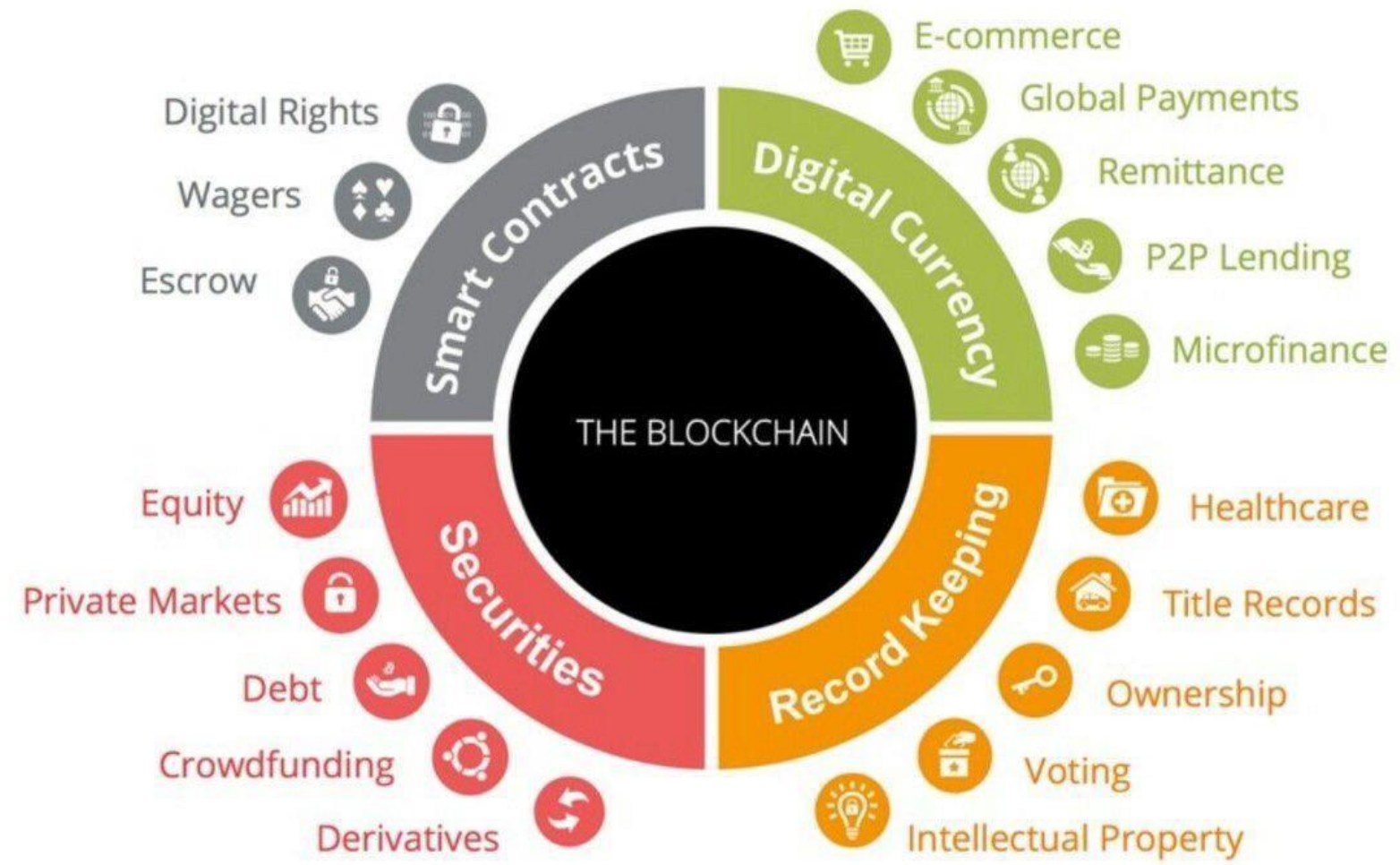
- where the government or cyberterrorists would be unable to pass through the personalized ledger designed for personal use

Efficient, consistent transactions between participants

- lowers transaction costs and reduces the need for well-known and trustworthy third parties
- enables users of blockchain technology to avoid relying on third parties for transaction and asset security

Decentralization, persistency, anonymity, and auditability

No single point of failure

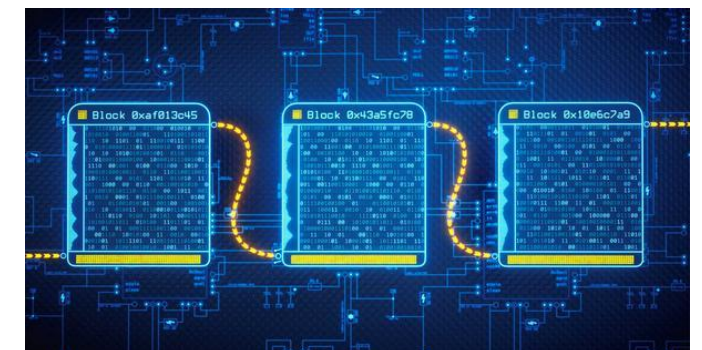


POSSIBLE AREAS OF USE CASES



Recapitulation – Blockchain principles

- Main idea is to solve double spending problem in the decentralized / distributed system, where actors don't trust each other.
 - Achieved through block authorization
- Distributed ledger technology
 - Peer2peer, with „nodes“ who authorize correctness
- Consensus building
 - Proof of work / Proof of stake / Proof of history / Proof of cover
 - Advantages / Disadvantages / Troubles





Blockchain – case studies and possible uses

- IoT
 - Smart Appliances and metering
 - IoT monitoring
- Cross-border transactions
- Medicine
 - Clinical trial tracking
- Public sector
 - Digital voting
 - Transparent budgeting
- Personal identity protection
 - Digital IDs (birth, marriage, death certificates, passports, ...)
 - Wills and Inheritances
- Gaming industry (play to earn schemes)



What is wrong with blockchain?

- It is just another append only database system.
 - Proof of work – too slow, extremely wasteful
 - Proof of stake – never used in great scale, monopolistic tendencies
 - Size of blockchain itself is horrendously small / big
 - Trouble with node consensus – forking, ...
 - Publicity of the data
- Promises to replace central authority, but creates new „big players“ anyway



What is wrong with blockchain?

- 1. Scalability Issues:** Blockchain networks, especially public ones like Bitcoin and Ethereum, can struggle with scalability. As more transactions are added to the blockchain, the network can become congested, leading to slower transaction processing times and higher fees. This scalability challenge needs to be addressed to accommodate mass adoption.
- 2. Energy Consumption:** Proof-of-work (PoW) blockchains, like Bitcoin and Ethereum, require significant computational power and energy consumption for mining activities. This has raised concerns about the environmental impact and sustainability of blockchain technology. Efforts to transition to more energy-efficient consensus mechanisms like proof-of-stake (PoS) are ongoing.
- 3. Security Concerns:** While blockchain technology is often praised for its security, it is not immune to attacks. 51% attacks, double-spending attacks, and smart contract vulnerabilities have all been documented. Additionally, the security of a blockchain heavily relies on the security of private keys, which can be compromised through various means.
- 4. Lack of Regulation:** The decentralized and global nature of blockchain makes it challenging for regulators to enforce consistent rules and protections. This can lead to legal and regulatory uncertainties, which can hinder broader adoption and investment in blockchain projects.
- 5. User Experience:** Blockchain and cryptocurrency applications often have a steep learning curve for non-technical users. Managing private keys, understanding transaction fees, and navigating complex wallet interfaces can be intimidating for newcomers.



What is wrong with blockchain?

- 1. Interoperability:** Different blockchain networks often operate in isolation, making it difficult for them to interact and share data seamlessly. Interoperability solutions are still evolving to address this challenge.
- 2. Privacy Concerns:** While blockchain transactions are typically pseudonymous, they are also transparent and permanently recorded on the public ledger. This can raise privacy concerns, especially as companies and governments explore blockchain applications.
- 3. Legal and Regulatory Challenges:** Blockchain technology faces a patchwork of regulations and legal considerations around the world. Issues related to taxation, securities laws, and anti-money laundering (AML) compliance can pose significant challenges to blockchain-based businesses.
- 4. Adoption Hurdles:** Convincing established industries and institutions to adopt blockchain technology can be difficult due to resistance to change, the need for industry-wide standards, and concerns about security, scalability, and cost-effectiveness.
- 5. Governance Issues:** Decentralized blockchains often rely on complex governance models to make decisions about upgrades and changes. Disagreements among stakeholders can lead to contentious hard forks, potentially splitting the community and undermining the stability of the network.



Cryptocurrencies

- Bitcoin/Ethereum

- Currency or speculative assets?
- Technological limitations of the system
- Security – Privacy - Anonymity
- Current market – its value and fluctuations
- Stablecoins – Tether et al.– is it real solution?
- Legal aspects of cryptocurrency



tether

- Alternative cryptocurrencies

- ICOs
- Scam or real thing?



- Is it real technological disruptor or just a hype?



Legal problems of cryptocurrencies

- Some governments are forbidding it 😞
- Is it currency? Is it goods? Is it financial tool? Is it asset?
- Taxation?
 - Income tax
 - VAT tax
- Can you insure it?



Problems of cryptocurrencies

Cryptocurrencies, while offering numerous advantages, also face various problems and challenges, which can impact their widespread adoption and stability. Here are some of the key issues:

- 1. Regulatory Uncertainty:** Cryptocurrencies operate in a regulatory gray area in many countries. Governments and regulatory bodies are still developing frameworks for their use, which can lead to uncertainty for users and businesses.
- 2. Volatility:** Cryptocurrency prices are highly volatile, which can be a barrier to their adoption as a stable store of value or medium of exchange. Investors can experience significant gains or losses in a short period, making cryptocurrencies a risky asset class.
- 3. Security Risks:** Cryptocurrencies rely on digital wallets and private keys for security. If these keys are lost or stolen, funds can be irretrievably lost. Hacks and fraud in the cryptocurrency space are also a concern.
- 4. Scalability:** Many cryptocurrencies face scalability challenges. As transaction volumes increase, networks can become congested, leading to slow confirmation times and high transaction fees.
- 5. Lack of Consumer Protection:** Unlike traditional financial systems, cryptocurrencies generally do not offer the same level of consumer protection. There are limited options for recourse in the event of fraud or disputes.



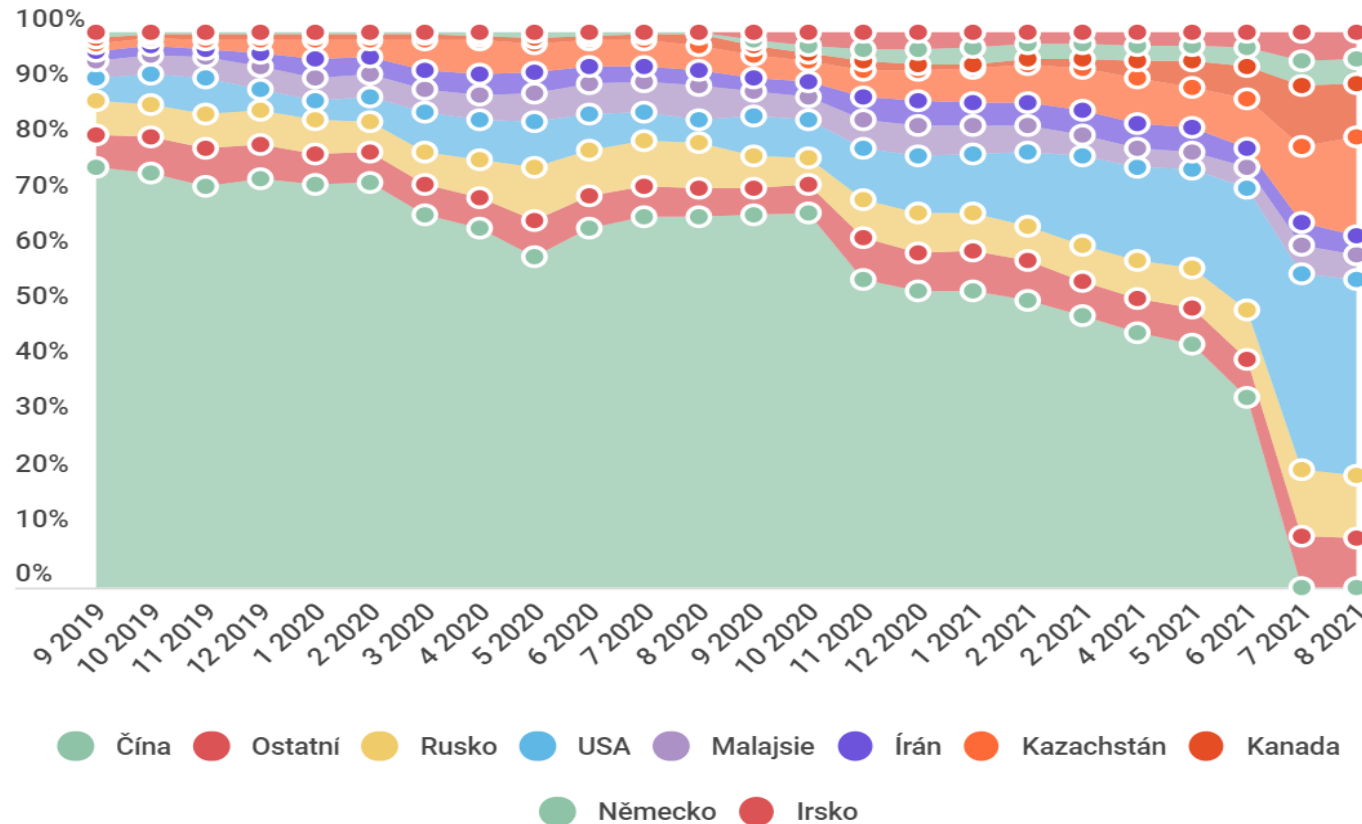
Problems of cryptocurrencies

- 1. Adoption Barriers:** Cryptocurrencies are not yet widely accepted as a means of payment. Limited merchant adoption and the need for improved user-friendly interfaces can hinder their use for everyday transactions.
 - 2. Environmental Concerns:** Proof-of-work (PoW) cryptocurrencies like Bitcoin require substantial energy consumption for mining. This has raised concerns about their carbon footprint and sustainability.
 - 3. Market Manipulation:** Cryptocurrency markets are relatively young and can be susceptible to price manipulation and pump-and-dump schemes. Lack of regulation exacerbates this issue.
 - 4. Privacy Concerns:** While some cryptocurrencies offer enhanced privacy features, many are pseudonymous, and transactions can be traced on public ledgers, raising privacy concerns.
 - 5. Legal and Taxation Challenges:** Cryptocurrency taxation laws can be complex and vary by jurisdiction. Compliance can be challenging, leading to potential legal issues for users and businesses.
 - 6. Technology Risks:** Cryptocurrencies and blockchain technology are still relatively new and evolving. Technical vulnerabilities, software bugs, and hard forks can lead to network disruptions and loss of funds.
 - 7. Use in Illicit Activities:** Cryptocurrencies have been associated with illegal activities, including money laundering, ransomware attacks, and the dark web. This has led to increased scrutiny from law enforcement agencies.
 - 8. Interoperability:** Different cryptocurrencies and blockchain networks often operate independently, limiting their ability to interact and share data seamlessly.
- Despite these challenges, cryptocurrencies have garnered significant interest and investment, and ongoing efforts within the crypto space aim to address many of these issues. As the technology matures and regulatory frameworks become clearer, cryptocurrencies may find wider acceptance and integration into traditional financial systems.



Where the bitcoin is mined?

Podíl vybraných zemí na těžbě bitcoinu (v %)



Zdroj: Cambridžská univerzita



Smart contracts

- Principles and technological limitations
- Legal status
- Case studies and possible uses
 - Financial Services
 - Insurance
 - Investment management
 - Financial data recording and management
 - Supply chain management
 - Copyright management
 - Property ownership transfer
- Is it real technological disruptor or just a hype?



SMART CONTRACT



Smart contracts - challenges

- Size of block is small (for bigger capacity needs more blocks)
- Functionality is actually very limited
 - Usually only link to http or peer-to-peer network (link rot)
- Can not change errors in code - minting new contracts is very expensive (ConstitutionDAO)
- There are better ways to solve the problems



Smart contracts - challenges

Smart contracts, which are self-executing agreements with the terms of the contract directly written into code, offer many benefits but also face several problems and challenges:

- 1. Immutability:** Smart contracts are typically immutable once deployed on a blockchain. If there's a coding error or a need for contract modification due to changing circumstances, it can be challenging to make amendments.
- 2. Security Vulnerabilities:** Coding errors or vulnerabilities in smart contracts can lead to exploits, hacks, and loss of funds. Examples include the infamous DAO (Decentralized Autonomous Organization) hack and various vulnerabilities in DeFi (Decentralized Finance) protocols.
- 3. Complexity:** Developing complex smart contracts can be challenging, and even experienced developers can introduce errors. The complexity of financial and business logic can make audits and testing difficult.
- 4. Oracles and External Data:** Smart contracts typically rely on external data sources (oracles) to make decisions or execute actions based on real-world events. Ensuring the accuracy and reliability of these oracles can be a challenge.
- 5. Legal and Regulatory Uncertainty:** The legal status of smart contracts is still evolving. Depending on the jurisdiction, they may not always be legally enforceable, and disputes related to smart contracts may pose unique legal challenges.
- 6. Scalability:** As more smart contracts are deployed on a blockchain network, it can lead to congestion and scalability issues. This can result in higher fees and slower transaction processing times.



Smart contracts - challenges

1. **Privacy:** Many blockchain networks are transparent, and smart contract data is publicly accessible. This lack of privacy can be problematic for applications that require confidentiality, such as sensitive business agreements.
2. **Upgradability:** The immutability of smart contracts can hinder their ability to adapt to changing business needs or evolving technology. Developing mechanisms for safe and controlled contract upgrades is a challenge.
3. **Interoperability:** Smart contracts built on different blockchain platforms may not be compatible with each other, limiting their usefulness in a multi-chain ecosystem.
4. **User Experience:** Interacting with smart contracts can be complex for non-technical users. Improving the user interface and experience is crucial for broader adoption.
5. **Standardization:** The lack of standardized development practices and contract templates can make it challenging to create interoperable and reliable smart contract systems.
6. **Costs and Gas Fees:** Executing smart contracts often incurs gas fees, which can be expensive during times of network congestion. This can be a barrier to entry for users and businesses, especially in developing regions.
7. **Human Error:** While smart contracts aim to eliminate the need for intermediaries, the process of deploying and interacting with them still relies on human actions. Errors in key management or transactions can lead to irreversible losses.

Addressing these challenges requires ongoing research, development, and collaboration within the blockchain and smart contract development community. As the technology matures, solutions to many of these issues are likely to emerge, making smart contracts more reliable and versatile.



NFTs problems

- Principles and technological limitations
 - Ownership/Uniqueness/Scarcity/Community
- NFT vs copyright
- Legal status, liability, regulation
- History, famous cases, 2022 crash
- Marketplaces and platforms
- Troubles and scams in NFT world
 - Monetization pyramid scheme?



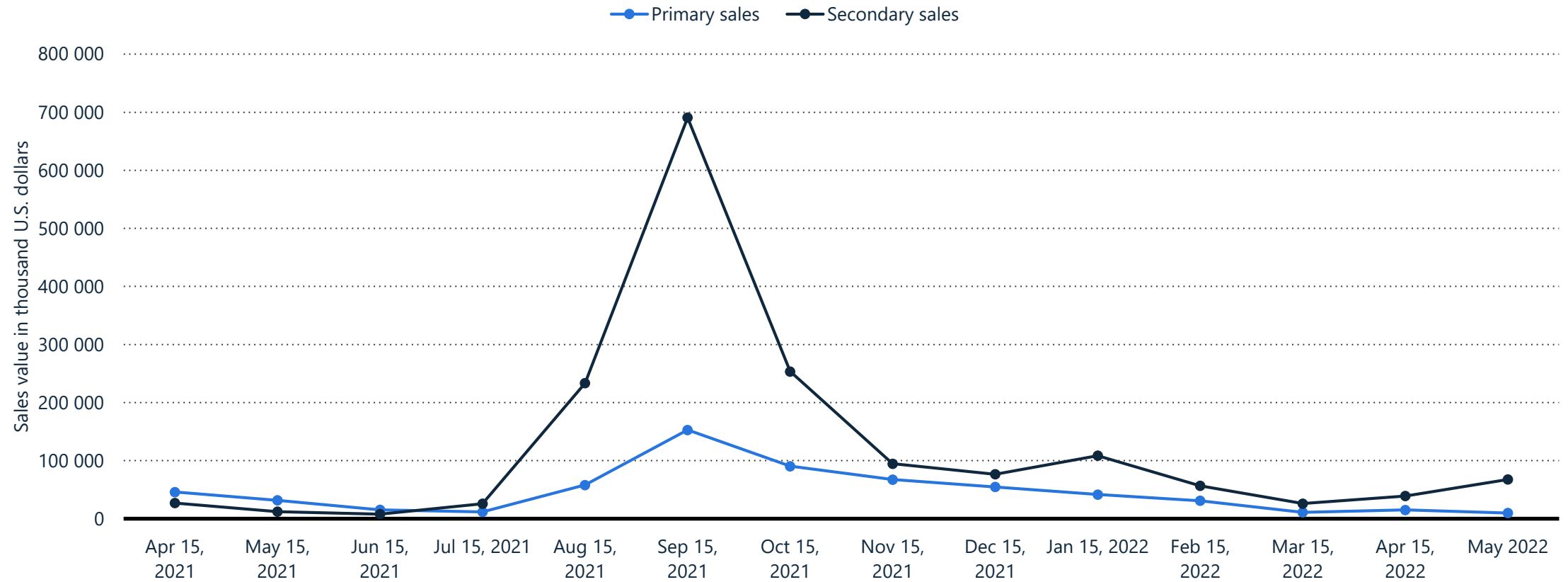
The biggest NFT sales worldwide (March, 2021)

The 50 biggest NFT sales worldwide as of March 16, 2021	ETH	USD (in 1,000)
Beeple Everyday: The First 5000 Days (Mar 11, 2021)	38474	69346
CryptoPunk 7804 (Mar 11, 2021)	4200	7821
CryptoPunk 3100 (Mar 11, 2021)	4200	7574
Beeple CROSSROADS (Feb 25, 2021)	4152	6600
CryptoPunk 6965 (Feb 19, 2021)	800	1546
CryptoPunk 4156 (Feb 18, 2021)	650	1199
CryptoPunk 2140 (Mar 02, 2021)	750	1069
CryptoPunk 6487 (Feb 22, 2021)	550	1052
hairy #1/1 (Mar 14, 2021)	543	1036
CryptoPunk 3393 (Mar 13, 2021)	500	884
CryptoPunk 2140 (Feb 22, 2021)	400	774
CryptoPunk 2890 (Jan 23, 2021)	605	747
CryptoPunk 3011 (Mar 12, 2021)	400	721
CryptoPunk 1839 (Mar 12, 2021)	360	649
Hashmask 9939 (Feb 02, 2021)	420	640
CryptoPunk 3609 (Mar 05, 2021)	369	585
The EverLasting Beautiful by FEWOCIOUS #1/1 (Mar 08, 2021)	336	566
CryptoPunk 5234 (Mar 04, 2021)	350	554
CryptoPunk 2681 (Feb 19, 2021)	277	535
Beeple Everyday - Raw #1/100 (Mar 13, 2021)	299	527
Hashmask 6718 (Feb 04, 2021)	300	498
Boardwalk #1/1 (Feb 20, 2021)	238	466

Aku.001 - The Vault #1/1 (Feb 23, 2021)	186	332
Beeple Everyday - Raw #19/100 (Feb 25, 2021)	204	324
The Smintons #1/1 (Jan 21, 2021)	236	314
INFECTED #67/123 (Feb 26, 2021)	176	268
Salvavidas #1/1 (Mar 13, 2021)	143	251
Afraid to Be Myself #5/5 (Feb 26, 2021)	153	233
Heroin - Weight Of The World (Mar 06, 2021)	149	230
BULL RUN #145/271 (Mar 11, 2021)	120	219
INFECTED #40/123 (Mar 11, 2021)	119	218
THE 5000 DAY SELECTS (Mar 12, 2021)	119	217
Everything's Fine #6/21 (Mar 10, 2021)	116	212
THE 5000 DAY SELECTS (Mar 13, 2021)	120	211
BULL RUN #238/271 (Mar 11, 2021)	115	211
BULL RUN #188/271 (Mar 11, 2021)	115	211
Queeny (Mar 03, 2021)	140	208
Real Ghost #1/1 (Mar 04, 2021)	122	195
BULL RUN #148/271 (Mar 11, 2021)	101	185
INTO THEER #156/207 (Mar 09, 2021)	101	180
The Bitcoin Angel #1/1 (Feb 28, 2021)	115	173
Cubist Satoshi #1/1 (Feb 28, 2021)	115	173
Beeple Everyday - Raw #76/100 (Mar 15, 2021)	92	172
The First Ever Edition Of Rick And Morty Cryptoart #1/1 (Jan 20, 2021)	122	172
BULL RUN #174/271 (Mar 11, 2021)	92	168
INTO THEER #196/207 (Feb 25, 2021)	101	160
AI Generated Landscape Painting #4 (Mar 06, 2021)	100	154



NFT sales value in the art segment worldwide in the last 30 days May 2022 (in 1,000 U.S. dollars)



Note(s): Worldwide; April 15, 2021 to April 15, 2022; figures refer to the aggregated number of sales recorded on the Ethereum, Ronin, and Flow blockchains during the previous 30 days

Further information regarding this statistic can be found on [page 8](#).

Source(s): NonFungible; [ID 1235263](#)



Crash of the NFT market in May 2022

- Data shown NFT transactions have decreased 92% in one year.
- The popularity of NFTs appears to be in decline.
- NFT „The First Tweet“ – auctioned for almost 3 mil. USD in 2020 was [auctioned for only 851 USD in 2022 week !!!](#)

Meltdown of cryptoworld in May 2022

- The price of Bitcoin, Ether and others got to its lowest point since 2020.
- Coinbase, the large cryptocurrency exchange, tanked in value by 20 %.
- Two major stable-currencies collapsed.
- More than \$300 billion was wiped out by a crash in cryptocurrency prices in just two days.
- Reasons? Consequences???

PROBLEMS OF NFTs

Non-Fungible Tokens (NFTs) have gained significant attention and popularity, but they also face various problems and challenges:

- 1. Lack of Inherent Value:** NFTs derive their value from the digital or physical assets they represent, such as art, music, or collectibles. However, some argue that NFTs themselves lack inherent value, and their prices may be driven by speculative and hype-driven factors.
- 2. Copyright and Ownership:** NFTs represent ownership and provenance of digital assets, but they don't necessarily grant copyright or intellectual property rights. Copyright disputes and legal challenges can arise when the ownership of an NFT conflicts with the rights of the original creator.
- 3. Piracy and Plagiarism:** NFTs can be linked to digital content, making it easy for malicious actors to mint NFTs claiming ownership of someone else's work. This raises concerns about plagiarism and intellectual property theft.
- 4. Environmental Impact:** Many NFTs are built on blockchain networks that use energy-intensive proof-of-work (PoW) consensus mechanisms, similar to cryptocurrencies like Bitcoin. The energy consumption associated with PoW blockchains has sparked environmental concerns.
- 5. Scalability and Fees:** Blockchain networks supporting NFTs, such as Ethereum, can experience congestion and high transaction fees during periods of high demand, making it costly and slow to mint, buy, or sell NFTs.

PROBLEMS OF NFTs

- 1. Interoperability:** NFTs are often specific to particular blockchain networks, making it challenging for NFTs on one network to interact with those on another. This lack of interoperability can limit the broader utility of NFTs.
- 2. Long-Term Viability:** The NFT market has experienced rapid growth, but it remains uncertain whether this trend will continue or if it represents a speculative bubble. Market volatility and uncertainty about the long-term value of NFTs can pose risks for investors and creators.
- 3. Fraud and Scams:** As the NFT space has gained popularity, it has also attracted fraudulent activities, including fake NFT sales, phishing scams, and misleading marketing practices.
- 4. Market Saturation:** The increasing number of NFT projects and marketplaces can lead to oversaturation and dilution of value, making it harder for individual NFTs to stand out or gain recognition.
- 5. Cultural and Social Impacts:** The commercialization of digital art and culture through NFTs can have complex cultural and social implications, including concerns about access to art and the commodification of creativity.
- 6. Regulatory Scrutiny:** Governments and regulatory bodies are closely monitoring the NFT space due to concerns about investor protection, tax evasion, and money laundering. Future regulations could impact the NFT market.

While NFTs present opportunities for artists, creators, and collectors, they also face these challenges that must be addressed to ensure their continued growth and sustainability in the digital ecosystem. As the technology evolves and matures, solutions to some of these issues may emerge.

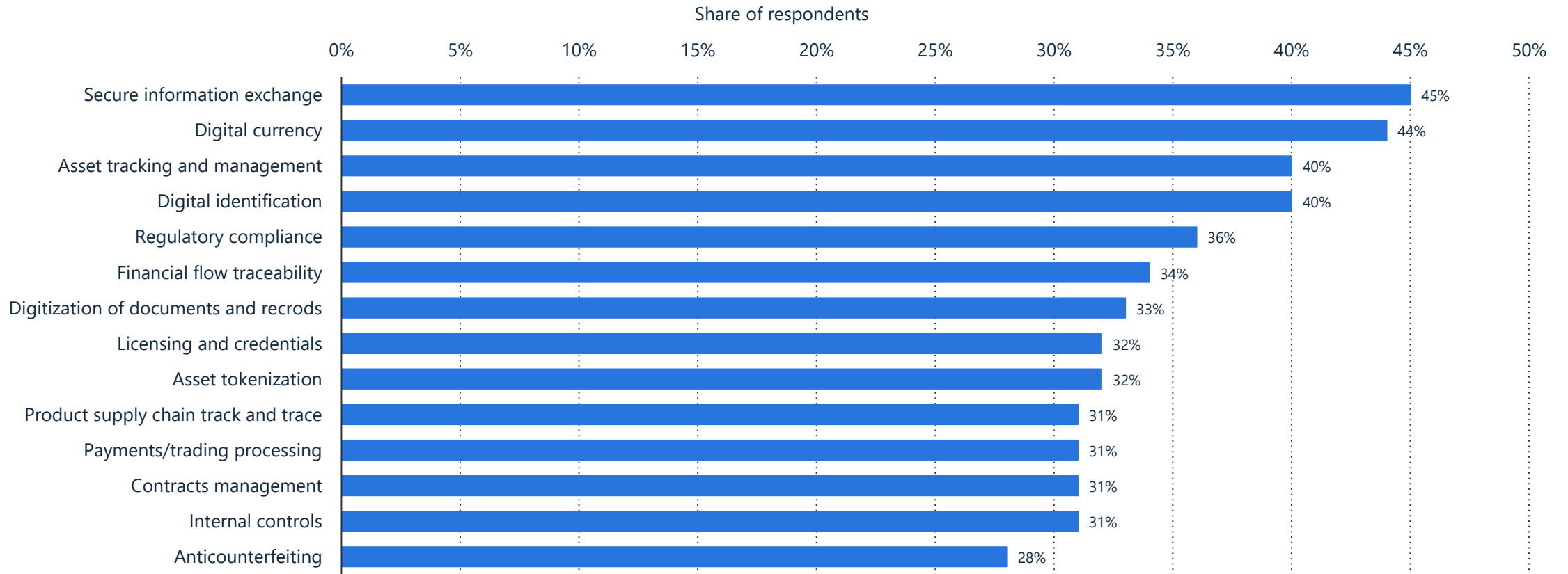


Web3 and other concepts related to crypto

- Web3
 - Decentralized internet of the future? or just another buzzword?
 - Web 3.0 vs Web3
 - Tokenization of the web
 - Current projects of web3
- Metaverse
- Decentralized autonomous organization (DAO)
 - The DAO and ConstitutionDAO vs Dash and UniSwap



Use cases for blockchain technology in organizations worldwide 2021



Note(s): Brazil, China, Germany, Hong Kong, Japan, Singapore, South Africa, United Arab Emirates, United Kingdom, United States; March 24. to April 10., 2021; 1280 respondents; senior executives and practitioners

Source(s): Deloitte; ID 878732



USE BY COMPANIES

26

- Microsoft
- Alphabet
- NOVARTIS
- cisco AIA
- TOYOTA
- TCS TATA CONSULTANCY SERVICES
- Honeywell
- السعودية ارامكو saudi aramco
- ORACLE
- Alibaba Group
- SAMSUNG
- Walmart
- amazon
- moderna
- BHP NIKE
- VISA Pfizer
- CATL
- SAP Coca-Cola
- MERCK
- Nestlé
- abbvie

- HYPERLEDGER FABRIC

18

- shopify
- PayPal
- NVIDIA
- TCS TATA CONSULTANCY SERVICES
- BANK OF AMERICA
- SAP
- Shell
- McDonald's
- LOWE'S
- SAMSUNG
- Alphabet
- NOVARTIS
- amazon
- Microsoft
- VISA
- Coca-Cola
- MERCK

- ethereum

11

- accenture
- J.P.Morgan
- Microsoft
- Goldman Sachs
- LVMH
- SAP
- Chevron
- UnitedHealth Group
- Shell
- Reliance
- Alibaba Group

- Quorum

8

- TCS TATA CONSULTANCY SERVICES
- accenture
- SAP
- RBC
- BANK OF AMERICA
- TOYOTA
- Goldman Sachs
- citi

- c.rda

3

- Lilly
- Pfizer
- abbvie

- MediLedger

3

- BlackRock
- Goldman Sachs
- citi

- AXONI AXCORE

2

- PayPal
- Microsoft

- bitcoin

2

- ExxonMobil
- السعودية ارامكو saudi aramco

- DATA GUMBO

2

- Alibaba Group
- AMERSON

- ANTCHAIN

2

- SAP
- PHILIP SHIRES EXTRASOFT

- MultiChain

Real world case studies

- Usage of Cardano in Buenos Aires to create Digital Identity Platform - [published whitepaper - proposal](#)
- Use of Cardano in Georgia to put educational credentials on blockchain - Atala PRISM - <https://atalaprism.io/app>
- IBM Food Trust - modular solution built on blockchain.

Industry statistics - Blockchain

Prague University of Economics and Business

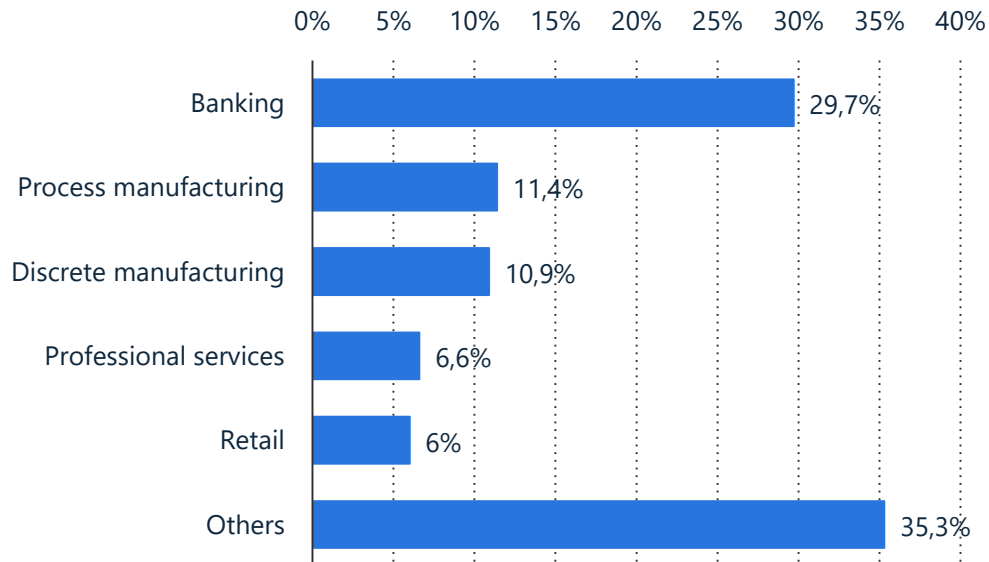


Blockchain by economic sector

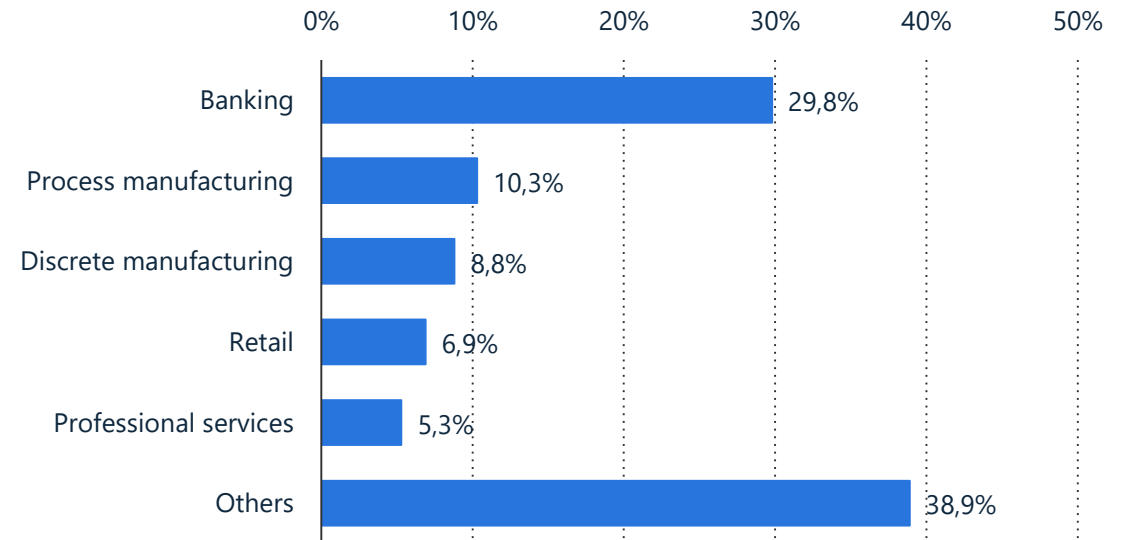
- The financial sector currently accounts for about 30% of blockchain's worldwide market value, manufacturing (20% of the market share), distribution and services (7%), retail (6%), public sector (4.2%), and infrastructure (3.1%).
- Blockchain size – Bitcoin 407 GB, Ethereum 414 GB, Cardano 55 GB

Distribution of blockchain market value in 2020, by sector

Worldwide



Europe

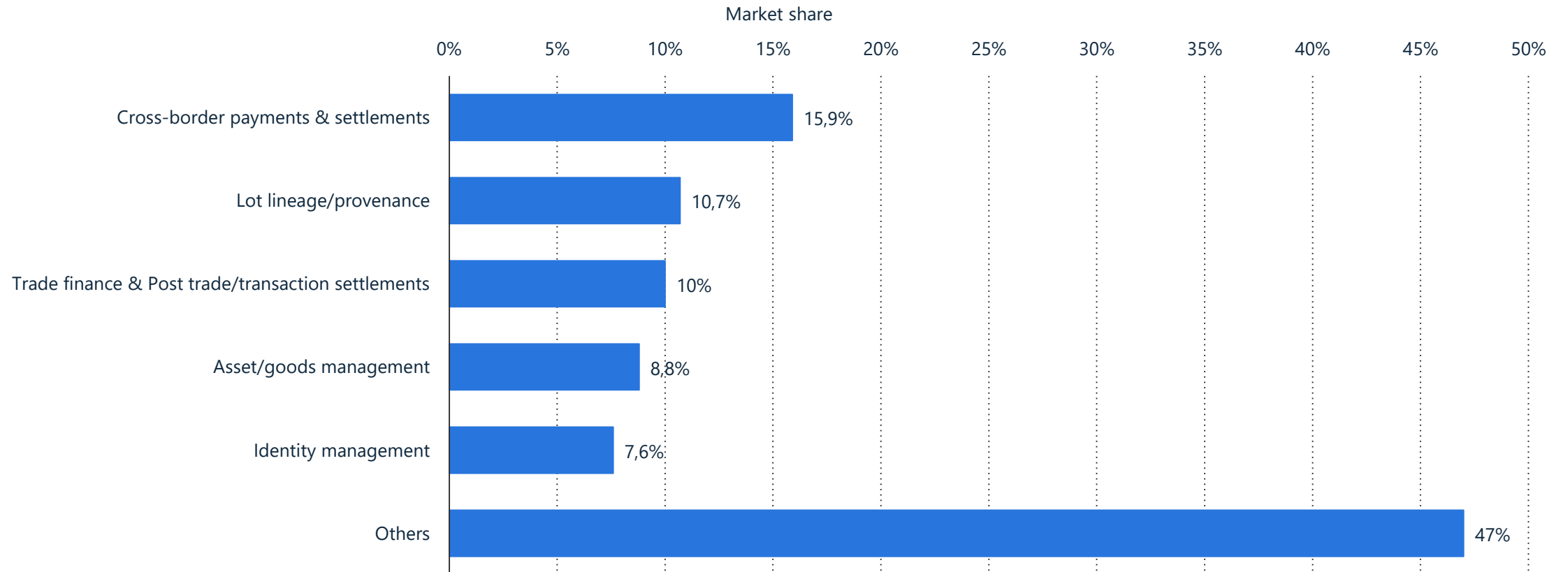


Note(s): Worldwide; 2020; constant annual value

Further information regarding this statistic can be found on [page 50](#).

Source(s): IDC; [ID 804775](#)

Top use cases for blockchain technology in terms of market share worldwide 2021

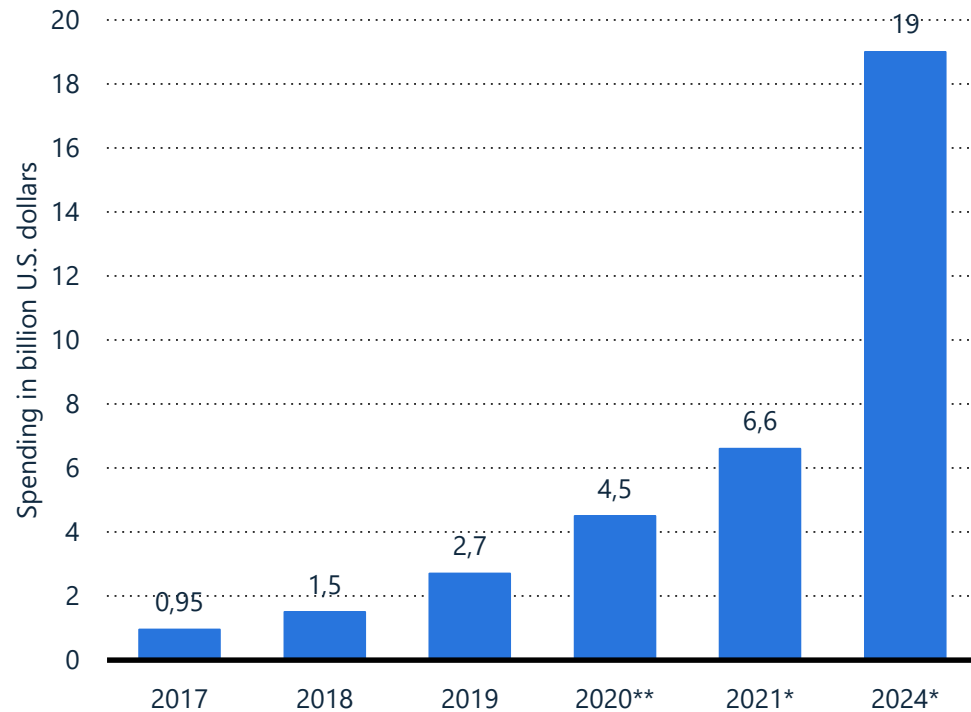


Note(s): Worldwide; 2021

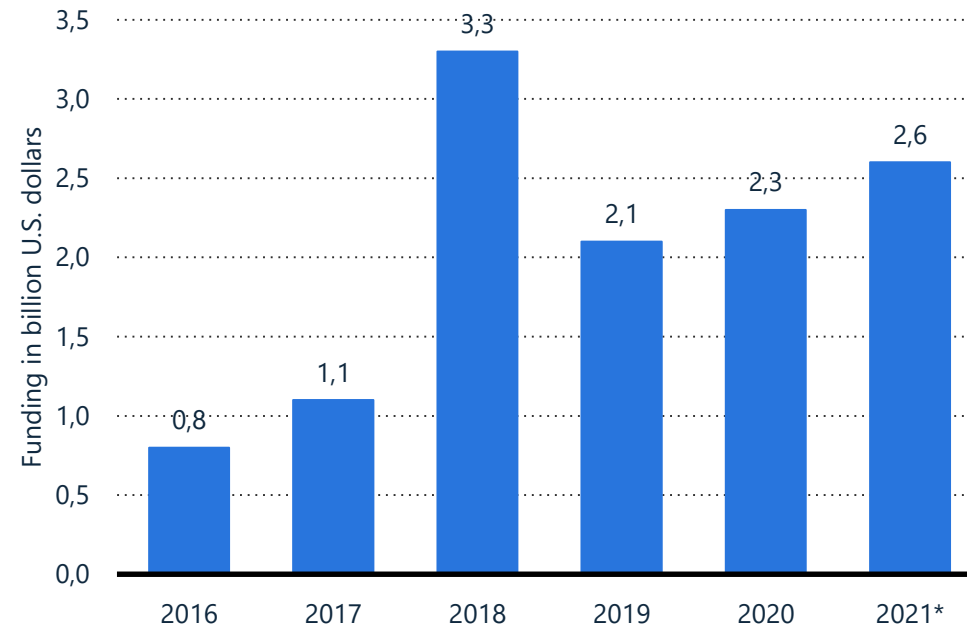
Further information regarding this statistic can be found on [page 8](#).

Source(s): IDC; [ID 982566](#)

Worldwide spending on blockchain solutions from 2017 to 2024 (in billion U.S. dollars)



Venture-capital funding in blockchain startup companies worldwide from 2016 to 2021 (in billion U.S. dollars)

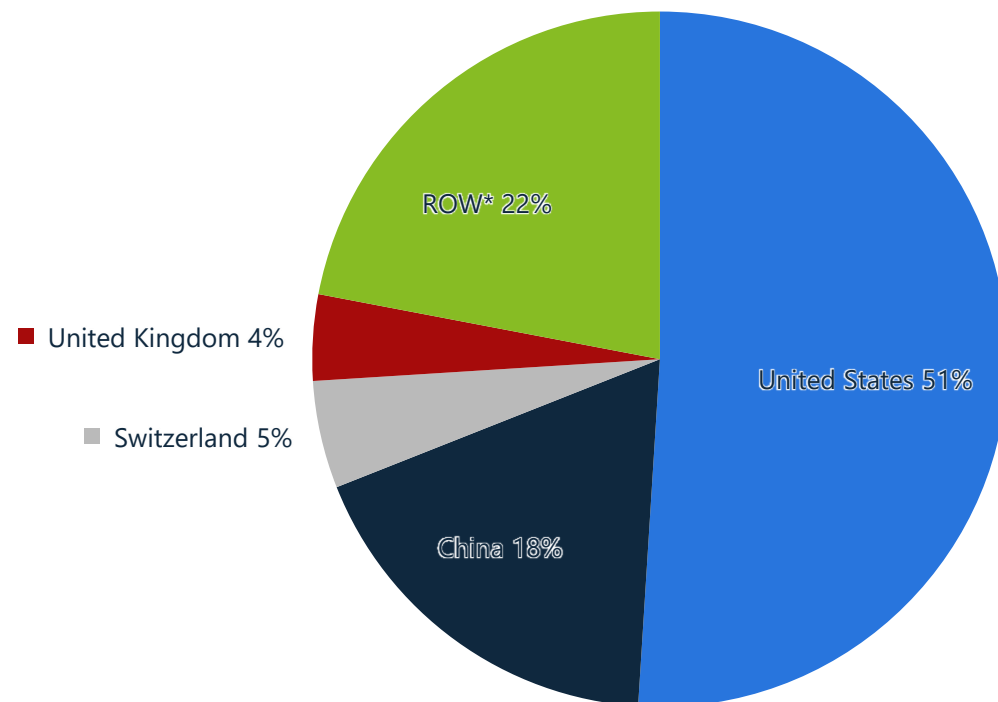


Note(s): Worldwide; 2017 to 2021

Further information regarding this statistic can be found on [page 43](#).

Source(s): IDC; Statista; [ID 800426](#)

Funding in blockchain companies worldwide from 2015 to 2019, by country

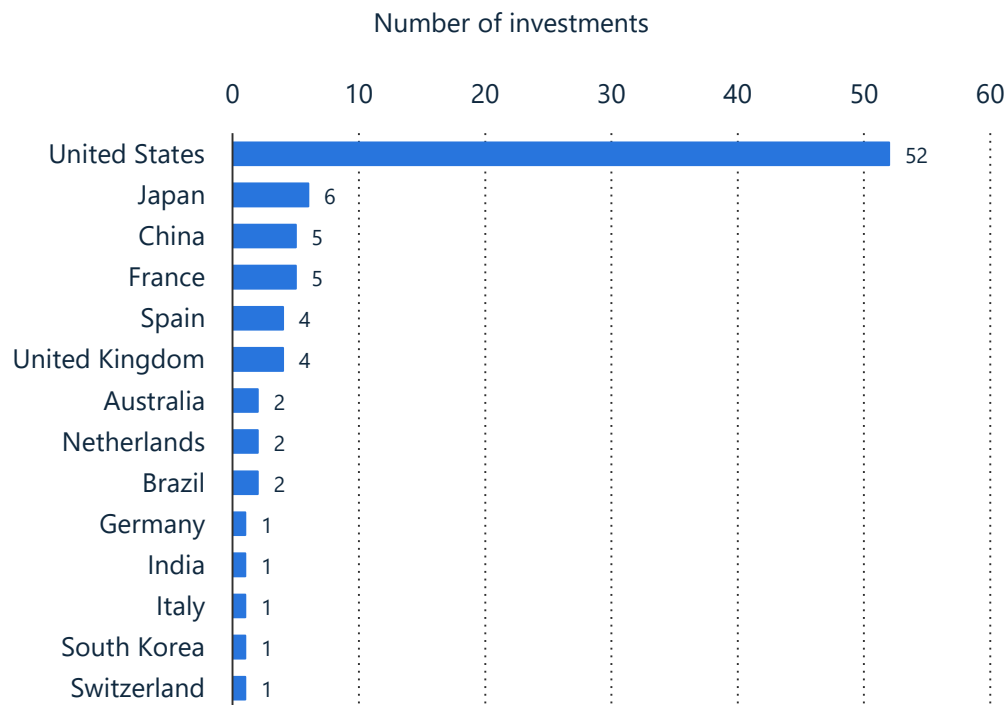


Note(s): Worldwide; 2015 to 2019

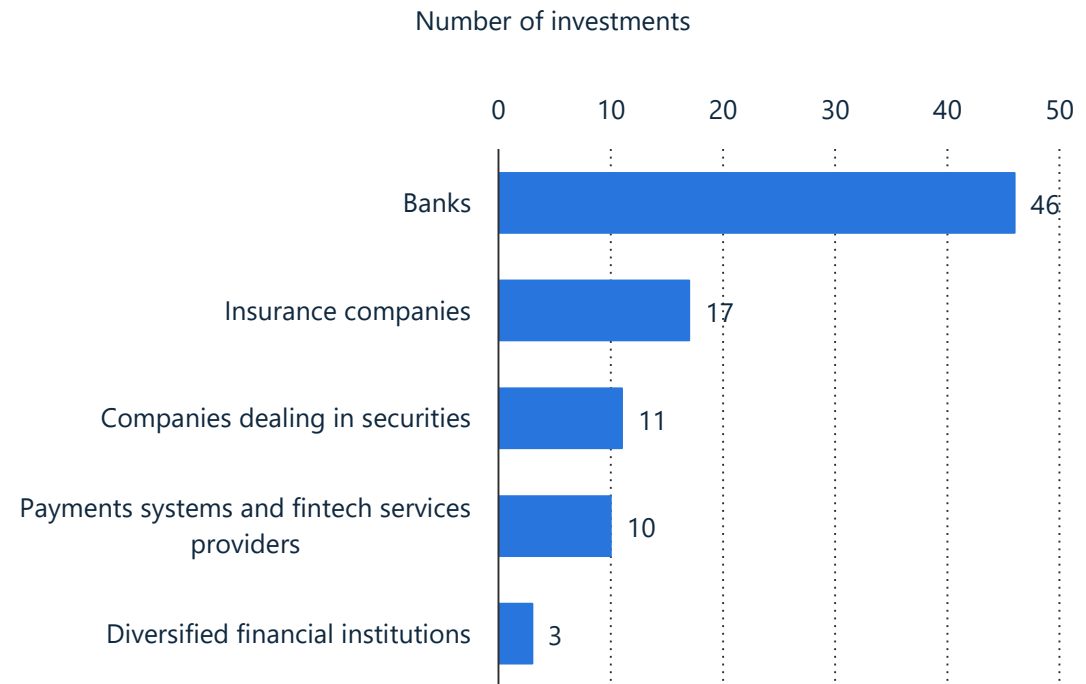
Further information regarding this statistic can be found on [page 47](#).

Source(s): CB Insights; [ID_1235117](#)

Leading countries for investments of financial institutions in blockchain companies in 2019, by number of investments



Leading financial institutions for investments in blockchain companies in 2019, by category



Note(s): Worldwide; 2019

Further information regarding this statistic can be found on [page 54](#).

Source(s): MINDSMITH; Clifford Chance; [ID_1229486](#)























Industry statistics Cryptocurrencies

Prague University of Economics and Business



The global cryptocurrency market cap is **\$1.35 Trillion** (19/05/2022)





















\$0,57 Trillion (43%) just in Bitcoin \$0,25 Trillion (18%) in Ethereum, \$0,25 Trillion in next 10 cryptocurrencies

#	Coin		Price	1h	24h	7d	24h Volume	Mkt Cap	Last 7 Days
1	 Bitcoin	BTC	\$30,309.31	1.9%	4.5%	5.0%	\$29,417,430,865	\$577,213,606,747	
2	 Ethereum	ETH	\$2,021.59	2.3%	3.3%	-2.9%	\$18,143,829,583	\$244,281,058,114	
3	 Tether	USDT	\$0.997641	-0.4%	-0.3%	0.2%	\$52,430,688,055	\$74,327,023,291	
4	 USD Coin	USDC	\$0.998208	-0.2%	-0.4%	-0.2%	\$7,378,812,239	\$52,646,120,518	
5	 BNB	BNB	\$306.82	1.2%	5.1%	14.1%	\$1,588,697,535	\$51,736,617,947	
6	 XRP	XRP	\$0.421965	1.9%	3.2%	1.3%	\$2,263,147,010	\$20,324,869,028	
7	 Binance USD	BUSD	\$1.00	0.1%	-0.1%	0.2%	\$6,471,142,825	\$18,731,314,227	
8	 Cardano	ADA	\$0.541666	2.9%	3.4%	4.9%	\$945,930,089	\$18,324,354,723	
9	 Solana	SOL	\$53.33	2.8%	5.4%	6.0%	\$1,762,730,264	\$18,040,753,412	
10	 Dogecoin	DOGE	\$0.087327	1.4%	2.1%	3.6%	\$501,907,860	\$11,586,068,763	
11	 Polkadot	DOT	\$10.24	2.8%	3.8%	15.1%	\$697,225,553	\$11,413,793,160	



Top Cryptocurrency Categories By Market Cap

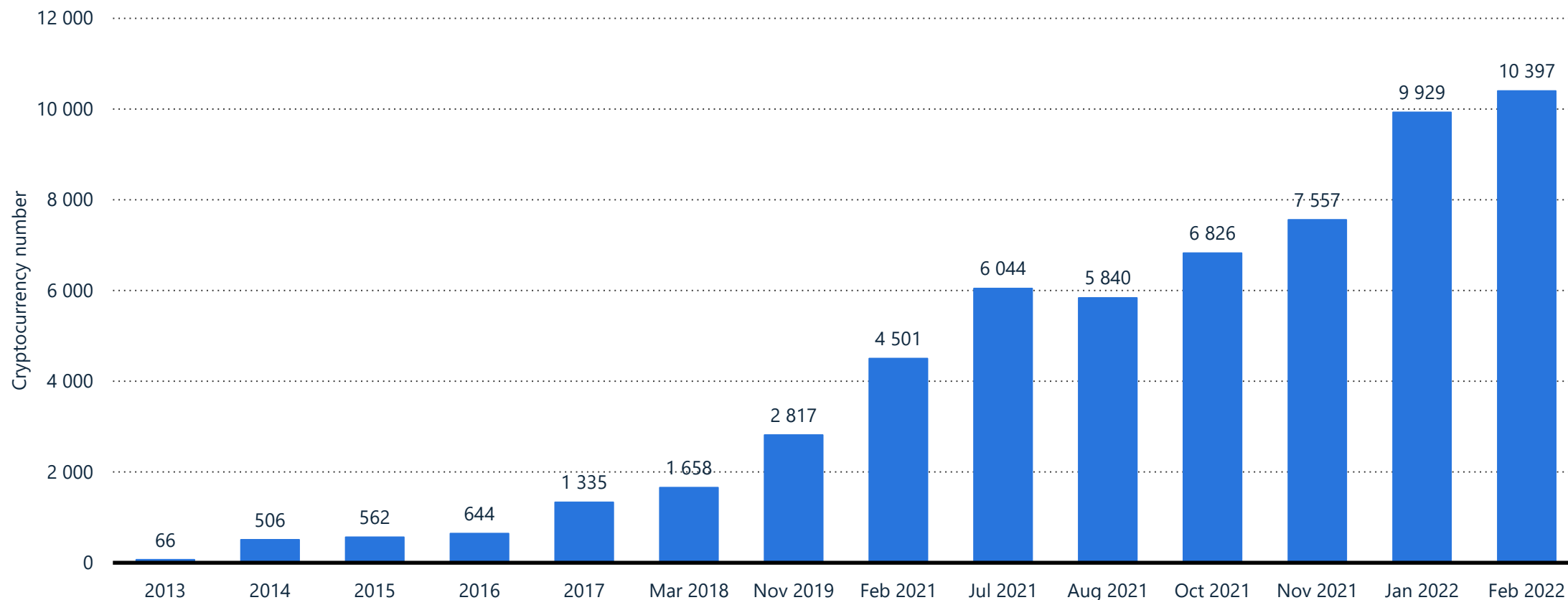
(smart contract platforms \$ 0,4 trillion, second place)

#	Category	Top Coins	1h	24h	7d	Market Capitalization	24h Volume	# of coins	Last 7 Days
1	Ethereum Ecosystem		0.1%	-1.6%	-2.2%	\$512,474,602,693	\$101,462,191,488	11132	
2	Smart Contract Platform		-0.2%	-0.1%	3.5%	\$395,239,706,573	\$28,883,913,837	184	
3	BNB Chain Ecosystem		0.0%	-0.6%	2.3%	\$261,122,578,106	\$76,904,389,710	3738	
4	Polygon Ecosystem		?	?	?	\$255,773,829,498	\$76,551,871,796	860	
5	Avalanche Ecosystem		0.5%	1.8%	3.2%	\$241,281,652,516	\$73,815,950,917	430	
6	Moonriver Ecosystem		-0.0%	0.2%	1.7%	\$227,769,165,048	\$70,825,131,039	48	
7	Fantom Ecosystem		0.3%	0.3%	-2.0%	\$175,197,989,832	\$69,806,813,927	317	
8	Stablecoins		-0.0%	-0.1%	-5.9%	\$162,649,495,258	\$66,198,016,634	98	
9	Arbitrum Ecosystem		0.3%	-0.6%	-2.4%	\$158,072,028,262	\$62,333,533,079	98	
10	Near Protocol Ecosystem		0.4%	-0.5%	-2.1%	\$148,873,727,429	\$60,128,158,400	52	



Number of cryptocurrencies worldwide from 2013 to February 2022

Quantity of cryptocurrencies as of February 3, 2022

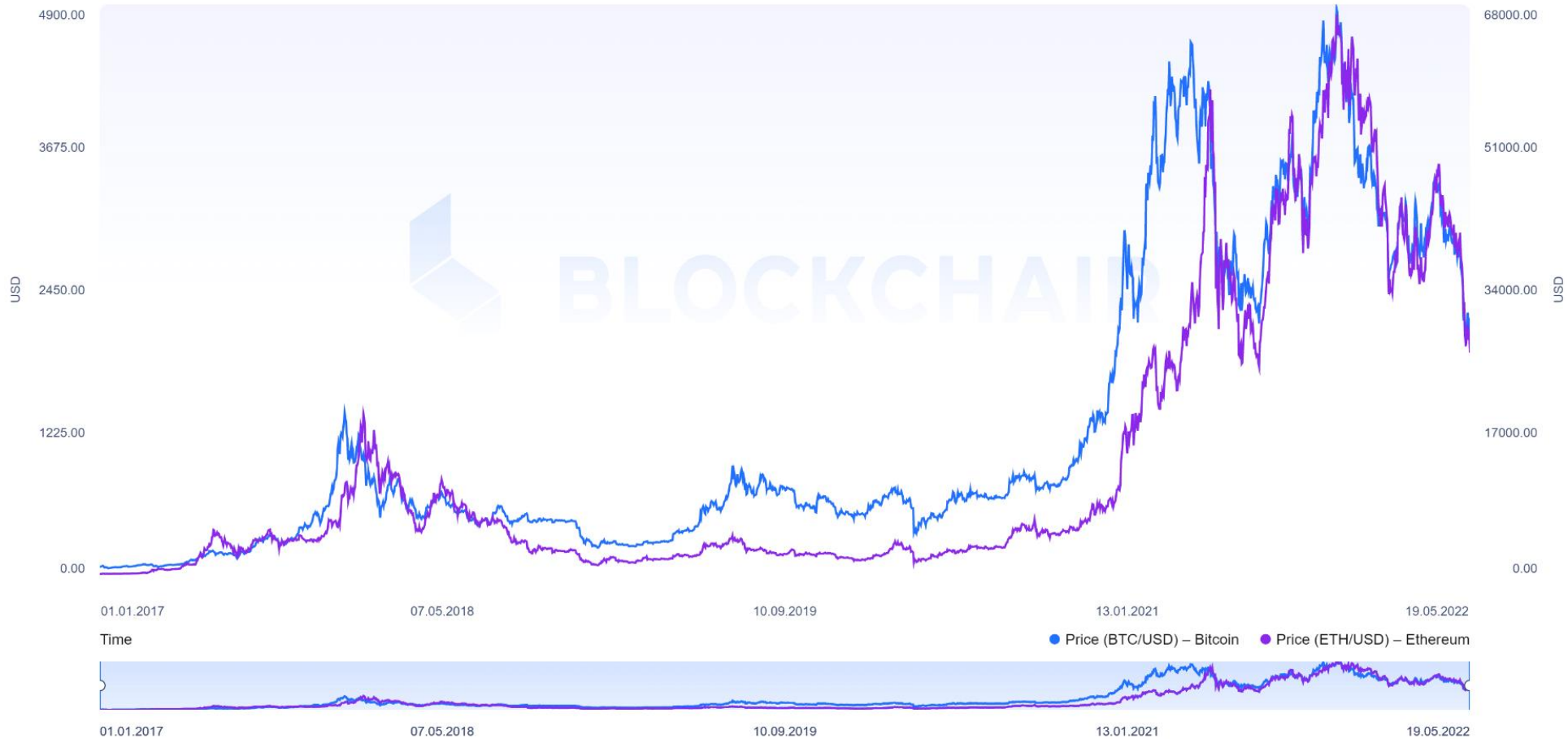


Note(s): Worldwide; 2013 to 2022

Further information regarding this statistic can be found on [page 56](#).

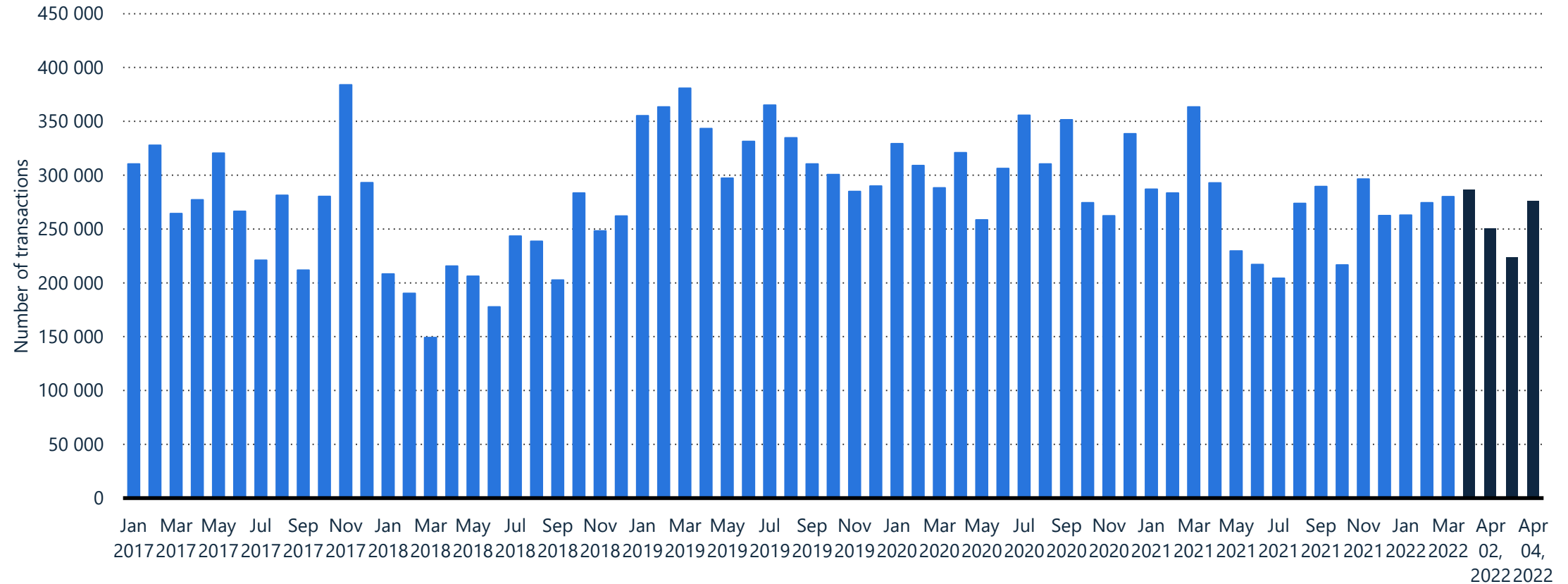
Source(s): CoinMarketCap; [ID 863917](#)

Leading cryptocurrencies - price development



Number of daily transactions on the blockchain of Bitcoin from January 2017 to April 4, 2021

Bitcoin (BTC) daily transaction history worldwide as of April 4, 2021

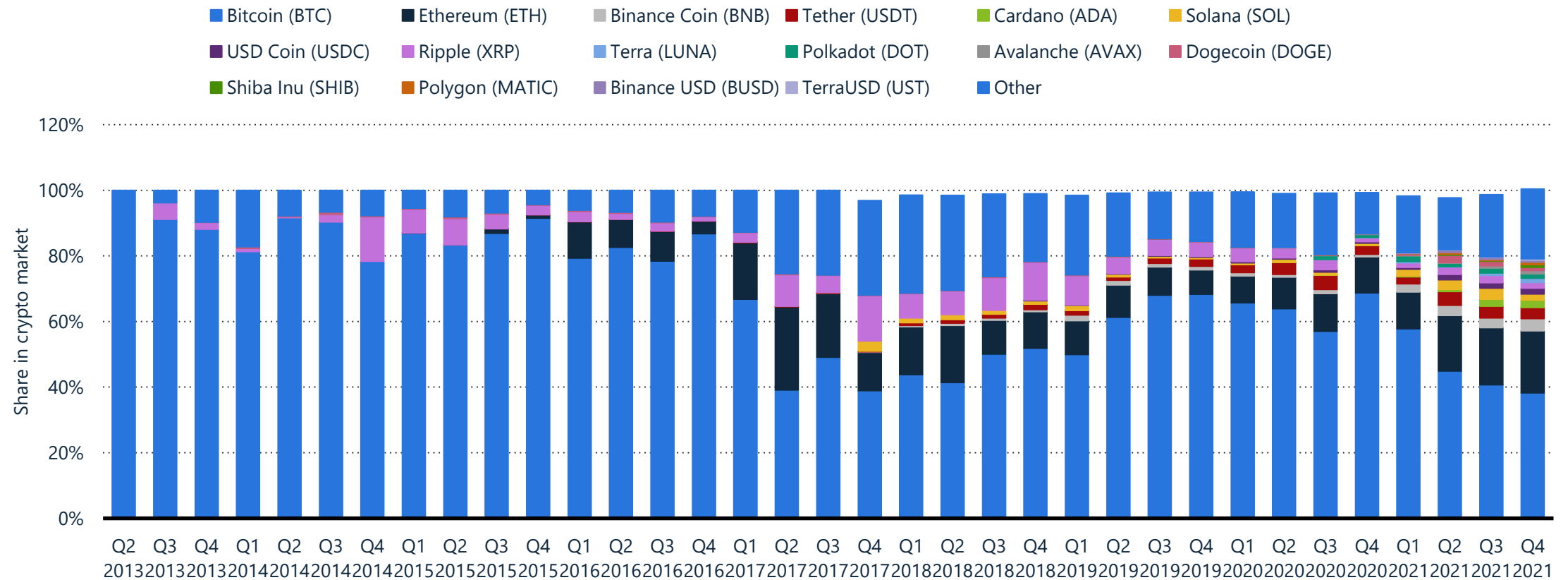


Note(s): Worldwide; January 2017 to April 4, 2021; The numbers provided concern network transactions, not trading volume

Further information regarding this statistic can be found on [page 66](#).

Source(s): Coin Metrics; [ID 730806](#)

Quarterly market share of selected cryptocurrencies, based on market cap 2013-2021



Note(s): Worldwide; Q2 2013 to Q4 2021; The numbers shown are interactive: Clicking on a coin name either adds or removes it from the graphic; The coins shown are the 16 largest as of February 21, 2022. Litecoin did not feature in the top ranked crypto based on market cap; The numbers provided are as of the end of each quarter

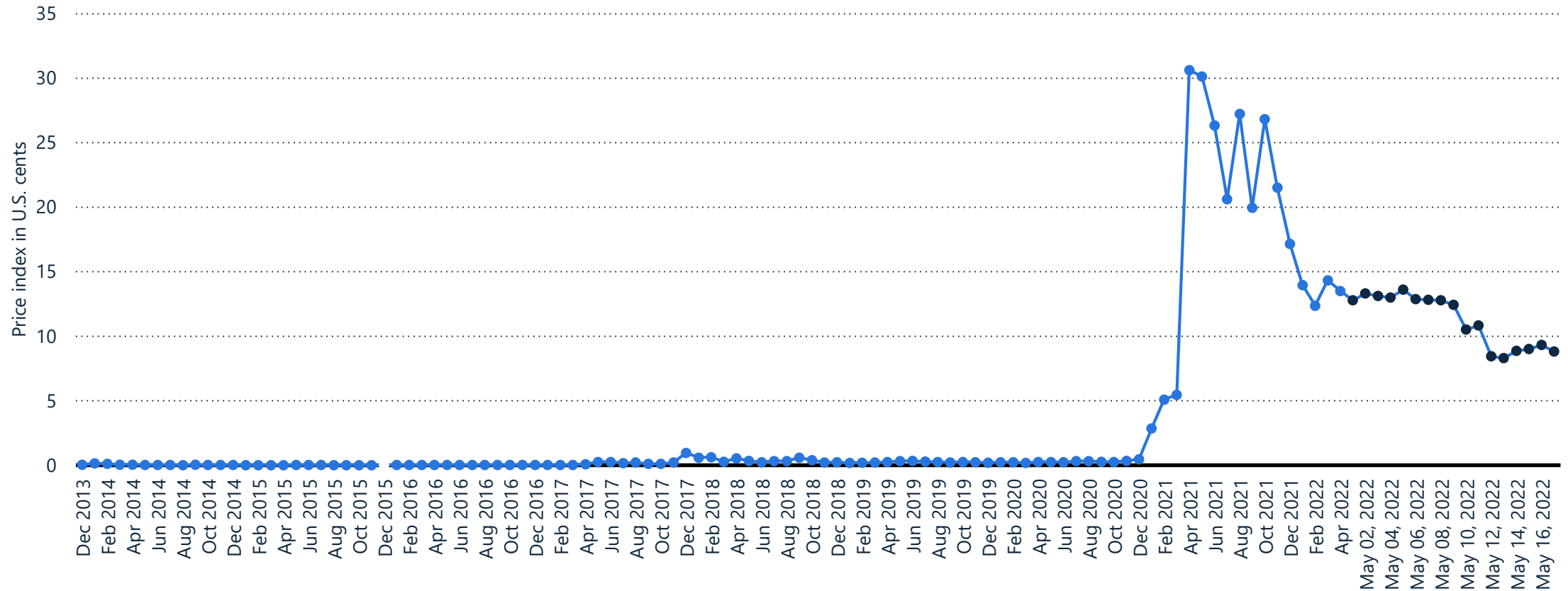
Further information regarding this statistic can be found on [page 57](#).

Source(s): CoinGecko; [ID 730782](#)



Dogecoin (DOGE) price per day from December 2013 to May 17, 2022 (in U.S. cents)

Dogecoin DOGE/USD price history up until May 17, 2022

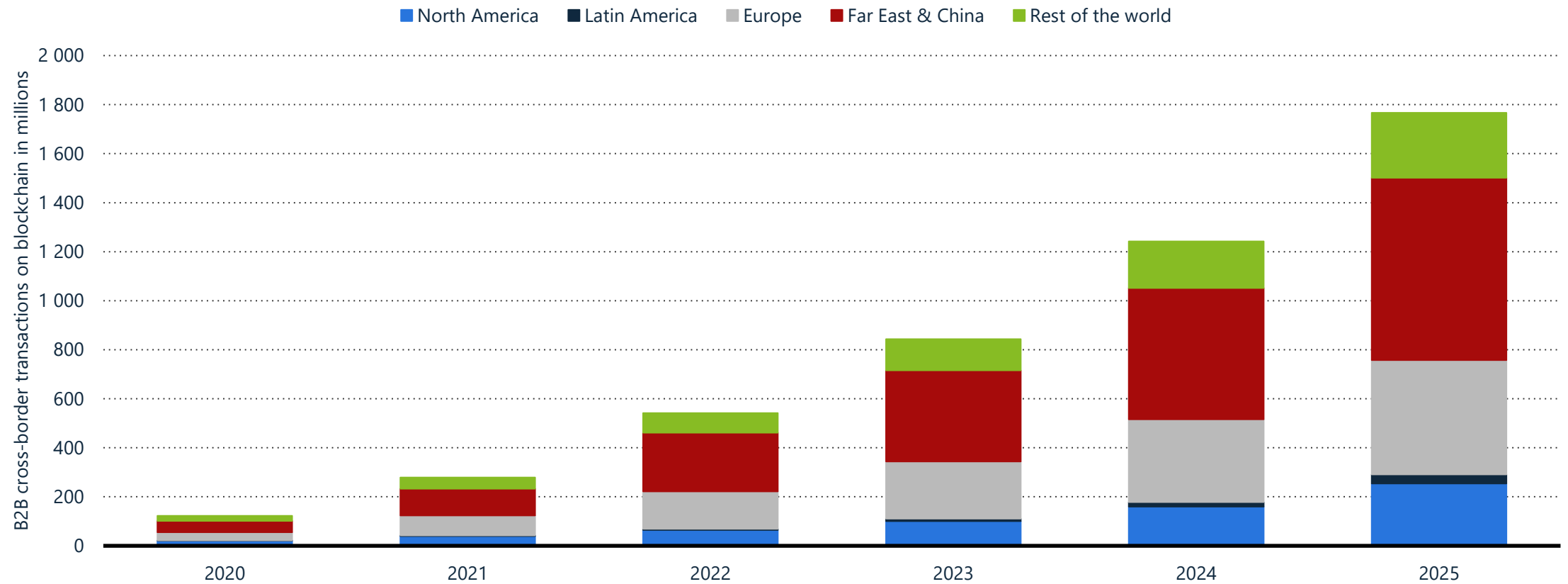


Note(s): Worldwide; December 2013 to May 17, 2022; The figures shown here are in U.S. cents: A figure like 0.19 in this chart, refers to 0.0019 USD.

Further information regarding this statistic can be found on [page 60](#).

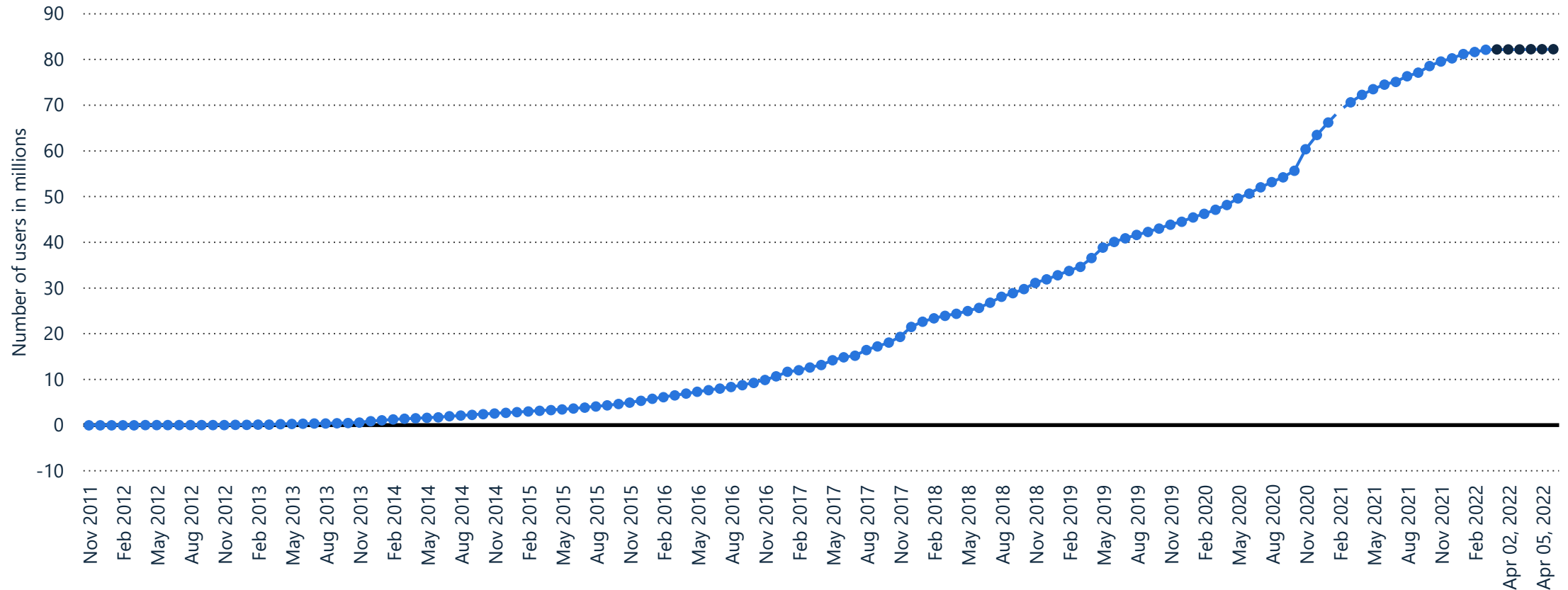
Source(s): CoinGecko; [ID 1200235](#)

B2B cross-border transactions on blockchain in various regions worldwide in 2020 with forecasts from 2021 to 2025 (in millions)





Number of Bitcoin block explorer Blockchain.com **wallet users** worldwide from November 2011 to April 6, 2022 (in millions)



Note(s): Worldwide; November 2011 to April 6, 2022; Number of unique Blockchain.com wallets created worldwide

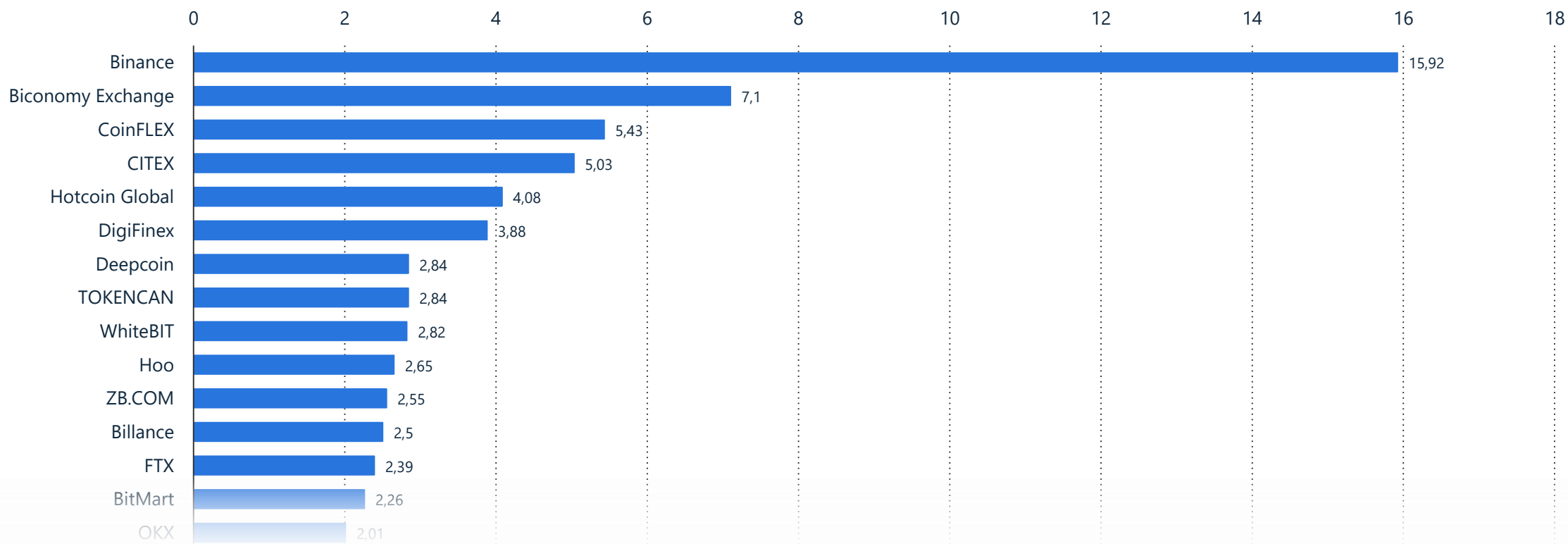
Further information regarding this statistic can be found on [page 55](#).

Source(s): Blockchain; [ID 647374](#)



Largest cryptocurrency exchanges - 24h volume - on May 17, 2022 (in billion U.S. dollars)

24h volume in billion U.S. dollars



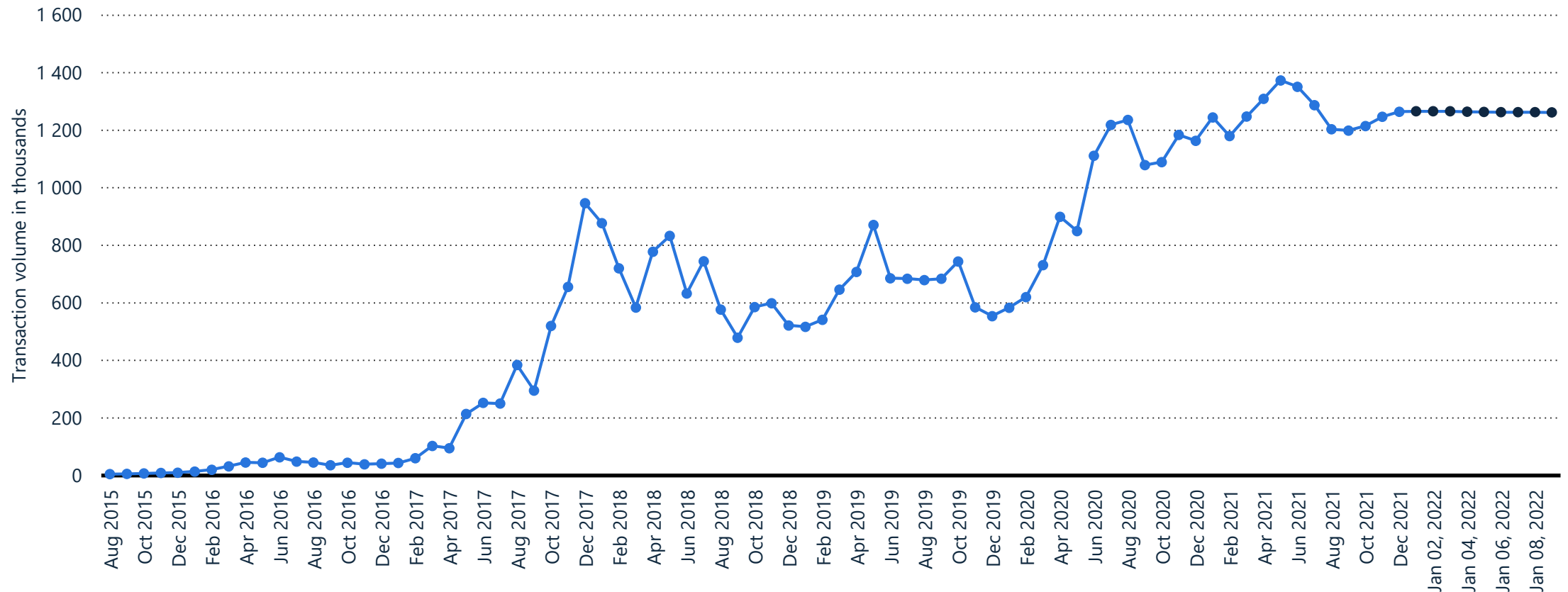
Note(s): Worldwide; May 17, 2022

Further information regarding this statistic can be found on [page 58](#).

Source(s): CoinMarketCap; [ID 864738](#)

Number of Ethereum transactions per day on the blockchain from August 2015 to January 9, 2022 (in 1,000s)

Ethereum (ETH) daily transaction volume up until January 9, 2022



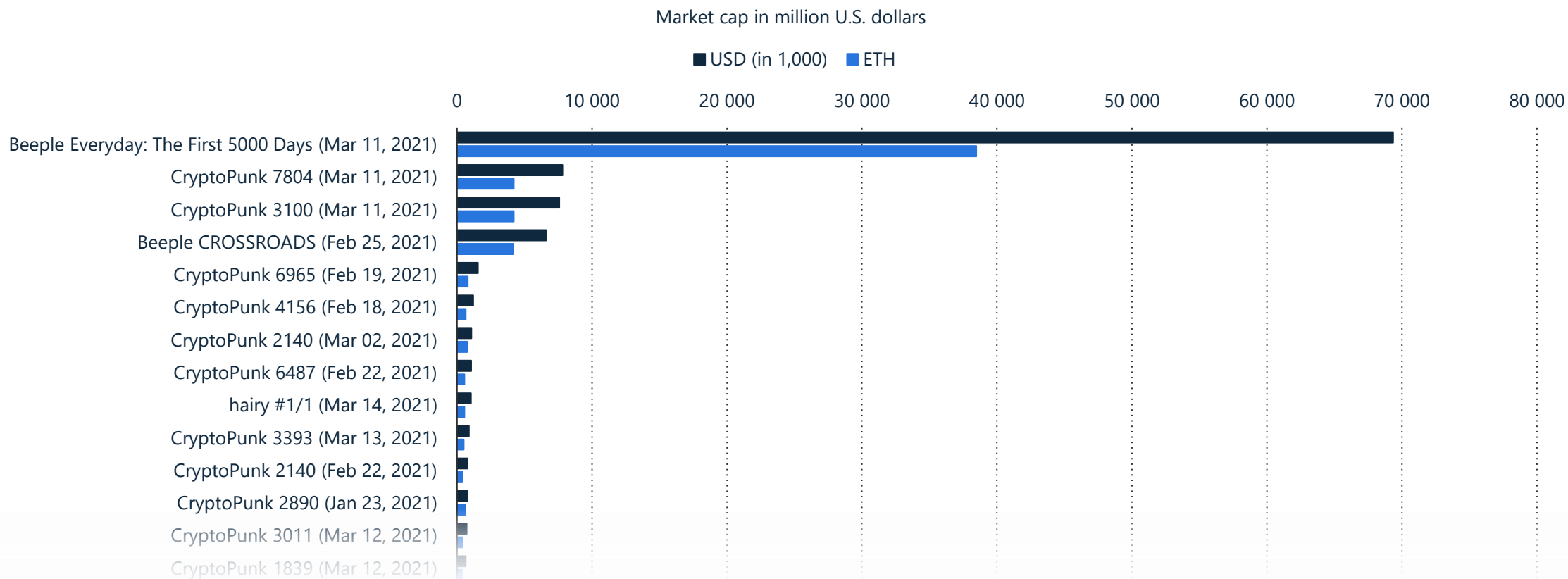
Note(s): Worldwide; August 2015 to January 9, 2022; The numbers provided concern network transactions, not the trading volume of each coin

Further information regarding this statistic can be found on [page 59](#).

Source(s): BitInfoCharts; [ID 730818](#)

Most expensive non-fungible token (NFT) sales worldwide as of March 16, 2021

The 50 biggest NFT sales worldwide as of March 16, 2021



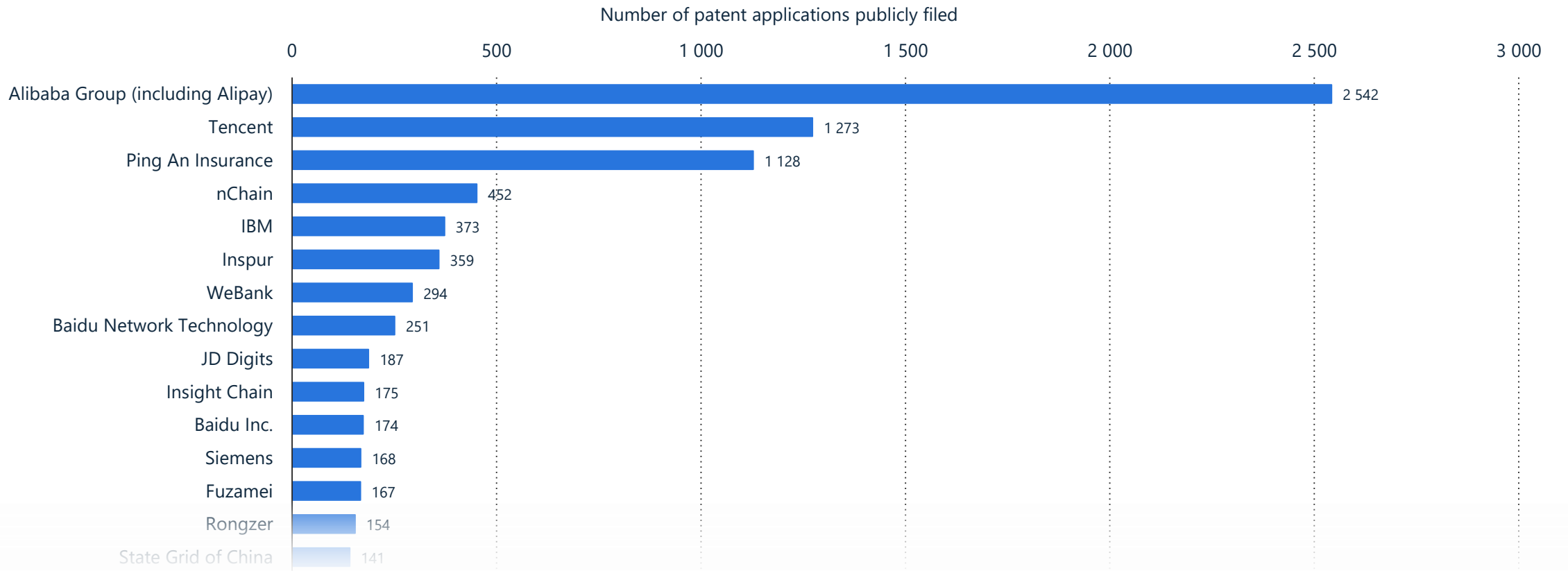
Note(s): Worldwide; March 16, 2021; The transaction values were in ETH, and have been converted to USD by using the average ETH price of that particular day

Further information regarding this statistic can be found on [page 61](#).

Source(s): Various sources; [ID_1222113](#)



Global blockchain patent applications filed by major company publicly 2020



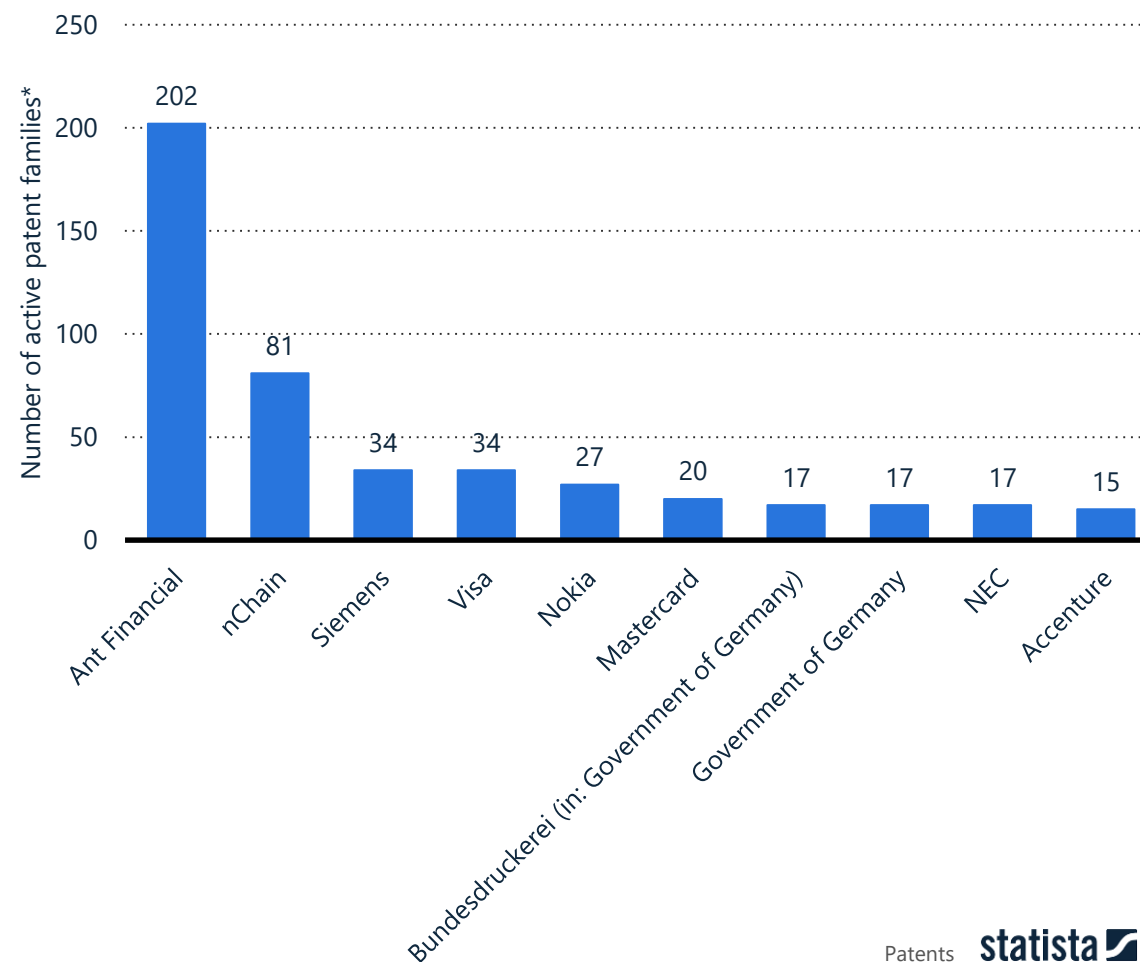
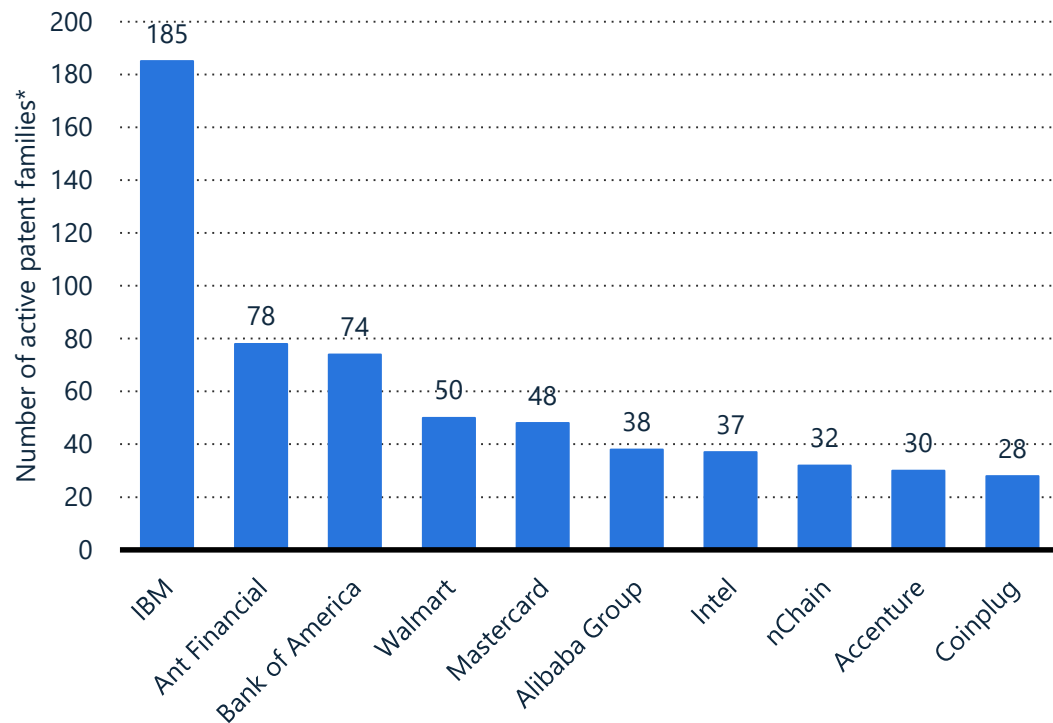
Note(s): Worldwide, China; January 1 to October 31, 2020

Further information regarding this statistic can be found on [page 70](#).

Source(s): incoPat; [ID 1119195](#)



Companies with the most blockchain patents in the United States / Europe



Note(s): United States; December 31, 2019

Further information regarding this statistic can be found on [page 71](#).

Source(s): LexisNexis PatentSight; [ID_1022077](#)

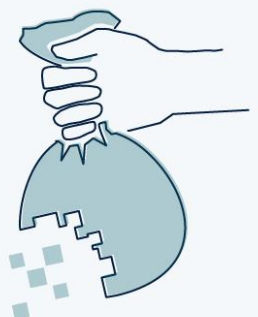
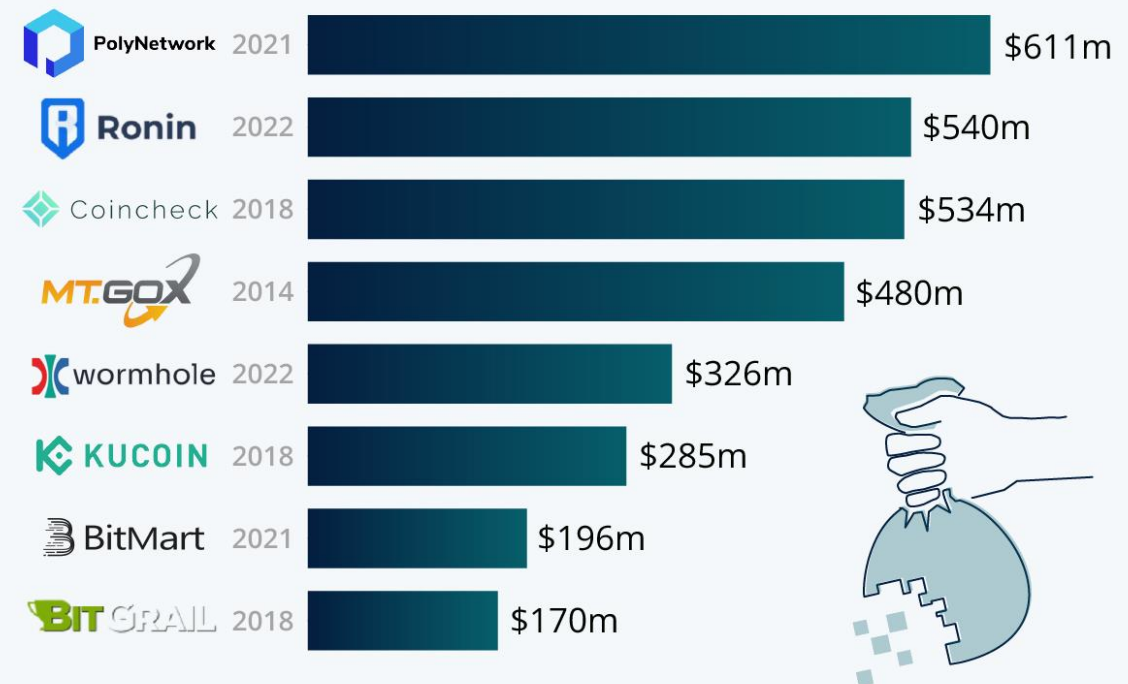
Owned or used cryptocurrencies – worldwide from 2019 to 2021

	2019	2020	2021
Nigeria	28%	32%	42%
Thailand	23%	18%	31%
Philippines	15%	20%	28%
Vietnam	22%	21%	27%
Turkey	20%	16%	25%
Argentina	16%	14%	21%
South Africa	16%	18%	21%
Switzerland	10%	11%	16%
Kenya	10%	11%	16%
Malaysia	6%	12%	16%
Brazil	16%	11%	16%
Netherlands	9%	10%	15%
Colombia	18%	15%	15%
Czechia	10%	9%	15%
... Israel	8%	5%	8%



The Biggest Crypto Heists

Largest known crypto currency thefts by estimated losses*



* According to crypto currency exchange rates at time of theft
Sources: Reuters, Blockchain Companion, Decrypt



Thank for your attention

Resources

Book to read

- Camila Russo: The Infinite Machine: How an Army of Crypto-hackers Is Building the Next Internet with Ethereum
 - <https://www.amazon.com/Infinite-Machine-Crypto-hackers-Building-Internet-ebook/dp/B07X8HS2WC>
- The Cryptopians: Idealism, Greed, Lies, and the Making of the First Big Cryptocurrency Craze
 - <https://www.amazon.com/Cryptopians-Idealism-Greed-Making-Cryptocurrency/dp/1541763017>

Interesting videos

- [Crypto Honest Ad](#)
- [The Lines Goes Up](#)
- [John Oliver – crypto – I](#)
- [John Oliver – crypto – I](#)