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Blockchain: Making Sense of Emerging Technologies

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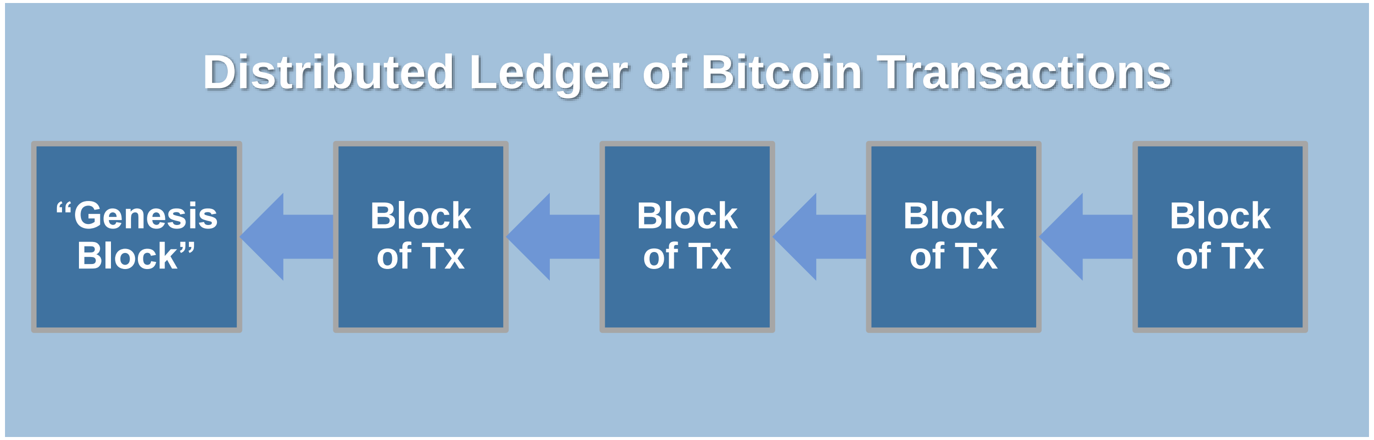
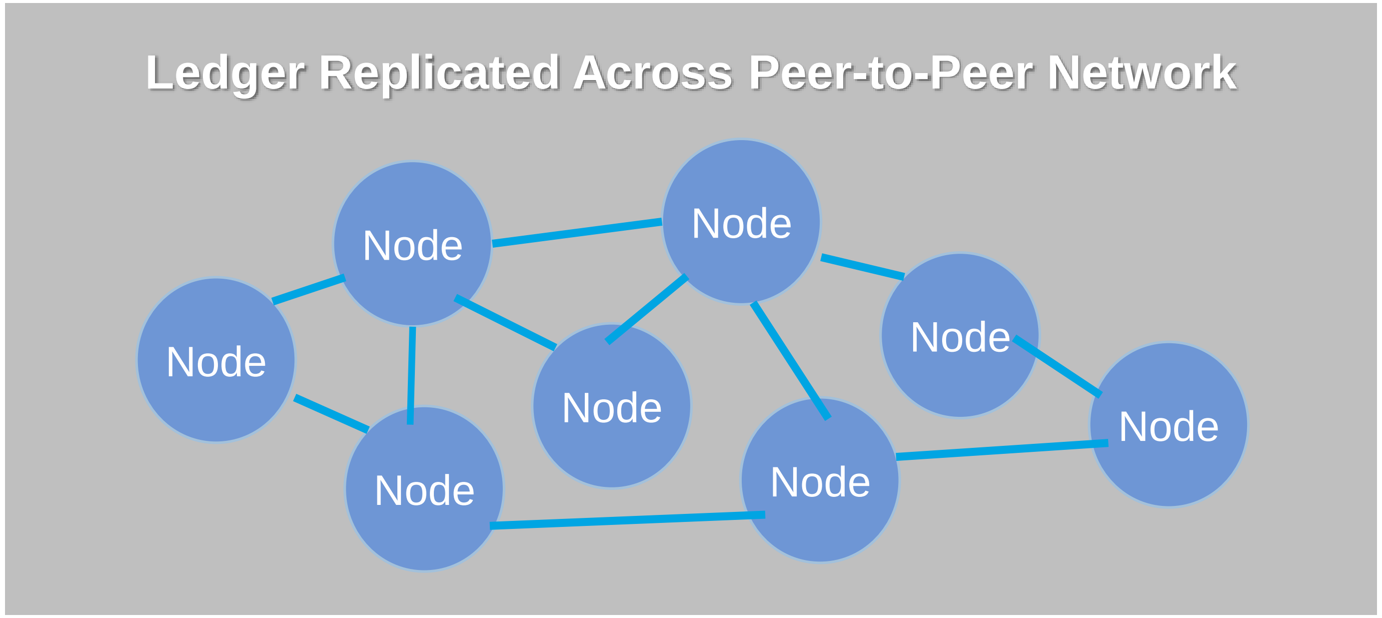
What is a Distributed Ledger (i.e. Blockchain)?





- Bitcoin is the best known real, proven distributed ledger (although more than two dozen competitors are underway)
- Linear list of transactions, cryptographically joined in a chain of blocks
- Replicated across P2P network
- Protocol for validation of transactions and propagation across network
- Protocol for structured update to ledger and generate of new value tokens (i.e., "mining bitcoins")

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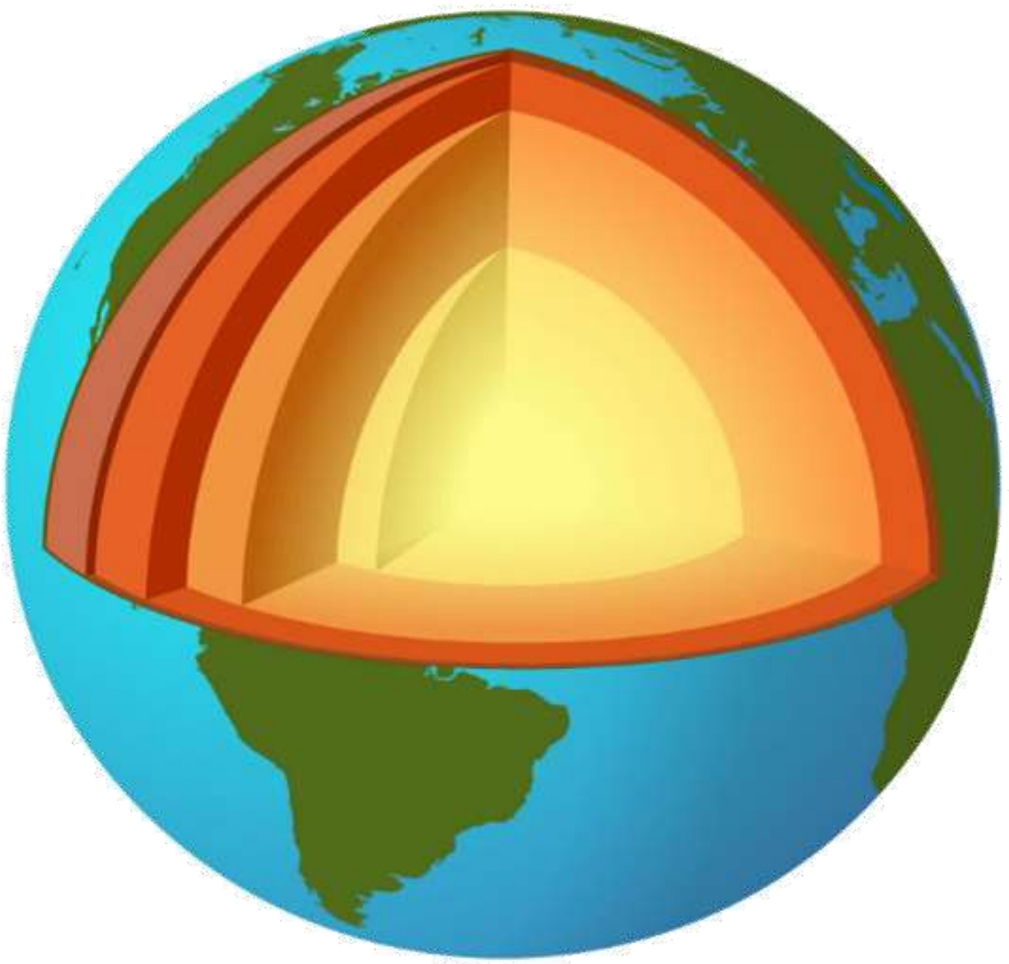
Blockchain Technology's Core Concepts

- Mechanism for adding trust in an untrusted environment
- An irrevocable record of significant data and events, such as monetary transactions, property records or other valued assets
- Not just a passive data record, but can optionally add dynamically programmed behavior to events
- Create and exchange multivarious assets and forms of value

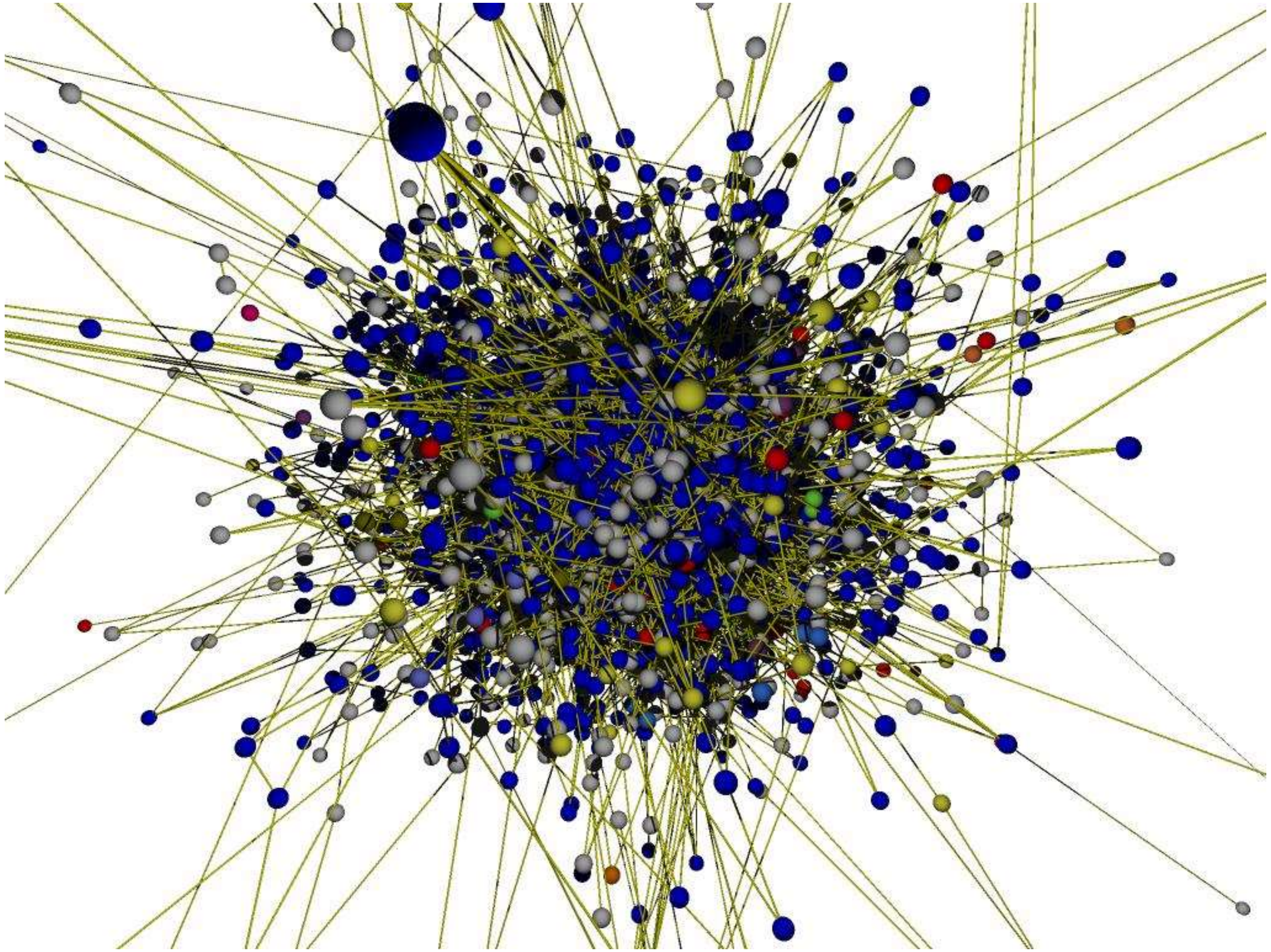


Top 11 Cryptocurrency Coins and Tokens, March 2018

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)
1	Bitcoin	$179,980,553,950	$10,656.20	$7,171,950,000	16,889,750 BTC	3.48%
2	Ethereum	$85,632,348,193	$874.88	$2,066,980,000	97,878,517 ETH	0.18%
3	Ripple	$37,165,278,230	$0.950645	$336,240,000	39,094,802,192 XRP *	-0.94%
4	Bitcoin Cash	$21,209,241,150	$1,248.30	$417,706,000	16,990,500 BCH	0.14%
5	Litecoin	$12,024,737,984	$217.03	$920,569,000	55,404,858 LTC	-3.28%
6	NEO	$9,144,850,000	$140.69	$417,159,000	65,000,000 NEO *	4.45%
7	Cardano	$8,650,618,939	$0.333652	$110,942,000	25,927,070,538 ADA *	-1.49%
8	Stellar	$6,597,517,320	$0.357239	$39,806,000	18,468,076,889 XLM *	-2.67%
9	EOS	$6,023,027,853	$8.66	$332,959,000	695,887,070 EOS *	4.49%
10	IOTA	$5,298,701,964	$1.91	$37,384,100	2,779,530,283 MIOTA *	1.55%
11	Dash	$4,815,707,028	$608.84	$91,078,900	7,909,617 DASH	-1.89%

Source: Cryptocurrency Market Capitalizations

Three Generations of Global-Scale Transformation



- **The Internet of Data:** Any node on global-scale network can send a packet of data (1969)
- **The Internet of Content:** Any node can send a packet (web page) of content (1989)
- **Internet of "Money"**: Transport protocol for value (2030?)

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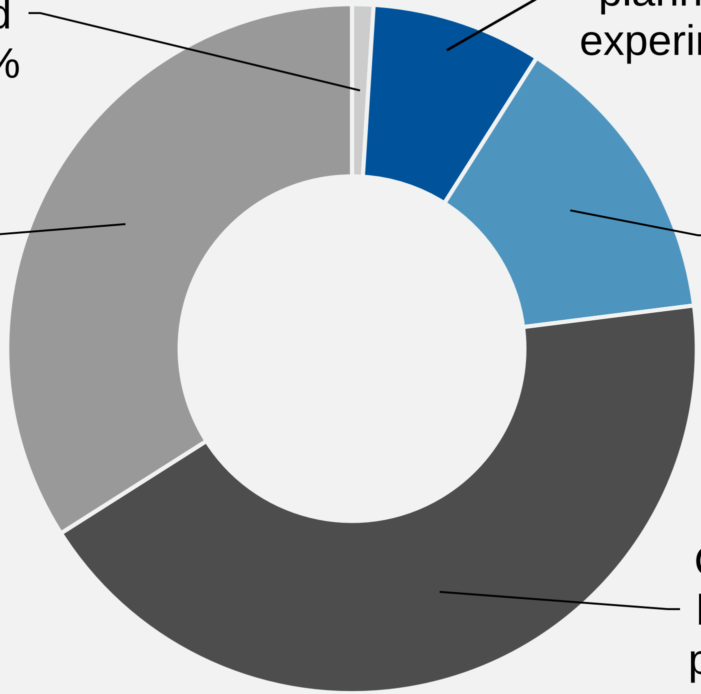
Regardless of Coins, Most Organizations Have Not Yet Begun Using Blockchain

Organizations' Plans for Blockchain (Percentage of Respondents)



Base: All answering, excludes DK, n = 3138

What are your organization's plans in terms of the following digital technologies and trends? Blockchain/Distributed Ledger

FS has been the leading industry historically for POC, but the implementation rate remains <5%.

26,000 blockchain projects began in 2016, only 8% still active.

Source: Deloitte

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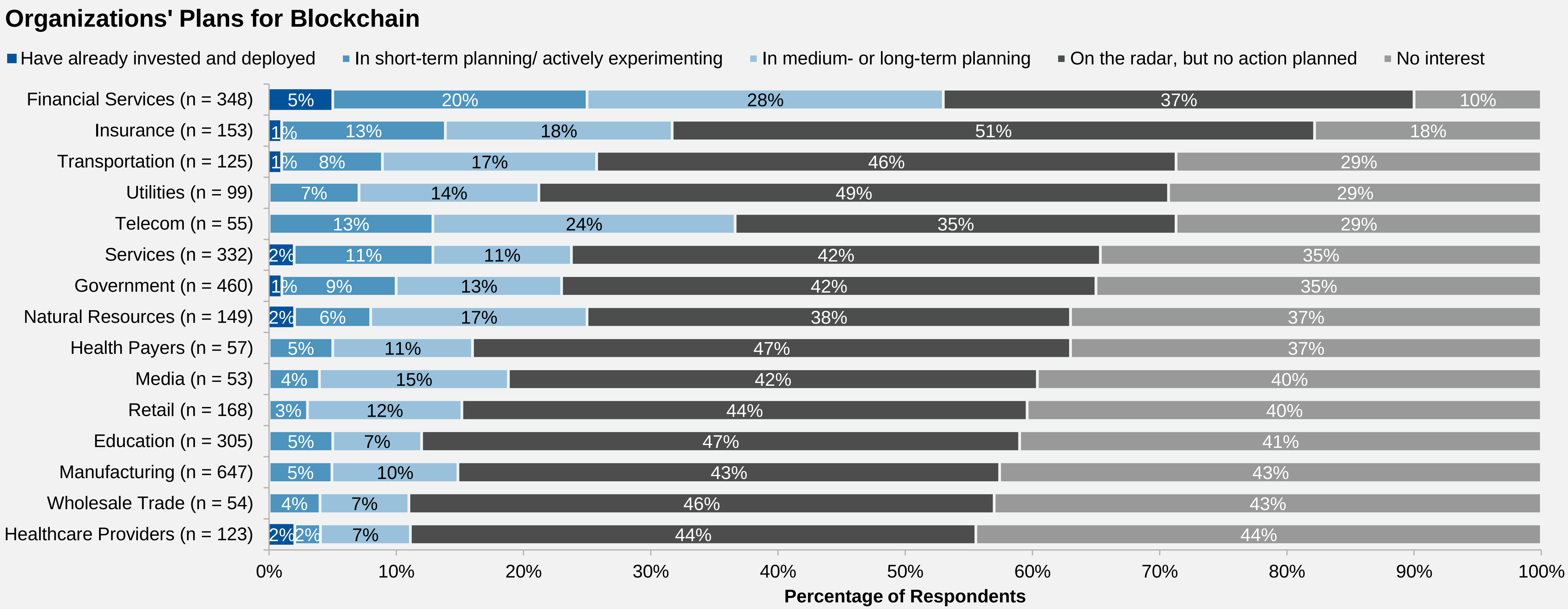
Interest in Blockchain Varies by Industry



What are your organization's plans in terms of the following digital technologies and trends?
Blockchain/Distributed Ledger

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What are your organization's top three concerns or challenges related to successfully developing and implementing Blockchain projects in 2017?

Responses	Response Rate
Lack of good business case ideas	26%
Compliance, security or regulatory factors	22%
Unproven/unavailable TCO/digital value calculations for blockchain use	15%
Skepticism over blockchain value	11%
Lack of skilled blockchain developers to execute proof of concepts, etc.	7%
Lack of funding	7%
Preference to maintain existing operating and business model	7%
Legacy infrastructure/applications architecture	4%
Lack of or adequate IT infrastructure	0%
Lack of or inadequate digital strategy	0%
Fear of being the first on the market	0%

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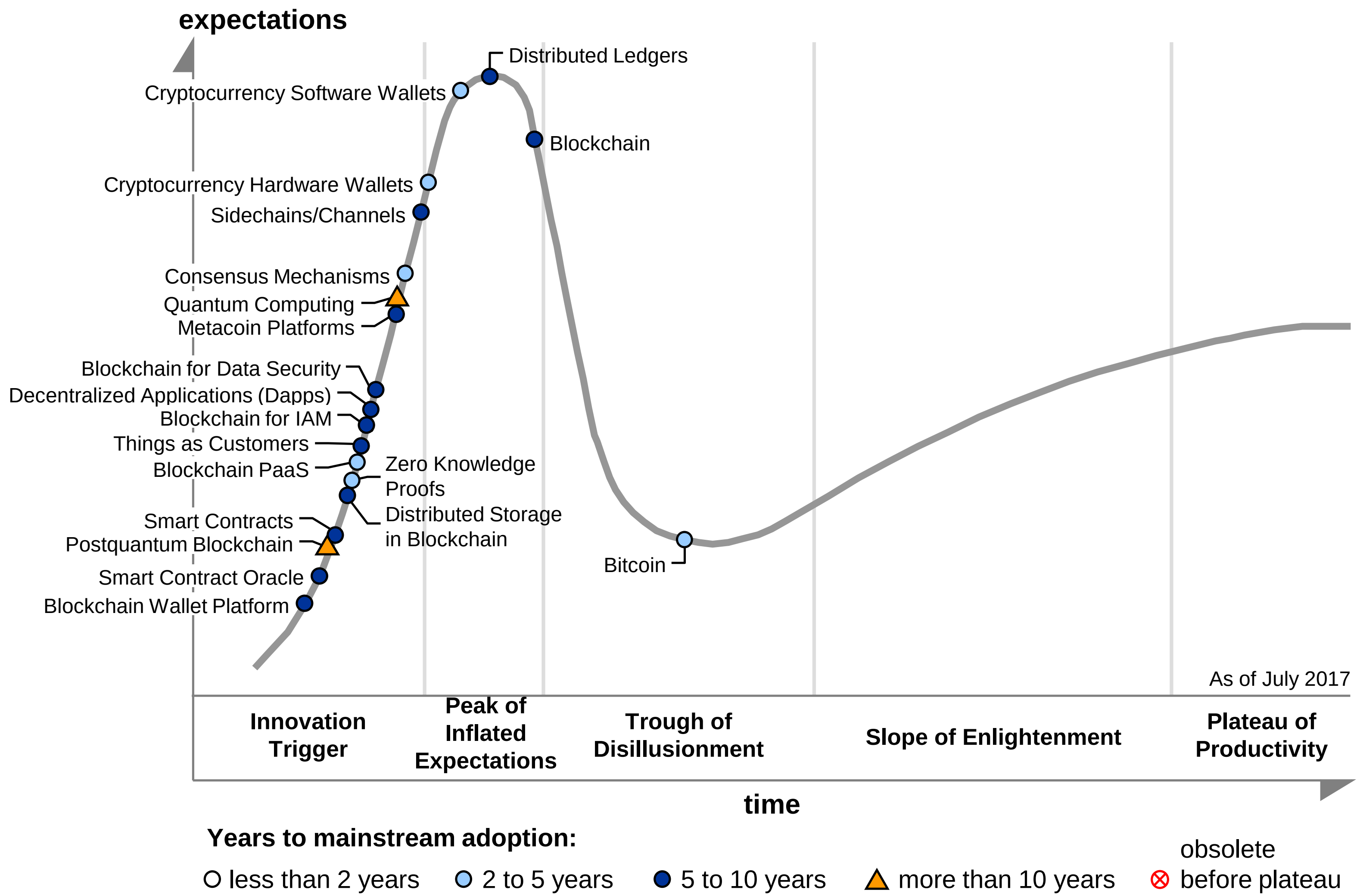
Hype Cycle for Blockchain Technologies, 2017



From "Hype Cycle for Blockchain Technologies, 2017," 29 July 2017, (G00332627)

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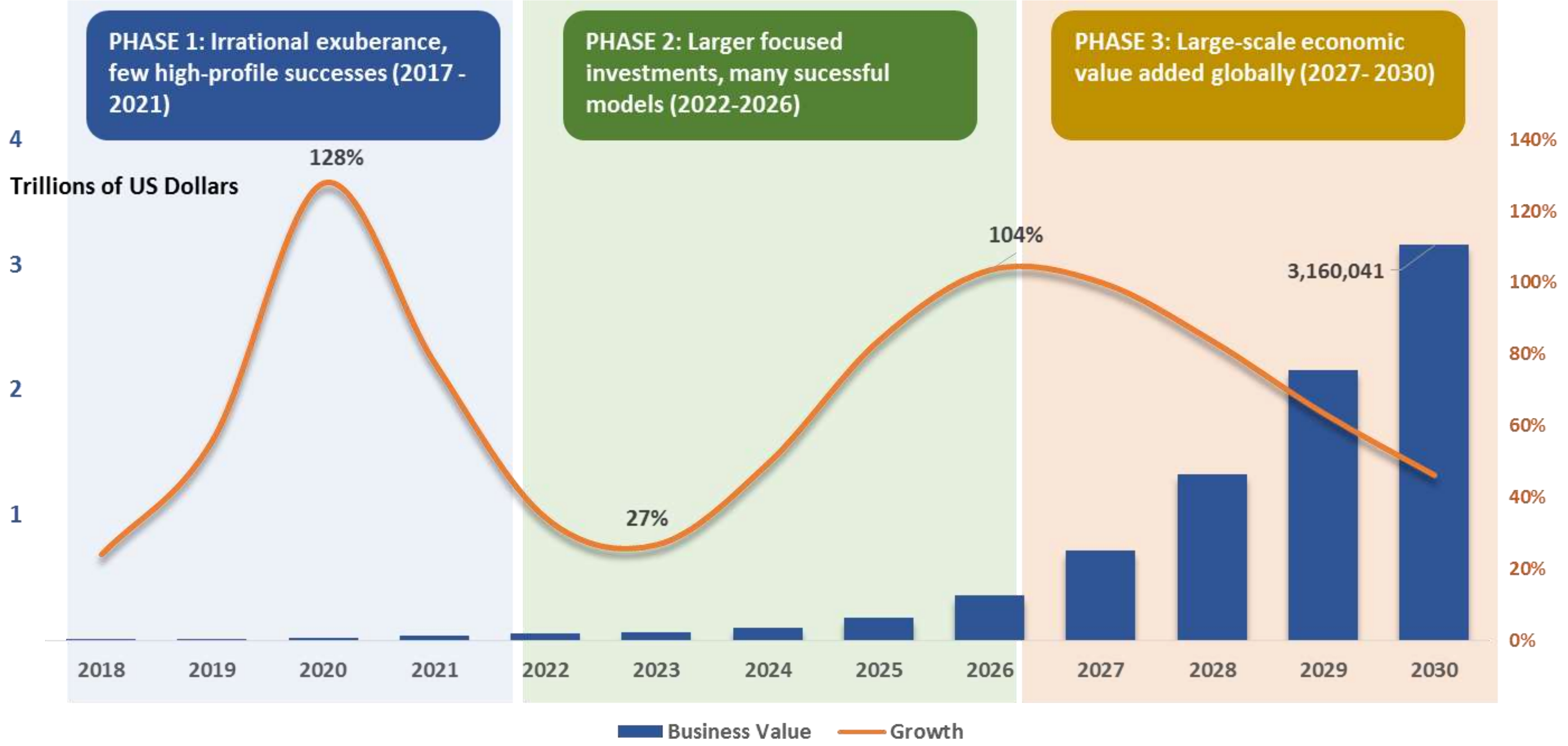
Business Value-Add of Blockchain — $176 Billion by 2025, $3.1 Trillion by 2030



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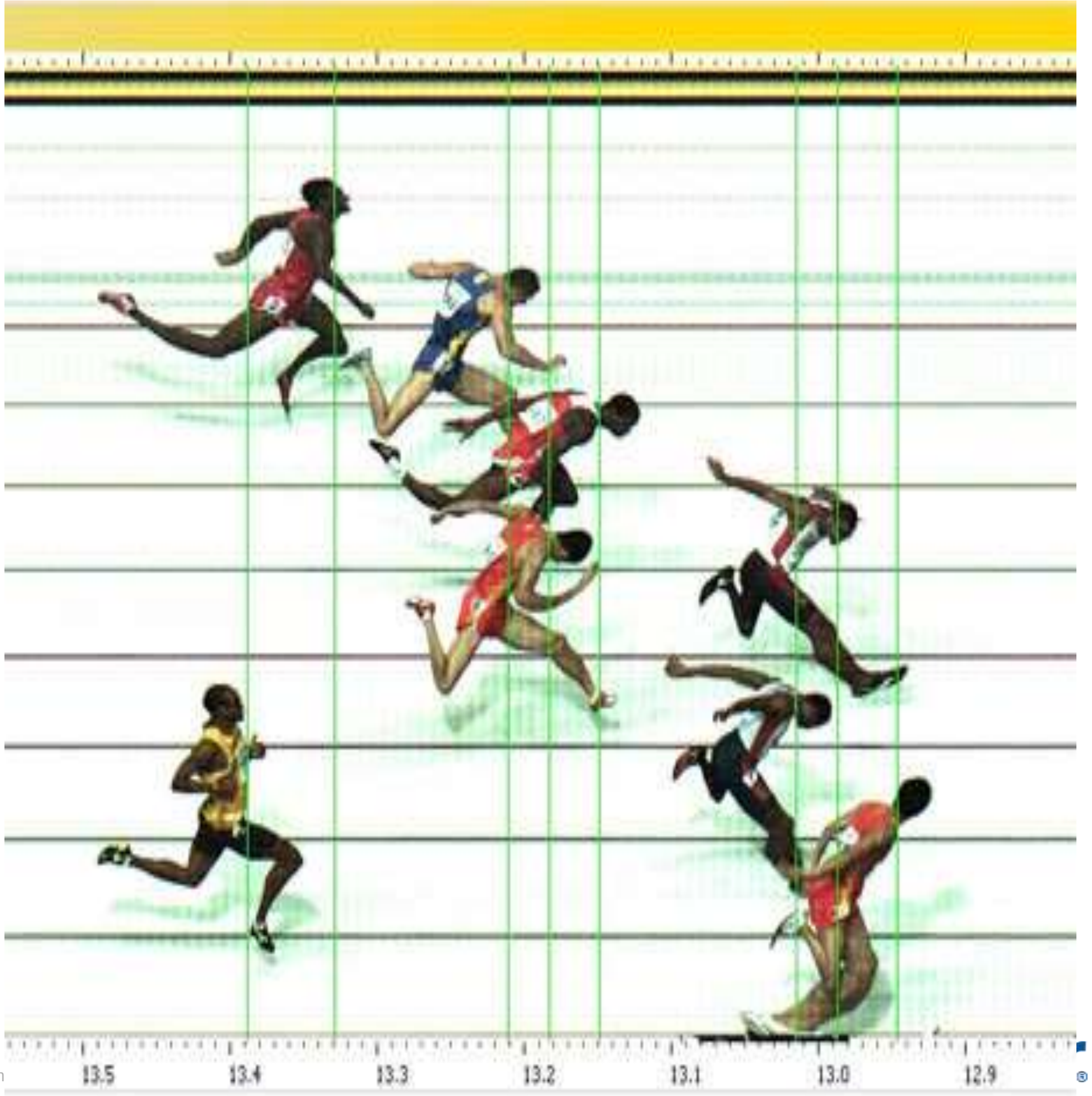
Forecast: Multi-Blockchain World for the Next Five Years

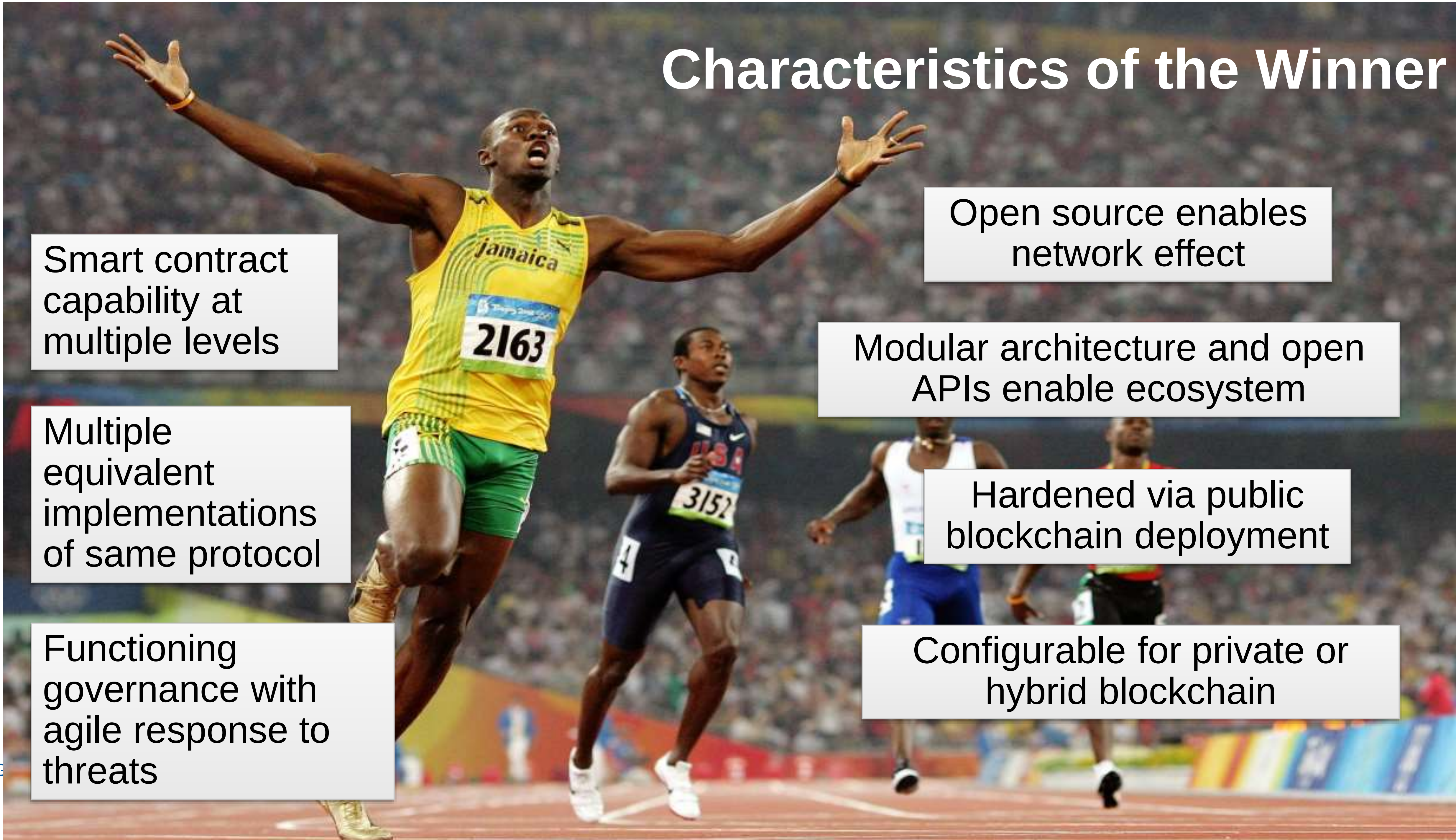
- Crowded field of 45+ competitors
- 5 or 6 leading choices
- Competition, collaboration, overlap, fragmentation
- Some vertical, others horizontal
- Limited interoperability
- Standards struggle to catch up
- Eventual consolidation over five year time frame

Who Will Win Among Competing Blockchain Platforms?

- The one not yet in the market
- Internet search engines in 1995:
  - Altavista, Lycos, Terra, Excite, Yahoo, Magellan were well-established players
  - Google came later and won
- Social networks in 2003
  - Friendster, Bebo, High5, Orkut, MySpace
  - Facebook came later and won
- Mobile OS in 2007
  - Blackberry, Nokia, Win Mobile, etc
  - IOS and Android came later & won



Characteristics of the Winner



Smart contract capability at multiple levels

Multiple equivalent implementations of same protocol

Functioning governance with agile response to threats

Open source enables network effect

Modular architecture and open APIs enable ecosystem

Hardened via public blockchain deployment

Configurable for private or hybrid blockchain

Four Types of Blockchain Initiatives and How They Differ

Blockchain Disruptor	Digital Asset Market	Efficiency Play	Record Keeper
New businesses that rely on a blockchain foundation. Business model may not be new.	New markets based on digital assets created from non-digital ones (both physical and virtual).	Efficiency improvements in transactions and interactions.	Records management by one entity, for self or for a community.
▪ Synereo: Content rights and social platform ▪ OpenBazaar: B2C marketplace ▪ Gnosis: Prediction market platform	▪ The Royal Mint, CME Group: Digital gold ▪ NYIAX: Advertising contracts ▪ China carbon credit	▪ DTCC: Derivatives clearing and settlement ▪ Maersk Line: Container shipment and trade ▪ IBM: Supply chain	▪ Estonia: Proxy voting ▪ Georgia: Land title ▪ Dun & Bradstreet: DUNS Number

The Evolution of the Programmable Economy

	E-Commerce	D-Business	Programmable
Focus	Exploit "Nexus" to drive greater efficiency, speed and economies of access	Enable personalization, extend potential customers from people to things, introduce new monies	Smart autonomous things enable new forms of value and interaction, democratization of value systems
Outcomes	Optimize interactions	Build new business models	Enable new economic systems
Entities	People Business	People Things Business	People Smart Things DAO
Disruptions	Deeper customer relationships, analytics	Creation of new value and new nonhuman customers	Smart things act as proxies for people or businesses, and ultimately for themselves
Technologies	Internet, mobile, apps, big data social	AI, sensors smart assets tokens	Blockchain, metacoin platforms, IoT, AI

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Recommendations

- ✓ Engage your Cxo in a detailed multiyear scenario plan that accounts for the impact blockchain will have on society, value and law. Consider the critical uncertainties of technology capabilities e.g., AI, as well as societal acceptance for radically new/different operating models and contracts. Ensure every senior executive is apprised of these scenarios and the timeline for realization.
- ✓ Investigate, and run PoC where applicable for emerging blockchain business models. Have a strategy to engage with startups and up date your risk management policies to account for blockchain activities.
- ✓ Establish or assign accountability for monitoring developments in blockchain and smart contract legal frameworks? Ensure your product, service and risk managers are aware of how smart contracts work and the ramifications for your business.
- ✓ Ensure your enterprise has the ability to accept, manage, transfer and secure non-fiat-based assets. Discuss with senior executives the competitive and customer implications of tokenized value evolution.

Recommended Gartner Research

- Toolkit: Overview of Blockchain Use Cases
  David Furlonger (G00302283)
- The Bitcoin Blockchain: The Magic and the Myths
  Ray Valdes, David Furlonger and Fabio Chesini (G00295779)
- Reinventing Education Credentials Using Blockchain as a Possible Missing Link for the Open Badge Infrastructure
  Jan-Martin Lowendahl and David Furlonger (G00302923)
- Hype Cycle for the Blockchain Technologies, 2017
  David Furlonger, Ray Valdes and Rajesh Kandaswamy (G00332627)
- Maverick* Research: The Programmable Economy Is the Ultimate Destination for Digital Business
  Ray Valdes, David Furlonger and Stephen Prentice (G00275030)
- The Future of Money Is the Programmable Economy, Not Just Bitcoin
  David Furlonger (G00270192)
- Metacoin Platforms Will Transform Transaction Banking Payments Services
  Fabio Chesini (G00276475)
- How to Evolve Your Trade Finance Strategy With Smart Assets and Blockchain
  Fabio Chesini (G00314066)

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