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Unchaining Blockchain in China

From Wild West cryptocurrencies to strategic technology

Kai von Carnap, March 2021
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Understanding the blockchain technology in China

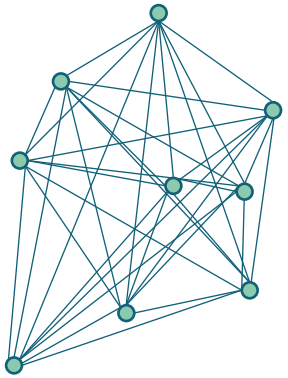
From cryptocurrencies to Distributed Ledger Technology (DLT)

Blockchain development	Status in China	Details
Blockchain 1.0: Cryptocurrencies	▪ Banned since 2017 ▪ Accessible through a vanishing number of channels (VPN, "OTC")	Bitcoin was first proposed by Satoshi Nakatomo in 2008. It uses decentralized ledgers, referred to as "blockchains". By **distributing trust across peer-to-peer networks**, it doesn't require a central authority to clear and settle transactions. **Mining** is the process of validating transactions and is incentivized by rewards paid in a cryptocurrency. Account balances are transparent while accounts are held pseudonymously. **Participation is permissionless** and decisions are based on an open democratic consensus mechanism.
Blockchain 2.0: Smart Contracts	▪ Initiated strategic adoption ▪ Smart contracts are widely used, excluding cryptocurrencies	Ethereum, published by Vitalik Buterin in 2013, adds automatically executable contracts, known as Smart Contracts, to the base technology blockchain. They allow blockchains to uniquely attribute the ownership not only to numerical values, as within currencies, but to any kind of digitizable information, such as claims to real estate and, commodities or temporal access rights. Smart Contracts allow **general digital attributability**, which has increased the use cases of blockchain across industries. For it to be implemented it requires neither a cryptocurrency or public participation.
Distributed Ledger Technology (DLT)	▪ Focus of political support ▪ New forms of private/ permissioned DLT's emerge	The term DLT gained traction as an umbrella term for blockchain and blockchain-like protocols in 2016 after banks, governments, and corporates started experimenting with the technology. New types of blockchain emerged: **permissioned** and **private blockchains**, where participation is restricted or exclusive. Private blockchains discard cryptocurrencies because participation does not require the incentive of cryptocurrency rewards. Some argue that these new systems are not blockchains as they re-centralize data structures.

Two types of blockchains

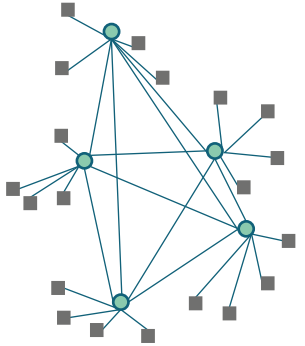
Permissionless blockchains/decentralized cryptocurrencies (Bitcoin, Ethereum)

- Anyone can participate in the network
- Participants can opt to validate new transactions (mining)
- Validated transactions need to be approved by the network
- Validating transactions is incentivized by rewards paid in cryptocurrency



Permissioned/private blockchains (IBM Blockchain, Hyperledger)

- Private blockchain networks do not need a cryptocurrency
- Access to the network is limited and requires permission or is restricted to a select group of private entities
- Validation of transactions can be further restricted



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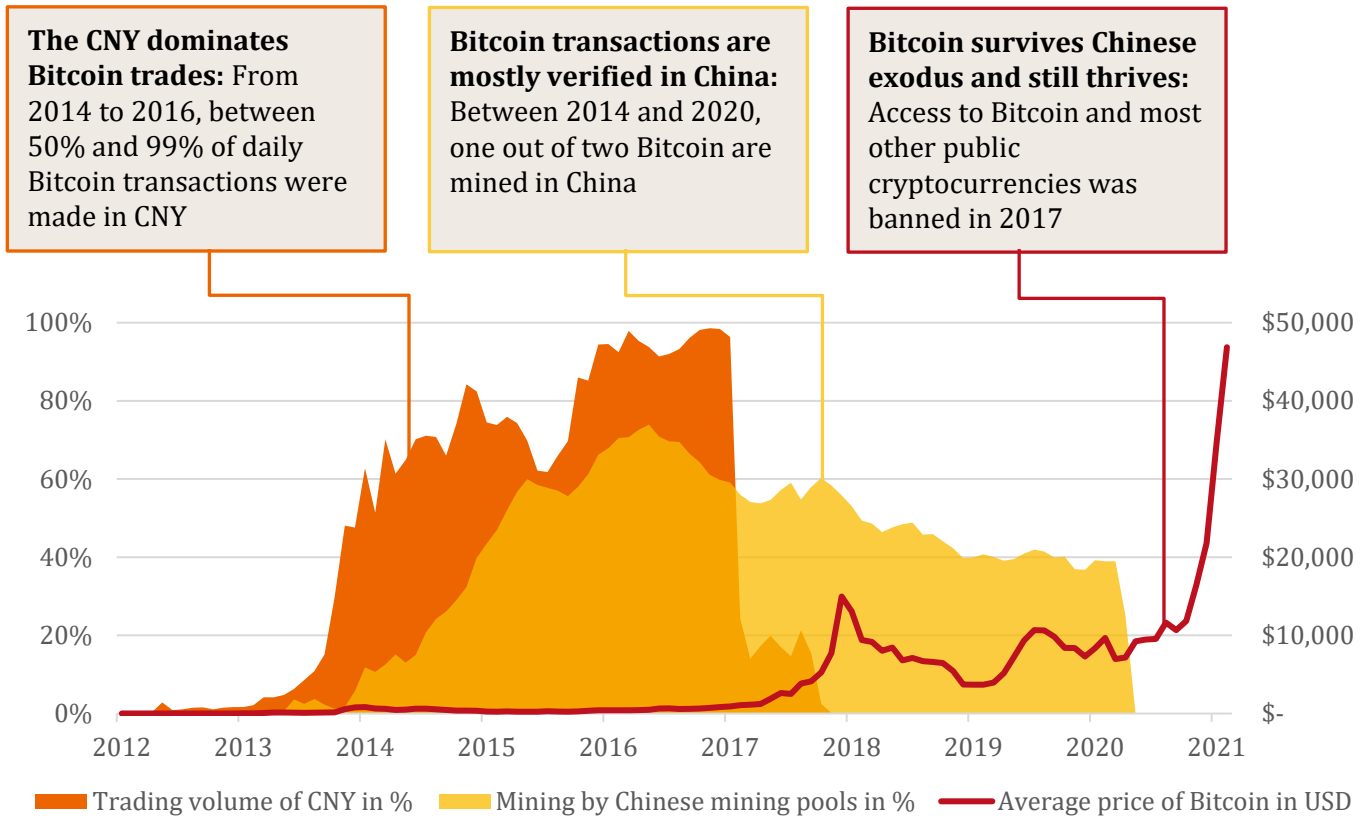
Between 2013 – 2017: Bitcoin brings the blockchain to China

Chinese traders and miners have dominated Bitcoin and other cryptocurrencies

Key indicators for China's "Bitcoin relevance"



Source: Bitcoinity; data on mining provided until April 2020, later reports suggest a continued participation of Chinese miners

Unique demand and supply factors have shaped China's cryptocurrency trajectory

Lack of alternative investment vehicles drives cryptocurrency demand in China

- Capital controls for CNY of 50,000 USD/year do not apply to Bitcoin. It remains unclear the extent to which Bitcoin and other cryptocurrencies were used to circumvent capital controls and to facilitate capital outflow.
- Bond and stock markets are still heavily regulated.
- Per capita income rose from around USD 3,000 in 2000 to USD 14,300 in 2017, after adjusting to purchasing power.
- Unlike in the US or Europe, cryptocurrency exchanges did not charge transaction fees until 2017.

Natural and systemic factors provide comparative advantage for Chinese mining pools

- Most of China's mining activity took place in northern and western provinces as they have favorable climate conditions, cheap land and cheap electricity.
- Relations with hydroelectric power companies are opaque, many offer subsidized energy prices to Chinese mining companies.
- The Beijing-based company Bitmain was simultaneously world market leader for specialized blockchain chips (ASIC) and behind two of the largest mining pools.

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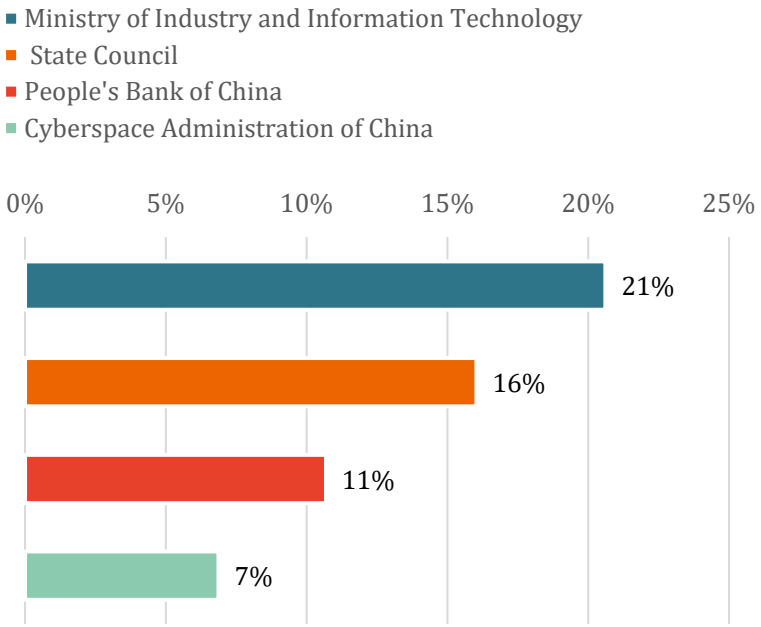
Regulation leads to a surge in private blockchains

In 2017, MIIT and State Council launch a wave of blockchain regulation in China

Share of key policy publications by government agency



Regulations directly or indirectly ban public permissionless blockchains

- The closure of Chinese exchanges and ban on access to those overseas in September 2017 largely halted the circulation of cryptocurrencies within China. Convertible cryptocurrencies, however, are needed by all public blockchains to incentivize public participation and increase resilience against attacks.
- The requirement to register users with China's cyber regulators in 2017 effectively bans anonymous or pseudonymous participation.
- Since the ban on ICO's, the development of new public blockchains "2.0" has come to a halt
- Types of blockchains that remain in China:

	Permissioned	Permissionless
Private	Baidu (Xuperchain), Tencent (FISCO BCOS), LegalXChain	(none)
Public	VeChain, NEO	Banned or moved abroad (Quantum)

Private blockchains proliferate but are limited in scope

- The industry around private and/or permissioned blockchains has rapidly expanded. Many of these systems are controlled by large multinationals, banking and finance consortia or government institutions.
- A large majority of private and/or permissioned blockchains in China don't make use of the incentive structure of a convertible cryptocurrency.
- A limited number of public cryptocurrencies have remained operational in China today. They were founded before 2017 and depend on international support to maintain their networks. At the same time, participation in their core network is restricted and requires permission.

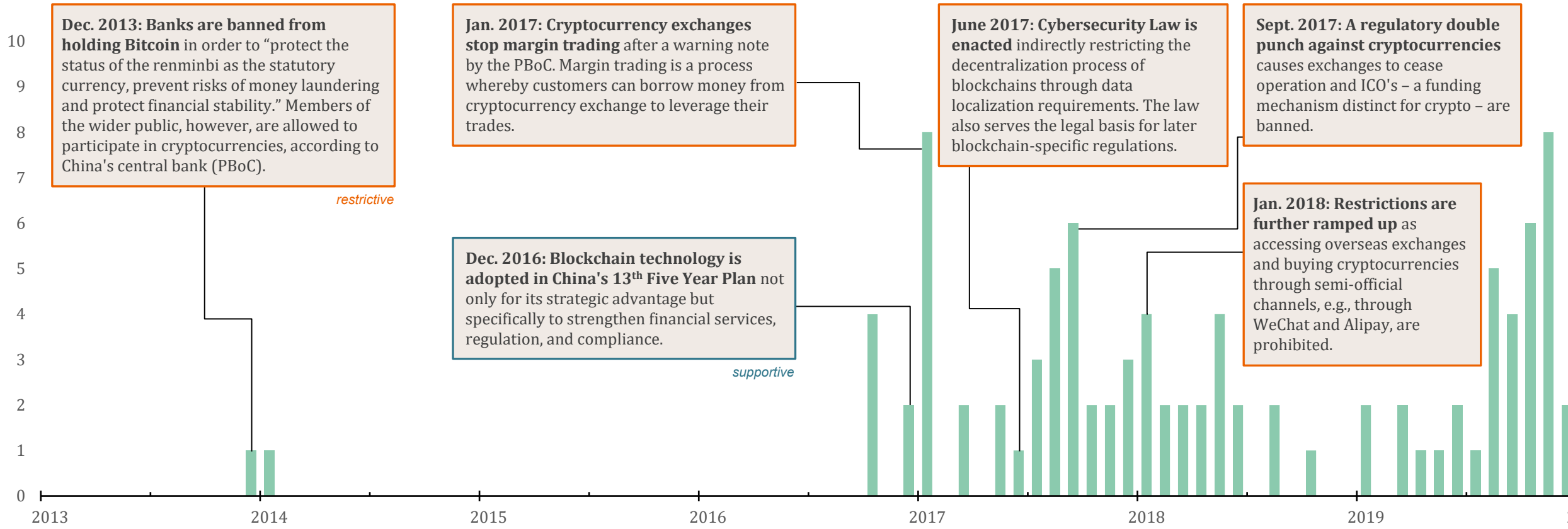
Source: MERICS database of 130 national blockchain-related policies, government announcements and key speeches on the subject by President Xi

China's political approach shifts after 2017: From bans and regulation ...

Key national policies and events reveal three distinct but overlapping trends

Blockchain-related national policies, government announcements, and speeches by President Xi, stacked by month

- **2013 – 2017**: Banks are barred but cryptocurrencies run wild
- **2017 – 2019**: Bans/regulations put halt to public blockchains and cryptocurrencies
- **2019 – today**: Blockchain is embraced as a strategic technology



Source: MERICS research

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… to strategic adoption after October 2019

Key national policies and events reveal three distinct but overlapping trends

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- **2013 – 2017**: Banks are barred but cryptocurrencies run wild
- **2017 – 2019**: Bans/regulations put halt to public blockchains and cryptocurrencies
- **2019 – today**: Blockchain is embraced as a strategic technology

Jan. 2019: Obligatory registration is enacted whereby all blockchain service providers need to register with the Cyberspace Admin. of China and are being made responsible for data content on their blockchains.

May 2018: Xi Jinping expects blockchain to bring forth breakthrough applications and calls for more research and investment during a study session at the Chinese Academy of Science.

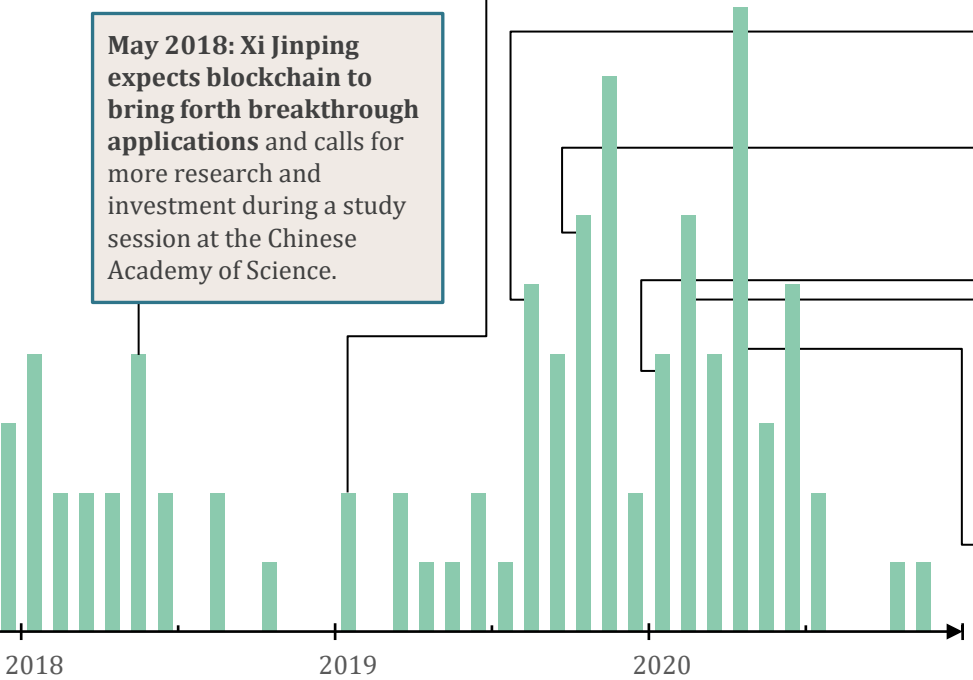
Aug. 2019: China's Central Bank announces it would be soon introducing a national digital currency.

Oct. 2019: In a speech touted the "1024 speech," Xi's sets a new pace for blockchain development in China as he calls it "an important breakthrough for indigenous innovation of core technologies." Shortly after, the Politburo holds a first study session on blockchain.

Jan. 2020: The Central Bank, the State Council and other departments announce information on 11 policies to promote the integration of blockchain and various fields.

Feb. 2020: PBoC sets security specification for blockchain in fintech including a new set of standards around hardware, encryption algorithms, infrastructure software, consensus agreements, smart contracts, privacy protection and more.

Apr. 2020: A new Chinese digital currency (DCEP) is released in pilot projects in Chengdu, Suzhou, Xiong'An, Shenzhen.



Source: MERICS research

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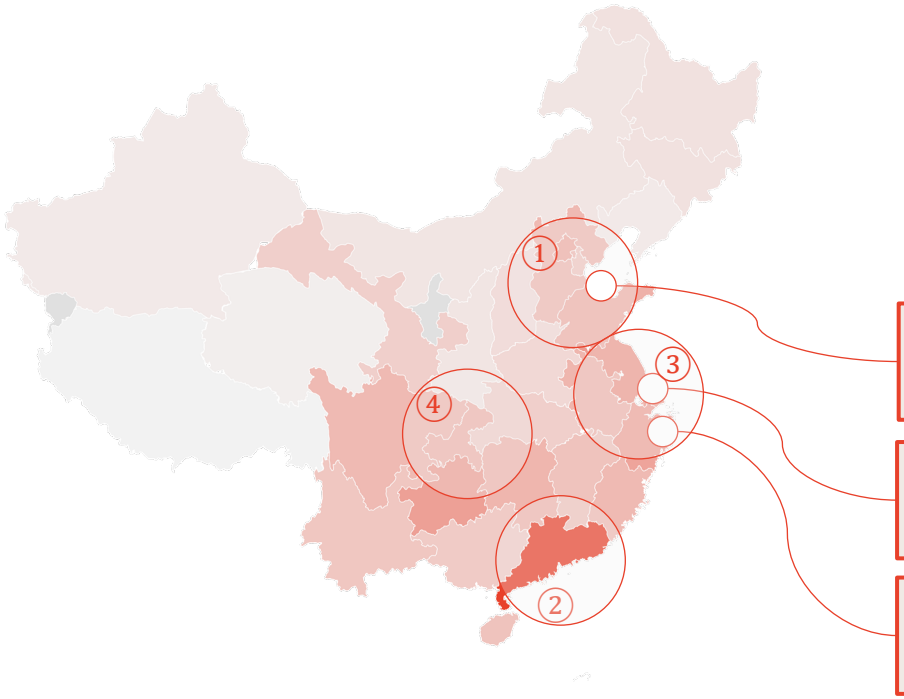
Provinces compete – regional hubs emerge – industrial parks drive development

Across China provincial governments are regulating and supporting blockchain tech

Distribution of 330 provincial blockchain policies, by number (as of Nov. 2020)



Four regional hubs register most corporate activity

New blockchain companies founded between 2019 and the first half of 2020:

① Bohai Economic Rim (环渤海), 32.8%
② Pearl River Delta (珠三角), 29.3%
③ Yangtze River Delta (长三角), 24.4%
④ Hunan-Guizhou-Sichuan (湘黔渝), 10.5%
(Other, 3%)

China's coastal provinces are most attractive for new companies

Blockchain competitiveness index:*

- Guangdong (8.8/10)
- Yunnan (8.3)
- Beijing (7.8)
- Shanghai (7.5)
- Shandong (7.3)

"33333" in Beijing's InnoTown 中关村创客小镇: Zhongguancun is China's leading tech hub, sometimes referred to as "China's Silicon Valley." In April 2018 it launched "33333," intending to attract 30,000 professionals working in the blockchain industry, 3,000 leading blockchain entrepreneurs, 300 incubated blockchain teams and 30 unicorns in 3 years.

The Bay Valley Blockchain Innovation Industry Base in Yangpu Dist., Shanghai 杨浦区湾谷区块链创新产业基地: The district government pursues a 5-in-1 development strategy: "fund + location + thinktank work + community dynamics + training". Registered companies focus on basic research, standard setting, talent acquisition and receive preferential treatment and subsidies.

Suzhou Highspeed Rail New City 苏州高铁新城: Starting in 2017, Tongji University and the Suzhou city government jointly set up the "Chain Valley" 链谷 in its Highspeed Rail New City. E-government services and industry support around blockchain technology is provided to be the first national "Digital Economy Application Demonstration City."

*Notes: * Index based on economic indicators, blockchain policies, investments and startup ecosystem.*

Sources: MERICS research; https://www.tuoniaox.com/news/p-471198.html; http://www.chuangze.cn/third_1.asp?txtid=2997.

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New blockchain actors have a far-reaching impact in China

Key industries, branches and selected representative companies

Infrastructure layer

Base protocols	Hardware	Mining services	Basic research	Industry research
▪ Neo ▪ BSN ▪ Baidu	▪ China mobile ▪ Greek geek	▪ Antminer ▪ Bitmain	▪ CCID ▪ Nanjing University ▪ CAICT	▪ Binance ▪ Huobi

Technology layer

Data services	BaaS platforms	Information security	Wallets
▪ Juzhen Cloud (矩阵云) ▪ Wanxiang	▪ Huawei ▪ OnChain	▪ Tencent Safety ▪ Slowmist	▪ Canaan ▪ Parity
Smart contracts	**Blockchain solutions**	**Cloud services**	**Media**
▪ Cryptape ▪ PDX (全息互信)	▪ Blockchain China ▪ DataChain (信数链)	▪ AliCloud ▪ KingDee	▪ Caijing ▪ 8BTC

Industry layer

Finance	IoT	Health	Energy	Trade
▪ Ant Financial ▪ Bank of China	▪ Tencent ▪ Neusoft	▪ AliHealth ▪ Vechain (+Bayer) ▪ Medicine Chain Group	▪ StateGrid ▪ JiaZe New Energy ▪ Qingdao Zhongzi	▪ Yuanben ▪ PBoC ▪ Alibaba
Law	**Agriculture**	**Entertainment**		**Welfare**
▪ LegalXchain ▪ Oracle ▪ Primas	▪ Agriculture Bank ▪ Vechain	▪ First blood ▪ Hashworld		▪ Aidchain ▪ AntChain
Voting	**Tracing**	**Supply chain**		**IPR protection**
▪ VotingChain (投票链) ▪ Yunphant	▪ Aliyun ▪ Haier	▪ JingDong ▪ Huawei ▪ CaiNiao		▪ Zhigui Technology

Source: MERICS research

Supply chain, financial and government services drive blockchain adoption

The focus of blockchain projects shifts notably after Xi's "1024 Speech" (Oct. 2019)

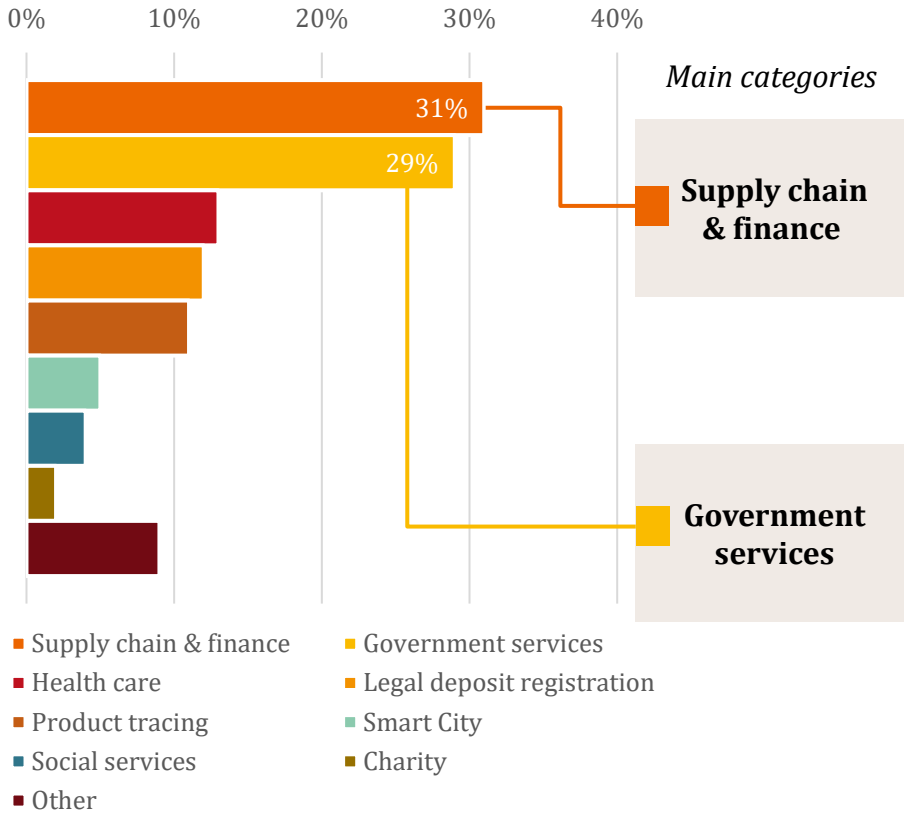
- In 2019, a fraction of 6% of new blockchain projects focused on government service blockchains.
- In the first half of 2020 alone, the share increased by 23%.
- Supply chain and financial services remained at the top, representing 31% of the projects in both periods.

New government services blockchain experiments allow "programmable governance"

- Since April 2020, citizens in Haidian, Beijing, have their personal data handled by a blockchain system "One Network Portal" (一网通办).
- Civil administration and applications for government services are carried out over this system. Data from several institutions and ministries is merged to streamline verification and procedures.
- Shared data includes ID card information, residence permits, marriage and divorce certificates, electronic business licenses, tax credit rating information, environmental assessment information, medical institutions' licensing, housing qualification information and more.

Blockchain adoption for government services increases rapidly

New blockchain-based applications in the first half of 2020*



Main categories

Supply chain & finance

- Financing in credit, 44%
- Electronic signature, 26%
- Supply chain finance, 20%
- Cross-border payment, 4%
- Asset securitization, 2%
- Other, 4%

Government services

- Administrative approval, 24%
- Electronic licenses, 19%
- Data sharing, 17%
- Precision poverty alleviation, 10%
- Customs trade, 7%
- Urban governance, 7%
- Electronic bills, 14%
- Other, 2%

Subcategories

*Notes: * Analysis of 146 official blockchain-based projects as collected by CCID, a Think tank under the Ministry of Industry and Information Technology (MIIT).*

Sources: MERICS research; http://www.chuangze.cn/third_1.asp?txtid=2997

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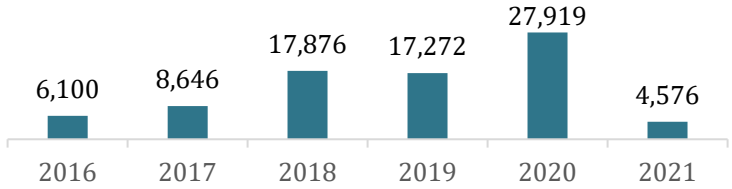
Regulators are struggling to keep up with the development of the industry

Blockchain companies are mushrooming

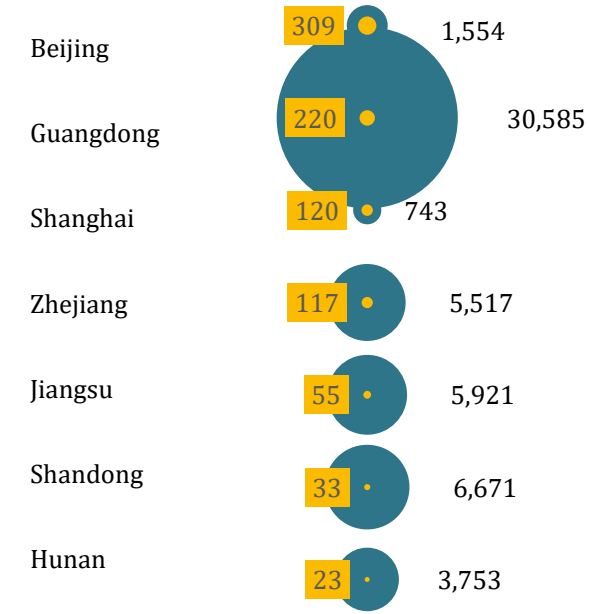
Number of newfound blockchain companies*



- Reports suggest that a considerable amount of them are not operational any more or do not actually use the technology.
- Since Jan. 2019, every blockchain service company needs to register with the Cyberspace Administration of China (CAC).
- As of Feb. 2020, a total of 1,015 projects, including Baidu's Xuperchain and VeChain, had filed with the CAC, according to four published entity lists (境内区块链信息服务备案清单).
- Regulatory progress is not transparent, and rejections not published.
- The progress of regulating the industry is only effective in Beijing and Shanghai.
- Registered and unregistered blockchain companies are joining forces in industrial alliances to represent industry interests both within China and abroad.

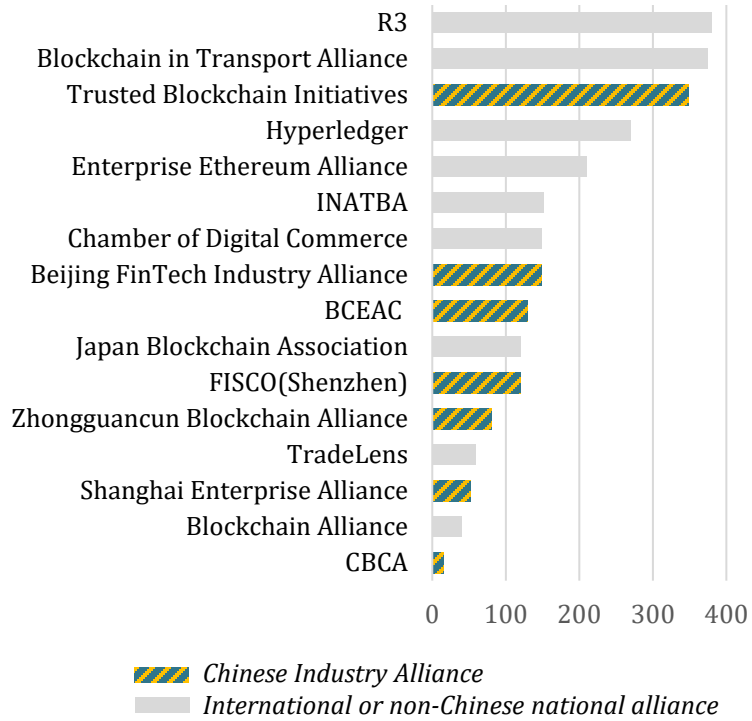
… but regulators capture only a fraction

Number of blockchain companies listed vs registered*



… and powerful industry alliances emerge to shape domestic and global developments

Number of alliance members



*Notes: * Data from company database QiChaCha until February 2021*

Sources: MERICS research; QiChaCha; http://pdf.dfcfw.com/pdf/H3_AP202004261378665796_1.pdf; https://cointelegraph.com/news/huge-rise-in-chinese-blockchain-companies-but-are-they-real.

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