



HFS Top 10 Enterprise Blockchain Services 2018

HFS Research author:

Saurabh Gupta, Chief Strategy Officer

Mayank Madhur, Knowledge Analyst

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January 2019

“Enterprise blockchain is no longer just a beautiful waterfall that people admire from a distance. Enterprises are starting to get wet (or are at least feeling the mist).”

—*Saurabh Gupta, Chief Strategy Officer*

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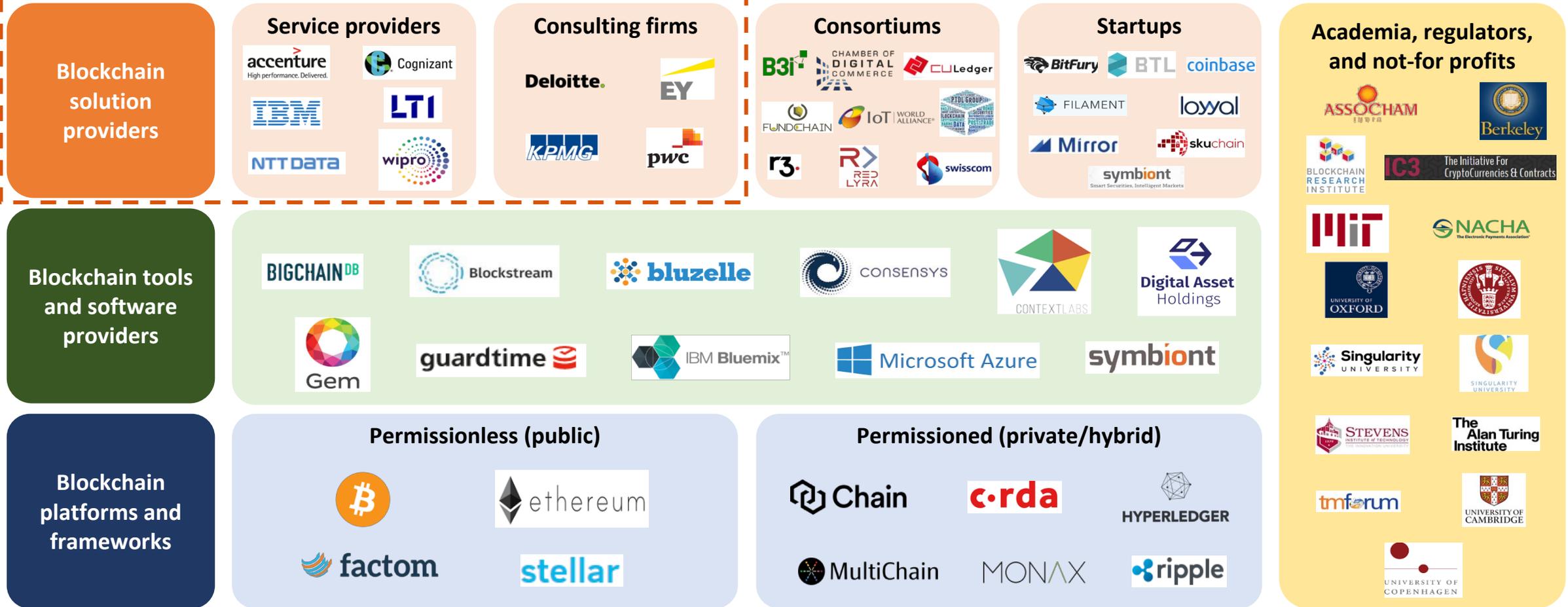
Introduction

- Blockchain is emerging as a powerful architectural technology with the potential to impact enterprise and B2B ecosystems as much as the internet and cloud.
- The 2018 Enterprise Blockchain Services Top 10 investigates the blockchain space to provide a comprehensive and foundational analysis of the blockchain services market for enterprises.
- From an enterprise or B2B adoption perspective, HFS assessed 17 leading blockchain service providers based on detailed discussions with their leadership teams, inputs from their enterprise clients, and analysis of nearly 2,800 blockchain engagements across industries and across the globe.

Blockchain provider ecosystem

This report focuses on providers of enterprise blockchain services

Illustrative lists, not comprehensive



Research methodology

HFS assessed 17 leading blockchain service providers based on detailed discussions with their leadership teams, inputs from their enterprise clients, and analysis of nearly 2,800 blockchain engagements across industries and across the globe. The research is also augmented with information from publicly available information sources.

Blockchain service providers were assessed on the following three main dimensions:



33.3%

Voice of the customer

- Clients in live production environment
- Client feedback (number of referencible clients, client satisfaction)



33.3%

Ability to execute

- Scale and growth (number of dedicated resources, YOY growth)
- Experience (number of engagements, practice start date)
- Solution breadth and depth (industries covered, average solution depth)
- Value chain coverage (advisory, prototype, pilot, production and system integration)



33.3%

Innovation

- Intellectual property (patents, tools, solutions accelerators)
- Ecosystem (experience with blockchain platforms, partnerships, consortium memberships)
- Investments (practice building, market development)

Blockchain service providers covered in this report



Executive summary

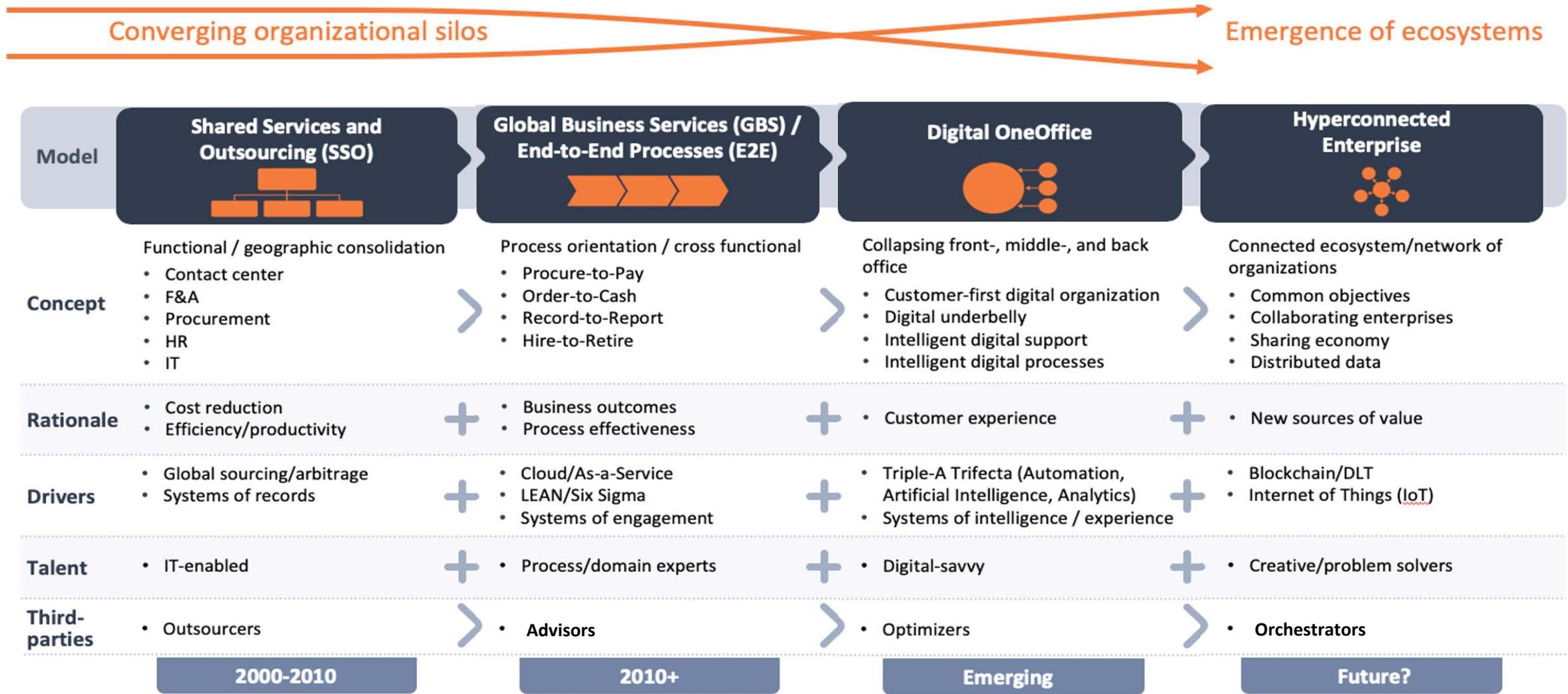
Executive summary (page 1 of 2)

- **We are hurtling toward a hyperconnected economy, and blockchain will provide the way to make it happen.** Ecosystems across organizations that service the specific needs of a customer are emerging. No single organization owns the entire customer experience and competitors and peers need to figure out how to collaborate. Blockchain in combination with other emerging technologies like IoT and artificial intelligence will provide the way to make it happen.
- **The blockchain “six-pack” is driving unprecedented interest from enterprises.** There are six built-in blockchain features with long-term potential for disruption when enterprises leverage them intelligently in relevant business use cases. The blockchain six-pack includes: 1. Distributed shared data over peer-to-peer (P2P) networks reduces single points of failure; 2. Consensus-driven trust cuts out the middle-man; 3. Immutable transactions ensure trust; 4. Hashing-based data ensures integrity and security; 5. Automated smart contracts promote touchless interactions across process chains; and 6. Permissioned and permissionless flavors give enterprise users flexibility. These six blockchain features are changing the way we think about business transactions, data storage, and even industry value chains and associated revenue models.
- **Blockchain runs the risk of becoming representative of the massive hype bubble we live in today: yet another technology hammer trying to find business problems to nail.** Despite the cryptocurrency bubble-burst in 2018, blockchain continues to be the one of the most hyped emerging technologies. HFS estimates blockchain’s price-to-sales ratio (a useful ratio to understand the hype) to be 125+ compared to 2.3 for the S&P 500. It’s becoming harder to see through the blockchain hype these days to examine the problems we’re trying to solve with, create solutions, and contextualize them in real-world scenarios. Among the hype and mad use cases there is some gold, but it’s getting lost in the noise. Blockchain is not the panacea for everything and we need to choose the use cases carefully. HFS created the “Blockchain Bullshit Buster” —a set of 10 questions to help you dig out the gold from the piles of...well, you know what!
- **Despite the hype, enterprise blockchain is coming out of the closet.** The market is witnessing an explosion in blockchain proofs-of-concept (PoC) and pilots, but in-production solutions represent less than 5% of overall blockchain engagements. However, we are starting to get a critical mass of “live blockchain” solutions. HFS’ database of 2,800 enterprise blockchain engagements suggests nearly 135 in-production blockchain solutions. This is a 10X+ jump from last year! This is encouraging even though almost all “live engagements” represent “shadow” or “parallel” environments where the legacy solutions has not yet been replaced.

Executive summary (page 2 of 2)

- **Real blockchain clients want real business impact.** Blockchain promises “creative destruction” through disintermediation, but that is a long-term vision. Enterprise blockchain clients are investing in blockchain solutions to get real business impact in the near term. Without a tangible ROI, blockchain engagements get stuck at the PoC/pilot stage. No-nonsense, real business cases are a must-have to drive blockchain beyond the PoC-fatigue that we are witnessing today.
- **Enterprise blockchain has broader implications than just financial services.** While financial services was the first mover from an enterprise blockchain adoption perspective, other industries have had good success with blockchain. Supply chain (provenance tracking) is emerging as one of the hottest use cases for blockchain besides financial services use cases such as trade finance, payments, and KYC (identity management).
- **Blockchain technology is not the biggest adoption issue but collaborating across organizations is.** Enterprise blockchain adoption is going through a “90-9-1” adoption challenge. Ninety percent of enterprises are still trying to internalize the concept of blockchain and its relevant impact on their business. Nine percent of enterprises that identified relevant use cases are struggling to determine the starting point for their PoCs and pilots. And the 1% of enterprises that have successful pilots are challenged with scalability to a production-grade environment. Some enterprises that identified relevant use cases are struggling to determine the starting point for their PoCs and pilots. The few enterprises that do have successful pilots are challenged with scalability to a production-grade environment. There is a multitude of challenges that the market needs to overcome (lack of awareness, solution immaturity, and lack of standards and regulations, among others), but one the biggest hurdles is to get organizations (that often directly compete with each other) to come together. Until organizations are convinced of the value proposition of the hyperconnected world and a sharing economy, blockchain will struggle to realize the value potential it promises.
- **Several service providers are doing commendable work to educate, experiment, and develop enterprise blockchain solutions.** HFS assessed 17 leading blockchain service providers based on detailed discussions with their leadership teams, inputs from their enterprise clients, and analysis of nearly 2,800 blockchain engagements across industries and across the globe. The HFS Top 10 enterprise blockchain service providers for 2018 are (in rank order): 1. IBM, 2. Accenture, 3. Deloitte, 4. EY, 5. Infosys, 6. Wipro, 7. NTT DATA, 8. Cognizant, 9. TCS, and 10. KPMG.

We are hurtling toward a hyperconnected economy, and blockchain will provide the way to make it happen



The Blockchain “six-pack” is driving unprecedented interest from enterprises

Distributed shared data over peer-to-peer (P2P) network reduces single points of failure

Consensus driven trust cuts out the middle-man

Immutable transactions ensure trust

Security driven by hashing-based data

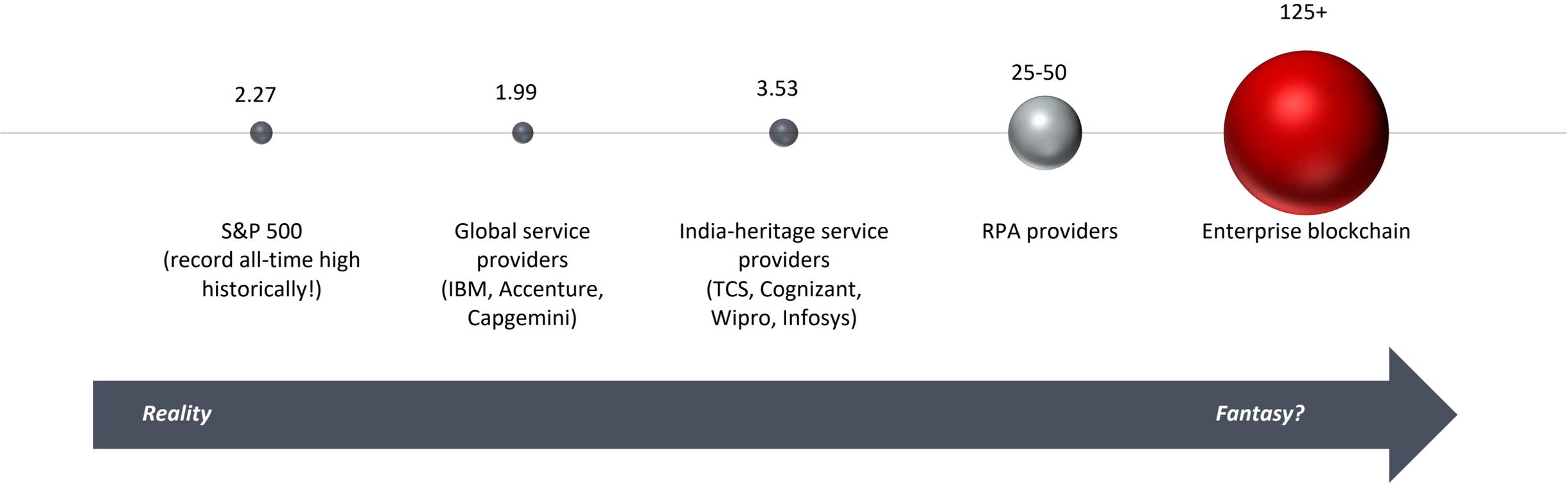
Smart contracts promote touchless interactions across process chains

Permissioned and permissionless flavors give enterprise users flexibility

Refer to [*“The Blockchain Reality Check: Where Are We and What Can We Expect in 2018?”*](#) for more details on the blockchain “six-pack”

Blockchain continues to be the one of the most hyped emerging technologies

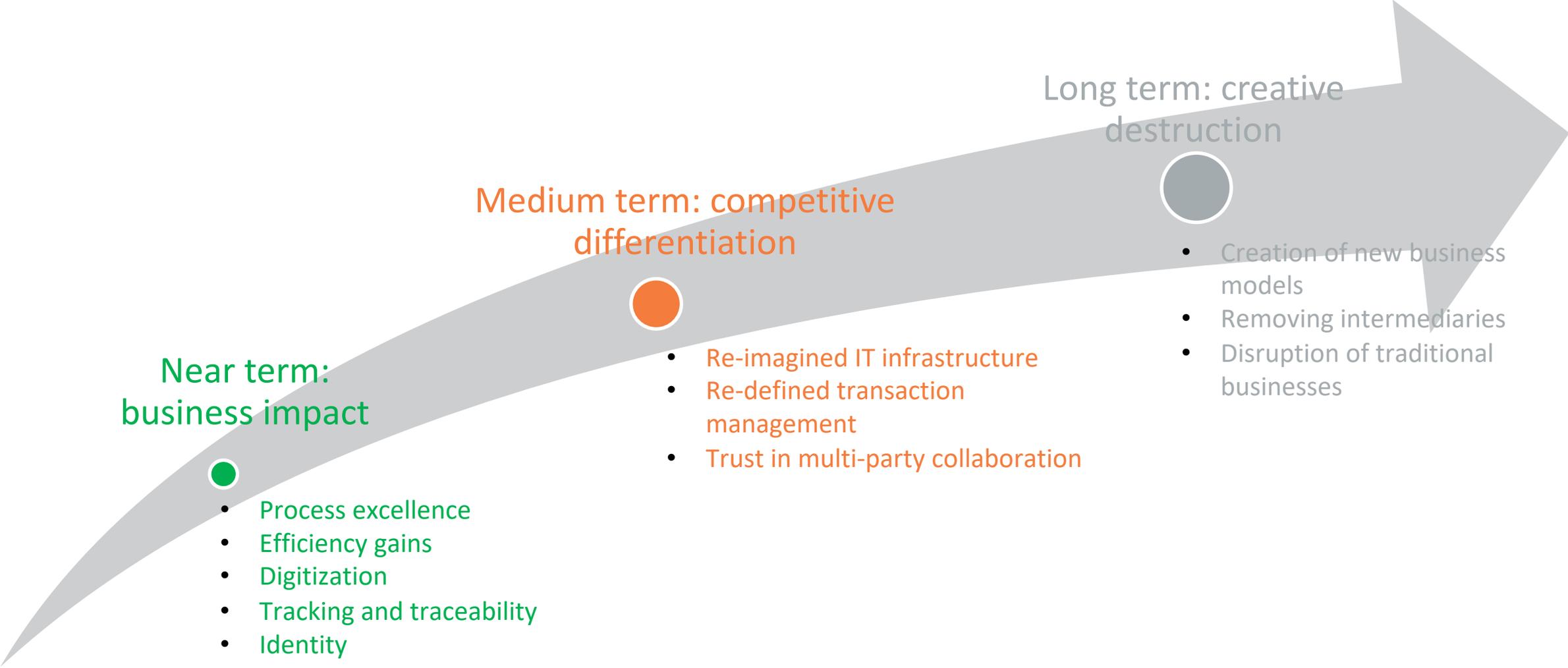
Price-to-sales (PSR) ratios as we enter 2019
(PSR = Market capitalization / revenues)



Sources of information

- S&P 500 PSR: multipl.com
- Global and India Heritage Service Providers: Y Charts and financial reports
- RPA providers: HFS estimates
- Enterprise blockchain: Coinmarketcap.com and HFS estimates

Blockchain promises “creative destruction” through disintermediation, but that is a long-term vision



Despite all the promises, real clients need real impact in the near term

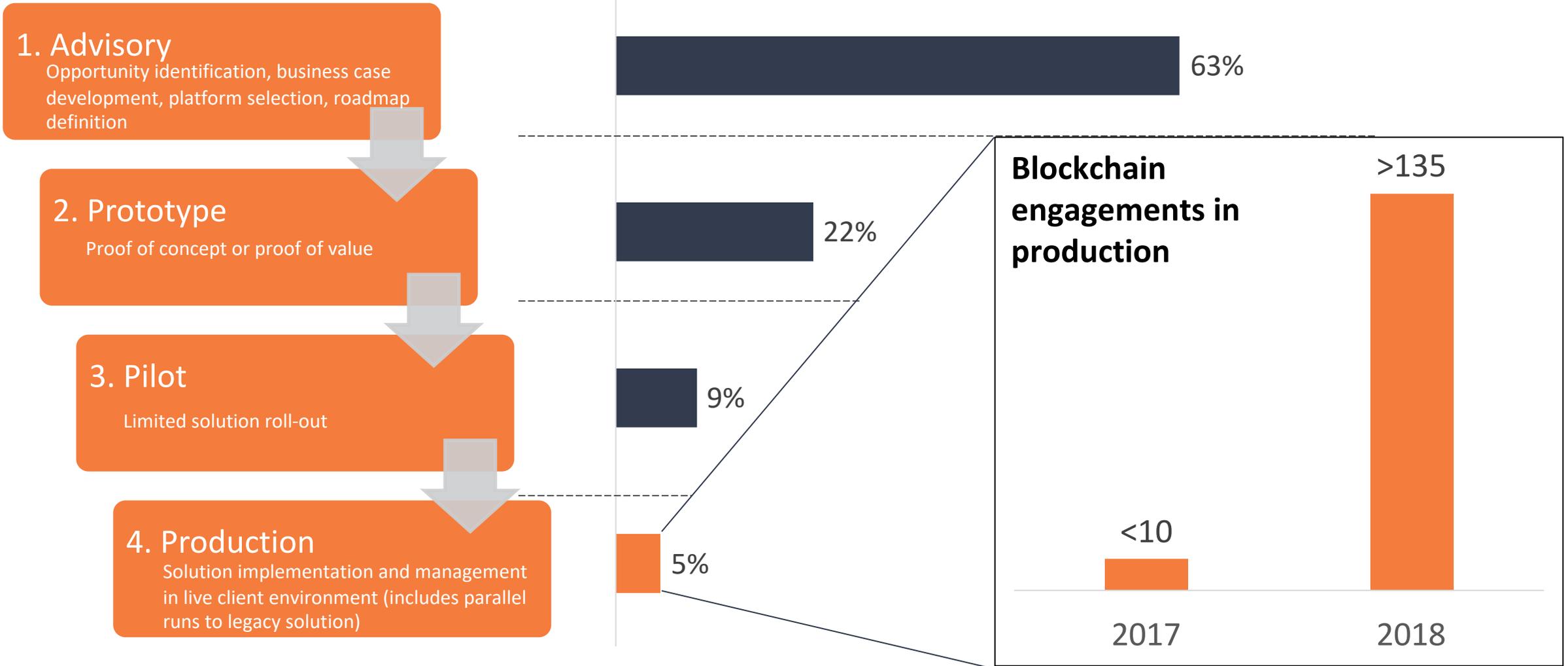
What benefits do you hope to achieve from the above woven blockchain solution?

(Weighted average of responses)



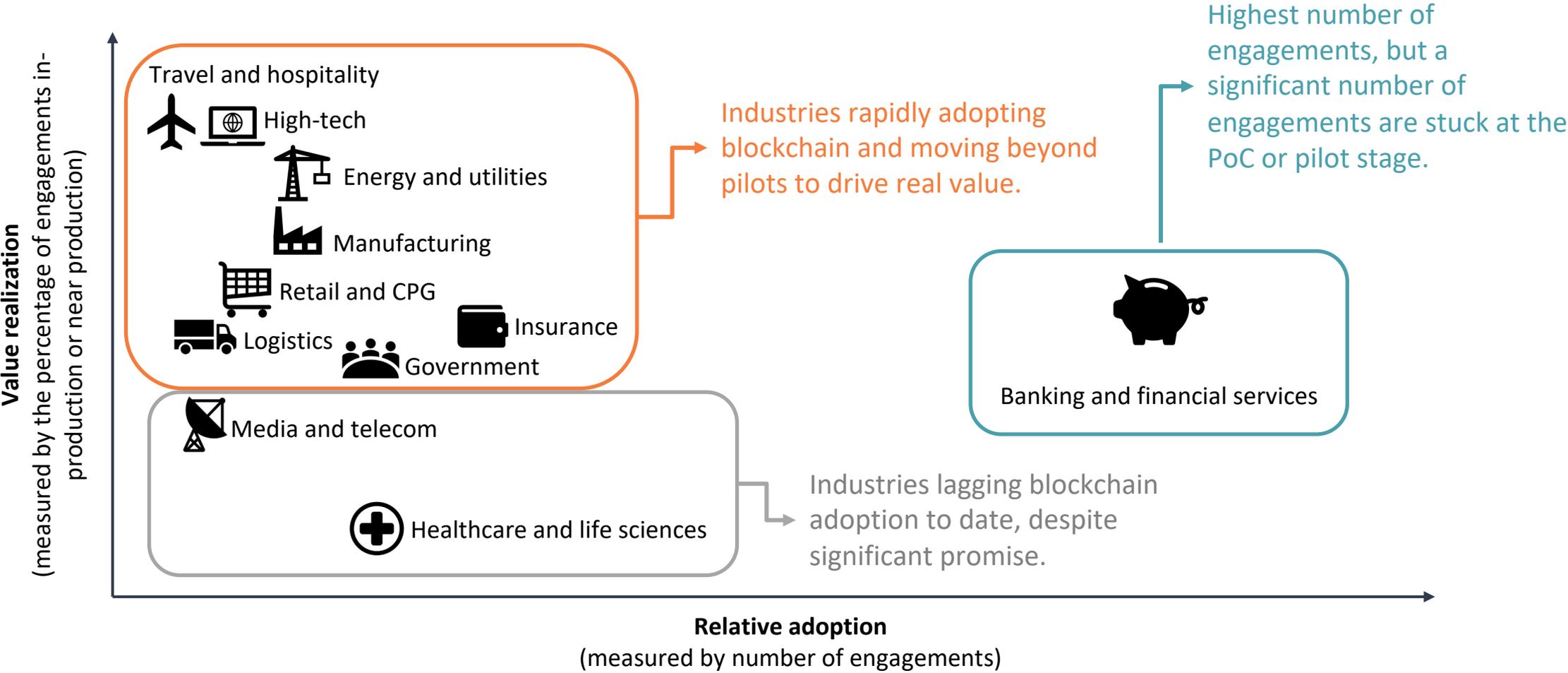
Based on ~20 interviews with real blockchain enterprise clients

Enterprise blockchain is coming out of the closet



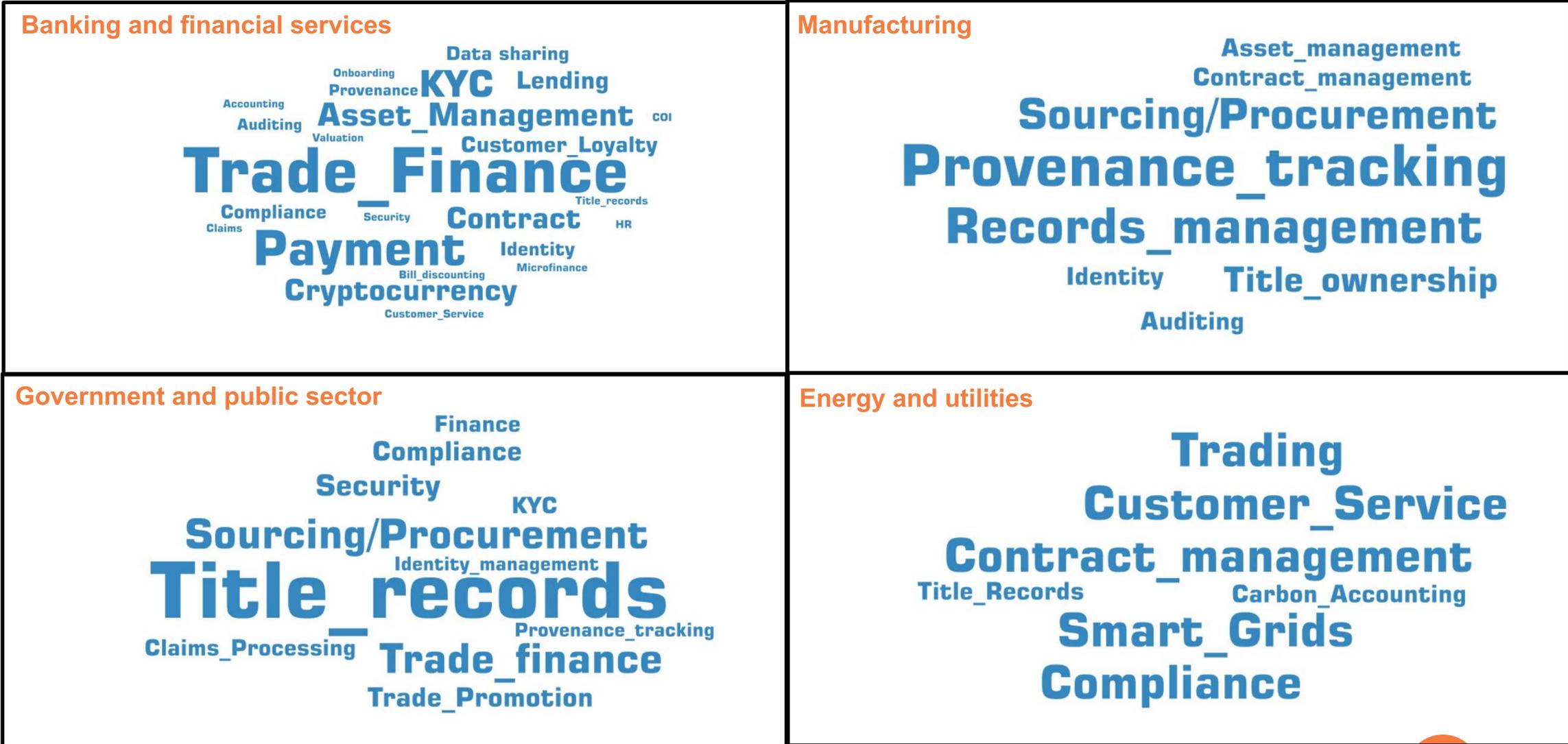
Sample: ~2,800 blockchain engagements across 17 service providers

Enterprise blockchain has broader implications than just financial services

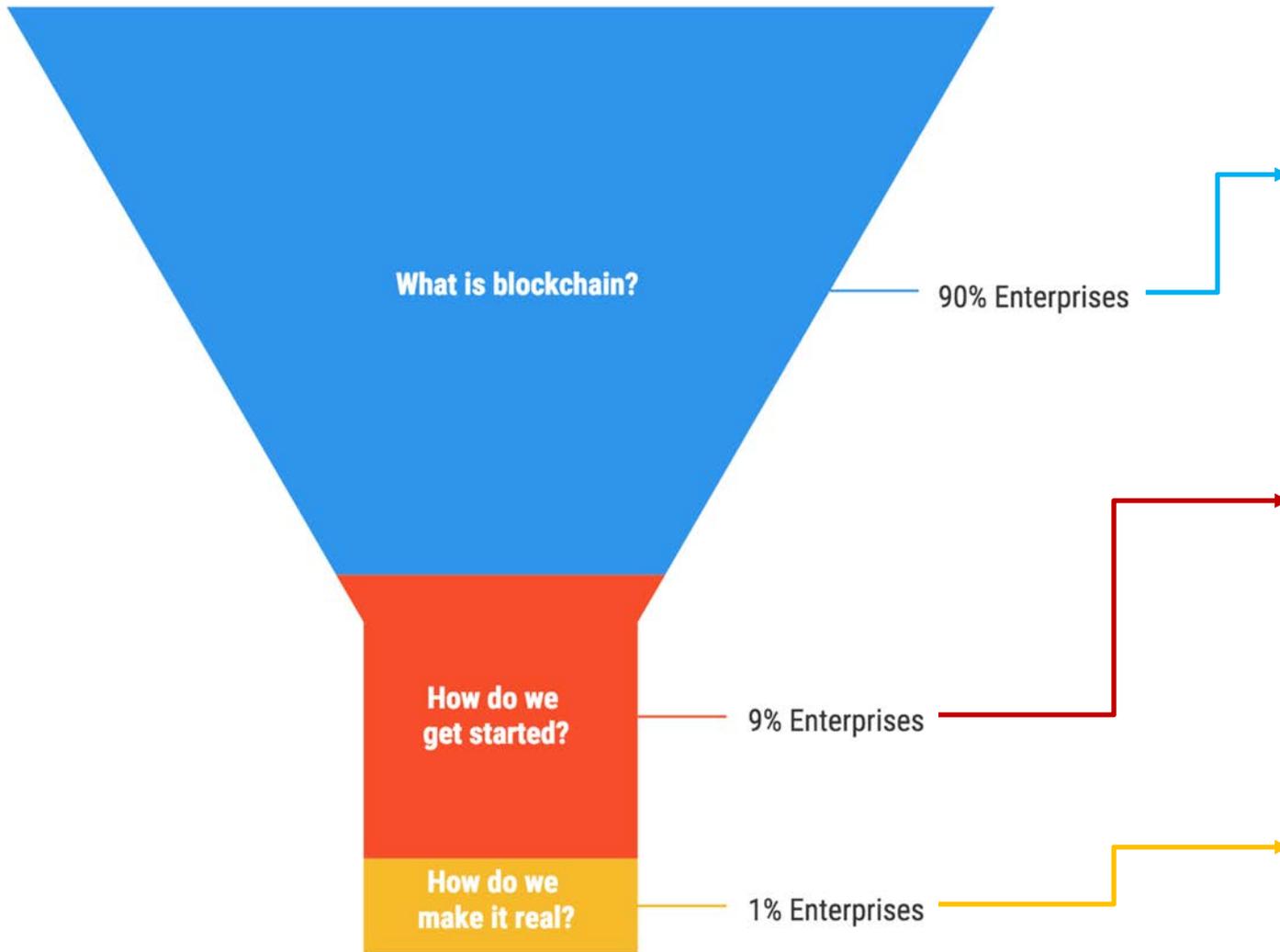


Sample: 550 blockchain engagements across 15 service providers

Prominent blockchain use cases across industries



The “90-9-1” enterprise blockchain challenge

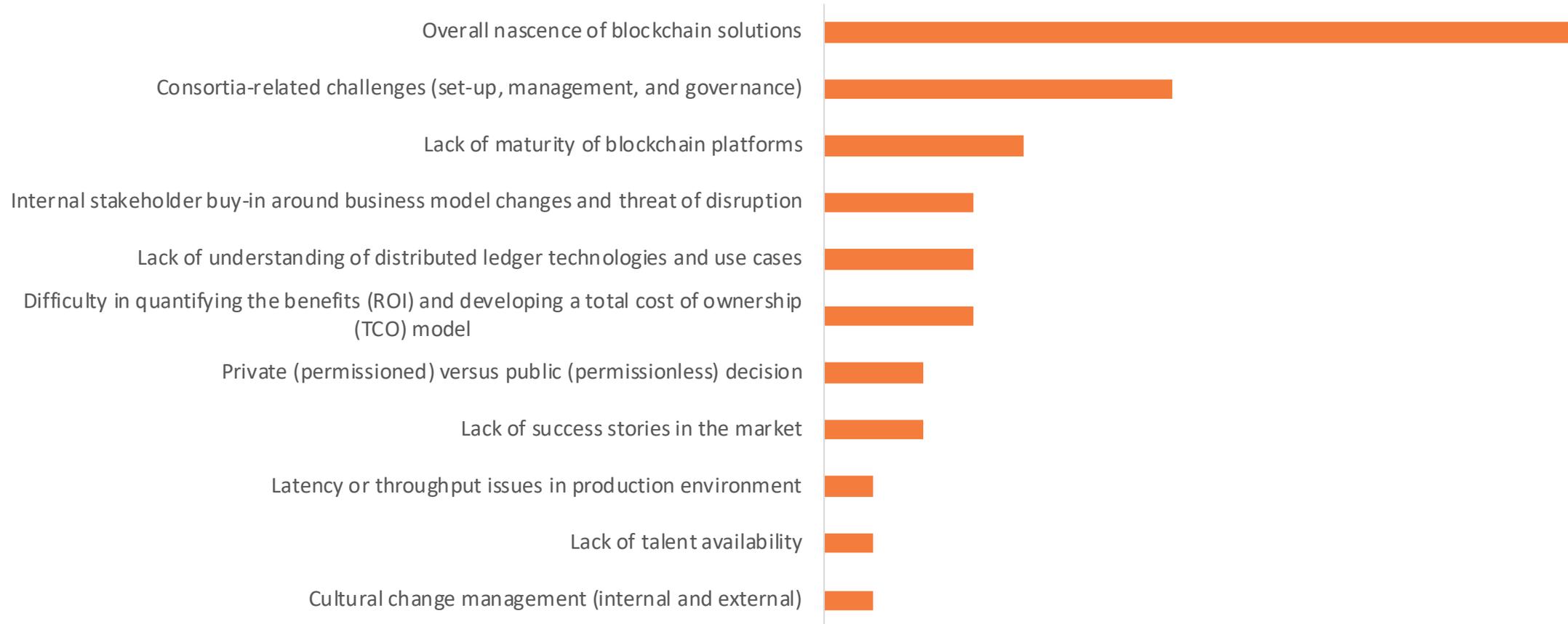


- Overall nascence of blockchain solutions
- Lack of understanding in distributed ledger technologies and use cases
- Lack of maturity of blockchain platforms
- Lack of success stories in the market
- Internal stakeholder buy-in around business model changes and threat of disruption
- Consortia-related challenges (set-up, management, and governance)
- Difficulty in quantifying the benefits (ROI)
- Lack of clarity on technical architecture
- Permissioned versus permissionless decision
- Security and privacy concerns
- Uncertainty and lack of formal regulations
- Lack of talent availability
- Lack of market standards, inter-operability issues
- Integration issues with legacy
- Cultural change management (internal and external)
- Latency or throughput issues in production
- Service support for blockchain largely undefined

Refer to [“The Blockchain Reality Check: Where Are We and What Can We Expect in 2018?”](#) for more details

The blockchain market needs a lot more investment in education

What were the key challenges that you faced in adopting blockchain?
(Weighted average of responses)



Based on ~20 interviews with real blockchain enterprise clients

Introducing the HFS BBB: Blockchain Bullshit Buster

Blockchain BS busters	Your response?			
	No	Not really	Probably	Yes
Principle 1: Replacing ledgers is pointless	Stop! Blockchain is not for you.	Wait! Do you really need blockchain?	Caution! Get some professional help	Go! You've hit blockchain gold
Principle 2: The realpolitik chestnut				
Principle 3: Change for the sake of change				
Principle 4: Blindly quoting the network effect				
Principle 5: Garbage in, garbage out				
Principle 6: Stone carvings				
Principle 7: Speed of light				
Principle 8: The privacy conundrum				
Principle 9: Law ambiguity				
Principle 10: The good old cost-benefit equation				

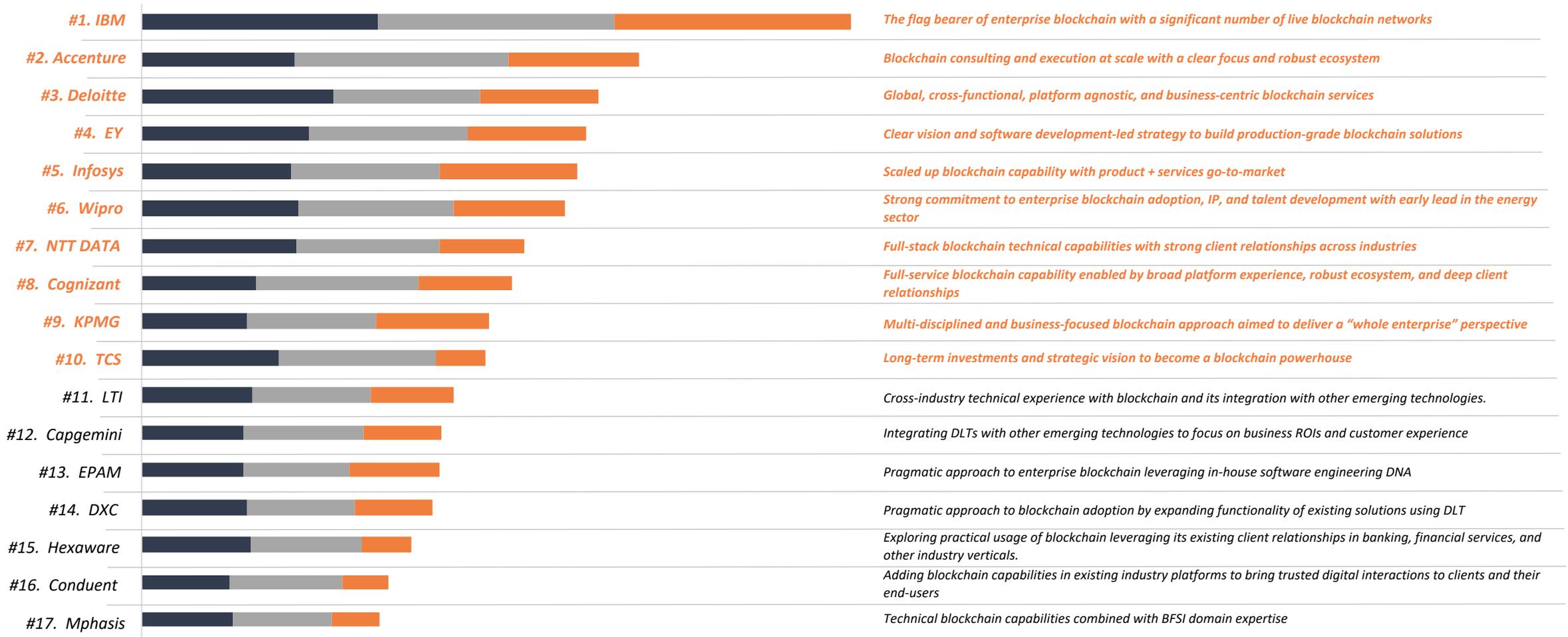
Refer to ["Is blockchain a giant digital joke?"](#) for more details

HFS Top 10 enterprise blockchain service providers, 2018

HFS Top 10 enterprise blockchain service providers, 2018

■ Execution success ■ Innovation capability ■ Voice of the Customer

HFS Top 10



Sample: Based on detailed discussions with their leadership teams, inputs from their enterprise clients, and analysis of nearly 2,800 blockchain engagements across industries and across the globe
 Source: HFS Research 2018

HFS top five enterprise blockchain service providers by individual assessment dimensions

TOP 10
HFS

Rank	Ability to execute				Innovation capability			Voice of the customer		Overall ranking
	Scale and growth	Experience	Solution breadth and depth	Value chain coverage	Intellectual property	Ecosystem	Investments	Clients in production	Client feedback	
#1										
#2										
#3										
#4										
#5										

Sample: Based on detailed discussions with their leadership teams, inputs from their enterprise clients, as well as analysis of nearly 2,800 blockchain engagements across industries and across the globe

Source: HFS Research 2018

Enterprise blockchain service provider profiles

IBM: The flag bearer of enterprise blockchain with a significant number of live blockchain networks

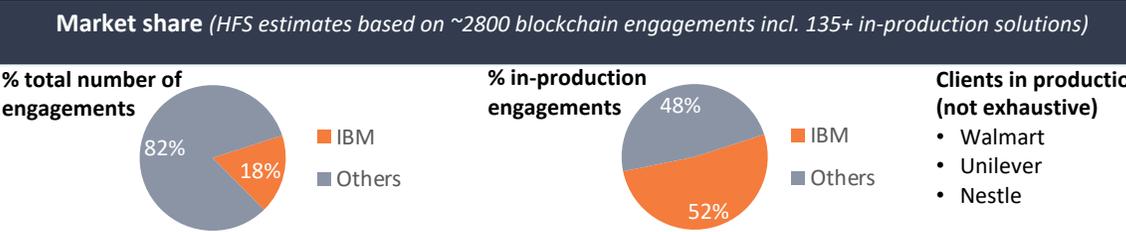
Dimension	
HFS Top 10 position	# 1
Ability to execute	
Scale	# 1
Experience	# 1
Solution maturity	# 2
Value chain coverage	# 1
Innovation capability	
Intellectual property	# 1
Ecosystem	# 2
Investments	# 1
Voice of the customer	
Clients in production	# 1
Client feedback	# 3

Strengths

- Early mover advantage with significant in-production client base.** IBM has nearly 70 “live” in-production blockchain clients, which we estimate represents over half of the overall market. This is a significant competitive advantage that will likely have a multiplier effect soon.
- Full-stack blockchain capabilities.** IBM is a founding member of Hyperledger, and it launched the IBM Blockchain Platform for business workloads; it offers hosting and support solutions through the IBM Cloud and makes blockchain real for clients with an engagement model across exploration, piloting, production, and integration. IBM is using its Watson platform to pilot cognitive capabilities for blockchain. Its Watson IoT Platform enables deployment in IoT-based blockchain use cases.
- Strong contributions to blockchain market development.** As one of the 17 founding members of Hyperledger, IBM contributed to the initial codebases of Hyperledger Fabric and Hyperledger Composer. It also added blockchain to the Academic Initiative, a program that provides students and educators with training resources to develop market-ready skills. Columbia University and IBM are also partnering to create the Center for Blockchain and Data Transparency.

Development opportunities

- Multi-platform strategy with focus on Hyperledger.** IBM has experience across multiple platforms and has delivered some of its largest clients with other platform technology such as Axoni, but the market narrative is often too closely tied with Hyperledger. IBM gives multiple deployment options including the IBM Cloud, preferred cloud environments such as AWS, or locally using on-premise data centers.
- Organizational diffusion.** As an early mover, clients will expect other parts of the large IBM organization to offer solutions and services that are integrated with blockchain. This is both an opportunity and a threat for IBM.
- Pressures of being the market leader.** Given its early successes and market leadership, IBM will be the poster child for taking the blame and the kudos depending on the failures and successes of in-production networks. IBM will also need to walk a tightrope of balancing new growth and ensuring



- ### Prominent use cases
- Provenance tracking
 - Compliance
 - Finance and accounting
 - Retail
 - Smart contract
 - Procurement and sourcing
 - Trading

Blockchain practice overview

- IBM has been involved with blockchain since 2015 and presently has 1600+ blockchain dedicated resources.
- Over 500+ client engagements including Maersk, SecureKey, Walmart, Unilever, and Nestle.
- IBM supports initiatives and legislation that will facilitate government, academia, and private sector collaboration in order to advance blockchain technology skills building.

Blockchain platform and technology capability

- Founding and premier member of Hyperledger; contributor to code-base of Hyperledger Fabric and Composer.
- IBM blockchain platform expertise includes Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, Multichain, BigChain DB, Bitcoin, Factom, Stellar, and Axoni.
- Launched the IBM Blockchain Platform for business workloads that offer hosting and support solutions through the IBM Cloud.
- Developed several tools and accelerators to aid blockchain adoption such as Hyperledger Composer (now part of Hyperledger project), Secure Document Store, Provenance Engine, Membership Services, and Trade Finance Accelerator.

Blockchain ecosystem

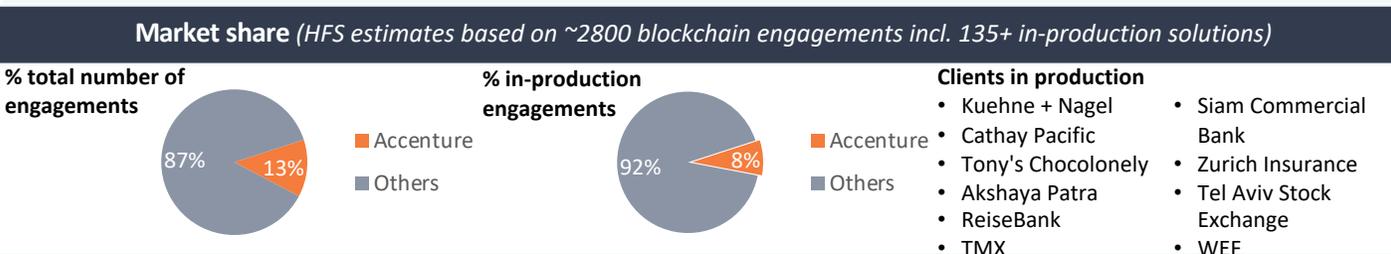
- IBM is participating with over 180 industry players in the Hyperledger organization.
- The IBM Blockchain Ecosystem provides companies building on the IBM Blockchain Platform a range of opportunities. As part of this broad ecosystem, IBM continues to closely partner with GSIs and professional services firms on blockchain engagements and initiatives globally.
- IBM is working with many government entities such as FDA, CDC and OPM in the US, the Smart Dubai initiative, and digital identity in Canada.

Accenture: Blockchain consulting and execution at scale with a clear focus and robust ecosystem

Dimension	Rank
HFS Top 10 position	# 2
Ability to execute	
Scale	# 7
Experience	# 4
Solution maturity	# 8
Value chain coverage	# 8
Innovation capability	
Intellectual property	# 2
Ecosystem	# 3
Investments	# 2
Voice of the customer	
Clients in production	# 2
Client feedback	# 4

Strengths
<ul style="list-style-type: none"> • Clear focus. Accenture has distilled the myriad of blockchain use cases to three areas of clear focus—identity, supply chain, and financial services infrastructure. This focus allows Accenture to build deep expertise in the chosen areas. • Consulting and execution at scale. Accenture has the unique ability to be able to bring to bear the diverse blockchain expertise across consulting, strategy, digital, technology, and operations. • Ecosystem strength. Accenture’s blockchain practice incorporates alliances, partnerships, and leadership positions in every aspect of the blockchain ecosystem (start-ups, technology providers, consortia, academia). This allows Accenture to bring the right combination of capabilities to each client’s unique challenges. • Blockchain is a strategic growth initiative. This means support and sponsorship from Accenture’s C-level with new hubs, capabilities, and significant investments planned for 2019. It has already filed for 35+ blockchain related patents (three have been granted thus far). • Platform independence and ecosystem operator. Accenture works across all major blockchain frameworks and platforms and positions itself as a catalyst to convene key stakeholders across the blockchain ecosystem.

Development opportunities
<ul style="list-style-type: none"> • Converting successful pilots to production environments. While this is an overall market challenge, some of Accenture’s close competitors have a better proportion of in-production solutions as a percentage of total engagements. • Continuing market education. Lack of regulations and standards, talent crunch, security concerns, and overall market nascence are key inhibitors of enterprise adoption. Accenture will need to continue to invest and educate the market to overcome these challenges.



Main use cases
<ul style="list-style-type: none"> • Supply chain • Identity • Loyalty • Payments • Testing payments

Blockchain practice overview
<ul style="list-style-type: none"> • Started in 2016, blockchain is a strategic growth initiative. • Dedicated team of 700+ people for blockchain initiatives with more than 1200 blockchain proficient resources. • 350+ engagements, including work with: AB inBev, APL, Kuehne + Nagel, Cathay Pacific, City of Antwerp, DHL, DTCC, Bank of Canada, Payments Canada, DHL, ID2020 (United Nations), Monetary Authority of Singapore, Siam Commercial Bank / Digital Ventures Co. Ltd, The Institutes RiskBlock alliance, Tel-Aviv Stock Exchange, Tony's Chocolonely, World Economic Forum (Known Traveler), Zurich insurance, and more. • 30+ studios for rapid prototyping, two R&D labs and seven delivery centers.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • Blockchain platform expertise includes Hyperledger Fabric, Ethereum, Quorum, R3 Corda, Ripple, Digital Asset, Multichain, and Hyperledger Sawtooth. • Three granted patents and 32 patent pending applications including: <ul style="list-style-type: none"> • Unique biometric identity • Electronic voting and verification • Smart contract enabled (energy) marketplace • Real-time equipment component tracking • Oil identification and tracking • Blockchain entitlements secure 3D model sharing • Distributed healthcare records management • Antivirus signature distribution • Blockchain consensus procedure to manage accumulative health records • Blockchain "redaction" editor patents • Method to archive a blockchain in read-only state • Hybrid blockchain, wrapped-up blockchain • Distributed ledger technology reference architecture • Testing framework—selective data security within data storage layers • Blockchain managed service—operating models • Procure to pay designs and prototype • Finance of the future blockchain transformation model • Chainbridge 2.0 • B-RAVE

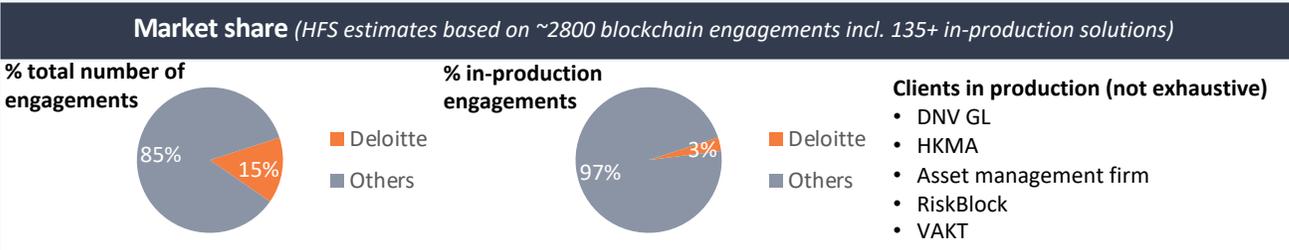
Blockchain ecosystem
<ul style="list-style-type: none"> • Member of consortia including Hyperledger, Ethereum Enterprise Alliance, R3, B3i, Chamber of Digital Commerce, Ripple, and Digital Asset. • Works with partner Avanade (a joint venture between Accenture and Microsoft) to deliver solutions for the Microsoft platform. Offers access to 35+ blockchain. • Partnerships with technology providers such as Microsoft, Amazon Web Services, IBM, Intel, HPE, and other industry platforms.

Deloitte: Global, cross-functional, platform-agnostic, and business-centric blockchain services TOP 10 HFS

Dimension	
HFS Top 10 position	# 3
Ability to execute	
Scale	# 2
Experience	# 2
Solution maturity	# 16
Value chain coverage	# 16
Innovation capability	
Intellectual property	# 11
Ecosystem	# 1
Investments	# 4
Voice of the customer	
Clients in production	# 7
Client feedback	# 2

Strengths
<ul style="list-style-type: none"> • Globally nuanced perspective. Deloitte has invested in three global labs and 33 dedicated hubs to support each region (Americas, EMEA, and APAC) to bring a nuanced global perspective to the market. • Cross functional offering. Deloitte’s blockchain offerings go beyond business advisory and technical implementations. It also offers blockchain-specific tax, risk, regulatory, cyber-security, and audit services. • Platform-agnostic technical expertise. Deloitte has credible experience across 10 blockchain platforms backed by supporting structures (e.g., technology integration, sandboxes, tech ecosystems) and industry specific assets (e.g., track and trace, EduScript, KYC, and contract lifecycle management). It is continually investigating, testing, and collaborating with multiple technologies to be best equipped to solve the clients’ pain points in a fast changing landscape. • Client relationships and industry experience. Deloitte has trusted senior relationships with clients and deep industry expertise across most sectors that allows it to have a strategic seat at the table to provide insights into how blockchain will impact its clients. • Influence with regulators. Deloitte is actively advising regulators and its influence and insights are proving to be extremely valuable in the nascent blockchain market where standards and regulations are non-existent.

Development opportunities
<ul style="list-style-type: none"> • Greater emphasis on making blockchain “real”. Despite the scale, breadth, and depth of Deloitte’s experience with blockchain, it has fewer blockchain solutions in production than its immediate competition. As a leader in the space, Deloitte can potentially further help its clients pass the hurdles of transitioning from a POC or pilot to a live production deployment. • Integrated go-to-market across blockchain, AI, IoT, and other emerging change agents. While Deloitte has strong capabilities across multiple emerging technologies including blockchain, a truly integrated engagement model for clients is still evolving. • Continuing market education. Lack of regulations and standards, talent crunch, security concerns, and overall market nascence are key inhibitors of enterprise adoption. Deloitte will need to continue to invest and educate the market to overcome these challenges.



Main use cases	
<ul style="list-style-type: none"> • Identity management • Trade finance • Finance and accounting • Provenance tracking • Health records 	<ul style="list-style-type: none"> • KYC • Asset management • Claims processing • Customer service • Compliance

Blockchain practice overview
<ul style="list-style-type: none"> • 1400 dedicated blockchain practitioners. • Beyond the dedicated team, has a global community of ~1,500 professionals. • 400+ engagements including DNV GL, HKMA, VAKT, insurance consortia, national banks, health care, manufacturing and consumer goods companies. • Three blockchain labs (Dublin, Hong Kong, and New York) and 32 country-specific blockchain hubs.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • Expertise across Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, Multichain, Bitcoin, Monax, EOS, IOTA, among others. • Multiple solution accelerators include Hyperledger-Corda Interoperability Bridge, Traceability, Bancassurance, Trade Finance, Track & Trace, EduScript, Contract Lifecycle Management, KYC, IoT for Digital Twins.

Blockchain ecosystem
<p>Partnerships across three distinct groups:</p> <ul style="list-style-type: none"> • Thought leaders and innovators: Groups of organizations that help innovate, ideate, and support blockchain innovation (e.g., UT Austin, MIT, Singularity University). • Collaborators: Vendors such as Riddle & Code, Thales, BitFury, Seal, and Digital Asset working within the blockchain space. • Platforms: Alliances with blockchain platforms and large technology vendors (e.g., Oracle, SAP, Microsoft) that Deloitte has built prototypes upon and investigated further.

EY: Clear vision and software development-led strategy to build production-grade blockchain solutions

Dimension		Strengths	Development opportunities	
HFS Top 10 position	# 4	<ul style="list-style-type: none"> Clear point of view around the adoption of public blockchain for business use. The clarity of vision (even though there can be a potential debate whether it is right or wrong) is lacking from other leading providers who mostly take centrist market positions. Focus on “in-production” blockchain solutions. EY has a significantly high proportion of in-production engagements as a percentage of its total engagements. It is trying to industrialize blockchain and investing in R&D (e.g., ZKP) and software development discipline that will be required to harden blockchain production environments going forward. Global blockchain development network. Under centralized global leadership, EY has regional leadership for the Americas, EMEA, and APAC, with product- and sector-specific teams within. It also integrates with tax and assurance subject-matter resources in product development and client work. Strong business process and industry skills. The Big 4 heritage provides EY with deep client relationships and the necessary industry and business expertise to advise and solve client problem statements. IP investments. EY has invested in building eight blockchain platforms, most notably the OpsChai platform. It has one patent pending (relating to tokenization of blockchain assets) and 13 in process. It is actively engaged in developing proprietary tools for speeding up coding of ZKPs. 	<ul style="list-style-type: none"> Building the technical scale of traditional large SI players. EY’s scale is smaller than the other larger SI players. This difference will become more acute given the stated expansion plans of the large players. Market awareness on relatively unique go-to-market around software development. The market continues to perceive EY as an advisory or consulting firm and does not recognize EY’s hands-on technical capability to get blockchain solutions in production. EY will need to invest in changing this market perception as it builds on its software development-focused strategy. Bold versus risk-averse strategy. EY’s bold and clear vision, especially around public blockchain, should be lauded, but it can potentially scare some clients that are on the fence and still testing waters. This is a balancing act with pros and cons that EY will have to tread carefully. 	
Ability to execute				
Scale	# 3			
Experience	# 7			
Solution maturity	# 4			
Value chain coverage	# 4			
Innovation capability		Market share (HFS estimates based on ~2800 blockchain engagements incl. 135+ in-production solutions)	Main use-cases	
Intellectual property	# 6	% total number of engagements: 94% Others, 6% EY	<ul style="list-style-type: none"> Royalty management Asset management Security Procurement and sourcing Contract management 	
Ecosystem	# 8	% in-production engagements: 93% Others, 7% EY		
Investments	# 3	Clients in production (Not exhaustive) <ul style="list-style-type: none"> Microsoft City of Vienna Cantina di La-Vis Maersk Schneider Logistics 		
Voice of the customer		Blockchain practice overview	Blockchain platform and technology capability	Blockchain ecosystem
Clients in production	# 3	<ul style="list-style-type: none"> Blockchain practice was created in June 2016 and presently has 800+ blockchain proficient resources including 125+ dedicated resources. EY has established blockchain labs in New York, Seattle, London, Paris, and Trivandrum. 170+ blockchain engagements including BNP Paribas, Microsoft, Commonwealth Bank of Australia, and Allianz. 	<ul style="list-style-type: none"> Blockchain platform expertise across Quorum, Ethereum, Hyperledger, and Corda One patent pending (relating to tokenization of blockchain assets), 13 in process. Eight platforms (including Ops Chain). Proprietary tools for speeding up coding of zero-knowledge proofs by a factor of 10. 	<ul style="list-style-type: none"> Active member of the Enterprise Ethereum Alliance. Extended existing alliances with SAP and Microsoft to include blockchain technology collaboration.
Client feedback	# 6			

Infosys : Scaled-up blockchain capability with product + services go-to-market

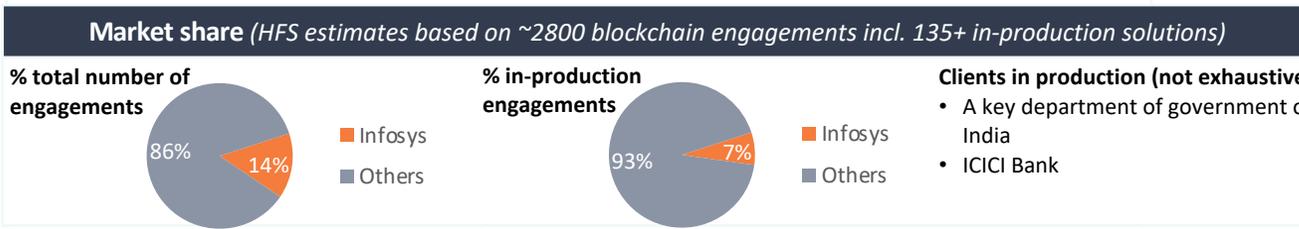
Dimension	
HFS Top 10 position	# 5
Ability to execute	
Scale	# 4
Experience	# 3
Solution maturity	# 15
Value chain coverage	# 14
Innovation capability	
Intellectual property	# 7
Ecosystem	# 9
Investments	# 5
Voice of the customer	
Clients in production	# 4
Client feedback	# 1

Strengths

- **Live BFS networks in APAC.** Emirates NBD in UAE and ICICI Bank in India are live on a blockchain network. They have positively affected 20 banks, 500 corporations, and hundreds of thousands of consumers.
- **Scale and scope of services.** With over 700 blockchain-enabled architects and senior staff, Infosys provides the breadth and depth of technology services required for blockchain implementations—frameworks, smart contracts, business process re-imagining, enterprise integration, infrastructure services, and database management services. It has aggressive targets to train over 3000 people by the end of CY 2018 and certify more than 25% of them with professional certification.
- **Investments and commitment.** Blockchain is an integral part of Infosys' Next Gen workforce initiative, it is heavily investing in creating blockchain innovation labs with physical spaces to facilitate design thinking, innovation, rapid prototyping, etc.
- **Integration capability with other emerging technologies.** The ability to combine blockchain with IoT, AI, and smart analytics to amplify the value proposition.

Development opportunities

- **Replicating success outside BFS and SE Asia.** Despite a strong roster of in-production clients in BFS, Infosys needs to push in-production use cases in other sectors and geographies.
- **Strategic advisory.** Value proposition and messaging emerges as technology-focused versus broader business context—an area where strategic advisory firms are excelling.
- **Improve awareness in the market about its offerings.** Enterprises are not yet fully aware of Infosys' strong blockchain capabilities. Infosys needs to invest in getting its point of view across as well as share success stories.
- **Role of start-ups in ecosystem.** Infosys has deep relationships with platform and technology players. However, overall collaboration with start-ups and niche players is still lacking on a relative basis with respect to its peers.



Main use cases

• Payment	• Customer service
• Trade finance	• Identity management
• Asset management	• KYC
• Smart grids	• Contract management
• Compliance	• Supply chain provenance and traceability

Blockchain practice overview

- Blockchain is an independent service line at Infosys with E2E delivery capability covering consulting, advisory, implementation, enablement, hosting, and network operations services.
- Infosys presently has 735+ blockchain-dedicated resources.
- Has over 400+ client engagements including a key Department of Government of India, ICICI Bank, and Emirates NBD Bank.
- Blockchain service line is a strategic priority for Infosys and has fixed business KPIs—revenue, operating margins, growth, and market share.

Blockchain platform and technology capability

- Infosys' blockchain platform expertise in Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, Multichain, BigChain DB, and Bitcoin/Bitcore.
- Developed Infosys Nia Provenance solution that integrates blockchain with AI and IOT based systems using Infosys NIA, an integrated knowledge-based AI platform.
- Launched new solutions such as Finacle Payment connect (for cross-border remittances), Finacle Trade connect (an enterprise-grade solution for trade and supply chain finance), Finacle Identity Connect (EKYC solution), Nia Provenance solution (supply chain on blockchain).
- Came up with solution accelerators: loyalty management, blockchain assessment framework, identity management, blockchain testing framework, Infosys blockchain framework.

Blockchain ecosystem

- Member of Enterprise Ethereum Alliance and has partnered with ConsenSys.
- Infosys is in the final stages of joining the BiTA (Blockchain in Transport Alliance) alliance.
- Infosys works closely with IBM and Hyperledger and is in the process of joining Hyperledger.
- Infosys has a deep-rooted partnership with R3. It built remittance, trade, and BFSI solutions on R3's Corda platform.
- Infosys is a member of the Microsoft Blockchain Service Council.
- Partner of Oracle Blockchain Cloud Service.
- Infosys works closely as an advisor and technology partner with SAP to develop SAP's Blockchain capabilities under Leonardo.
- Research collaboration with the University of Oxford, Warwick.
- Infosys is working on finalizing the partnership with AWS to the blockchain space with plans to create a "BaAS" offering with Infosys solutions and AWS infrastructure.

Wipro: Strong commitment to enterprise blockchain adoption, IP, and talent development with an early lead in the energy sector



Dimension	
HFS Top 10 position	# 6
Ability to execute	
Scale	# 5
Experience	# 8
Solution maturity	# 3
Value chain coverage	# 3
Innovation capability	
Intellectual property	# 5
Ecosystem	# 6
Investments	# 5
Voice of the customer	
Clients in production	# 6
Client feedback	# 8

Strengths
<ul style="list-style-type: none"> • Early lead in the energy sector. While Wipro has credible cross-industry experience in verticals such as financial services, healthcare and life sciences, and manufacturing, it has taken a market lead in developing live in-production solutions for its energy clients around trading and compliance. • Investment and commitment. Wipro is investing significantly in building skills, competencies, and innovative solutions alongside a robust IP and patent portfolio. Wipro utilizes its \$100 million strategic fund to invest in blockchain-specific partnerships and potential acquisitions. It has established blockchain Innovation Labs and Digital Pods in 18 cities across the globe. It has blockchain talent and community building using crowdsourcing through Wipro Top coder. • Strategic focus. Wipro has identified 10 industry themes and six high-impact strategic focus areas where blockchain has the potential to drive industry level disruption and create enterprise-grade production blockchain networks globally. Wipro is integrating blockchain with other change agents like IoT, AI, and 5G. • IP development. Wipro has filed for 17 blockchain patents globally. Wipro's Blockchain App Fabric is a holistic platform-as-a-service offering that allows it to work with multiple blockchain platforms, facilitates quick provisioning of network and underlying infrastructure, and accelerates development lifecycle.

Development opportunities
<ul style="list-style-type: none"> • Inorganic growth. Wipro offers strategic advisory, technology, and ecosystem services but has the opportunity to further complement existing offerings through inorganic strategic investments. • Lack of market buzz. Wipro needs to both invest in getting its point of view across and share success stories with enterprises about its strong blockchain capabilities. • Continuing market education. Lack of regulations and standards, talent crunch, security concerns, and overall market nascence are key inhibitors of enterprise adoption. Wipro will need to continue to invest and educate the market to overcome these challenges.

Market share (HFS estimates based on ~2800 blockchain engagements incl. 135+ in-production solutions)		
<p>% total number of engagements</p> <p>92% Others, 8% Wipro</p>	<p>% in-production engagements</p> <p>93% Others, 7% Wipro</p>	<p>Clients in production (not exhaustive)</p> <ul style="list-style-type: none"> • Multinational financial services company • Large oil and gas company (EU) • Multinational oil field service company • Leading global stock exchange • Global clothing company • Multinational consumer electronics • Leading renewable energy company

Main use cases	
<ul style="list-style-type: none"> • Trading • Provenance tracking • Payments • Compliance • Finance and accounting • Asset management • Cold chain tracking 	<ul style="list-style-type: none"> • Supply chain finance • Anti-counterfeiting • Procurement and sourcing • Title records and ownership • Identity management • KYC • Customer loyalty and rewards

Blockchain practice overview
<ul style="list-style-type: none"> • Started in 2015, it is dedicated practice to drive and scale blockchain initiatives across Wipro. • Dedicated team of 570+ people with more than 3000 blockchain-proficient resources. • 235+ engagements with an Asian central bank, leading pharma company, Swiss insurance company, German pharmaceutical company based in UAE, leading regulatory body, Travacoin, and ConsenSys.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • Blockchain platform expertise include Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, Multichain, BigChain DB, Bitcoin, Factom, Hyperledger Sawtooth, Original Blockchain Engine. • 25+ blockchain solutions and assets include: • Blockchain consulting frameworks: Use Case Prioritization Framework, Platform Evaluation Matrix, ROI Business Case Assessment, Smart Contract Test Assurance Framework, Execution Priorities. • Technology assets: Blockchain Innovation Lab, Smart Contract Testing Utility, Decentralized Monitoring Utility, Digital Identity Services, Blockchain Visualization Utility, Blockchain DevOps Framework. • Blockchain industry solutions: Green Energy Trading Solution, Digital Identity and KYC, Contract Management, etc.

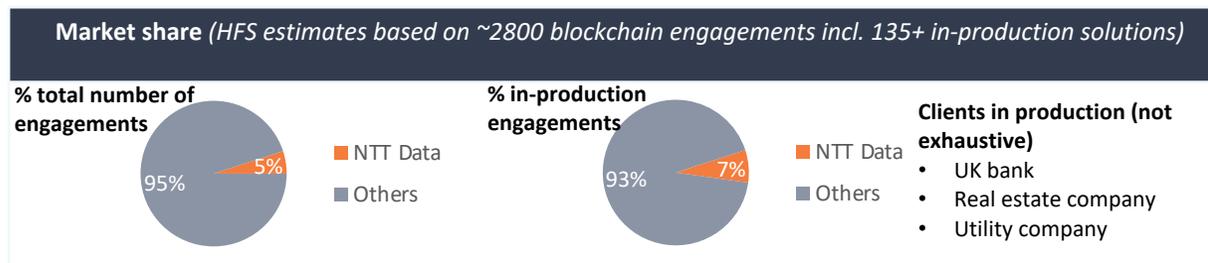
Blockchain ecosystem
<ul style="list-style-type: none"> • Member of Enterprise Ethereum Alliance, Hyperledger Project, Blockchain in Transport Alliance and a strategic member of the Energy Web Foundation council. • Chairperson of ASSOCHAM's National Council on Fintech, Digital Assets and Blockchain Technology. • Partnerships with R3, SAP, and VMware. • Member of the Oracle Blockchain Beta program. • Member of Blockchain Partner Council of Microsoft. • Partnership with universities such as The University of California (Berkeley), IDRBT (Institute for Development and Research in Banking Technology), and IISc.



NTT DATA: Full-stack blockchain technical capabilities with strong client relationships across industries

Dimension	
HFS Top 10 position	# 7
Ability to execute	
Scale	# 11
Experience	# 6
Solution maturity	# 1
Value chain coverage	# 2
Innovation capability	
Intellectual property	# 8
Ecosystem	# 5
Investments	# 6
Voice of the customer	
Clients in production	# 5
Client feedback	# 13

Strengths	Development opportunities
<ul style="list-style-type: none"> Robust investments. Blockchain represents the biggest tech initiative within NTT DATA TIG with the blockchain COE spread across 20 countries globally. Strong foothold in Japan and Europe across public and private sector. Multiple large blockchain initiatives in Japan (e.g., Trade Finance with a consortia of 13 large banks, insurers, and traders), Spain (e.g., government backed Alastria consortium on digital identity), Italy (e.g., ABI Lab for interbank reconciliations) and the UK (global payments on Ripple). Investments in BCOSE (Blockchain One Stop Environment) platform that enables sharing of blockchain POCs across 20 countries, provides a use case catalog and other basic and advanced level educational assets that enable clients to cross the hurdle from POCs to commercial and in-production environments. Deep experience across multiple private and public blockchain platforms (e.g., Hyperledger Fabric, Ethereum, Corda) to choose based on client and use case requirements backed by multiple in-house solution accelerators. 	<ul style="list-style-type: none"> Consortium driven solutions. NTT DATA has an opportunity to define consortium-based approach in developing solutions across industries and geographies with a focused GTM strategy and investments. Strategic business advisory. NTT DATA represents a one-stop-shop for all blockchain-related technical requirements but there is an opportunity to further expand its scale and presence for strategic consulting.



Main use cases	
• Trade finance and payments	• Carbon accounting
• Claims processing	• Smart grids
• Asset management	• Health records
• Provenance tracking	• Contract management
• Procurement and sourcing	• KYC

Blockchain practice overview
<ul style="list-style-type: none"> Cross-company blockchain initiative established in 2017. Blockchain initiative started in 2015 in Italy and Japan HQ Financial Sector. Dedicated blockchain team of 75+ people. 150+ blockchain proficient resources across 20 countries. 140+ engagements with clients such as ABI Lab, Cosenza Municipality, HakuHodo, Repsol, Densai.net, Valencia Port, MUFG, and LIFULL.

Blockchain platform and technology capability
<ul style="list-style-type: none"> Blockchain platform expertise includes Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, Multichain, BigChain DB, Hyperledger Indy, Parity, Hyperledger Sawtooth. Blockchain platforms such as 4Trace (traceability platform) and blockchain-as-a-service (under development). Solution accelerators such as digital identity and asset digitization frameworks, Khipus and everis ID, template and accelerator for rapid application development, ready development environments templates, utilities to accelerate smart contract development.

Blockchain ecosystem
<ul style="list-style-type: none"> Member of both Enterprise Ethereum Alliance and Hyperledger Project. Business and solution partners: Skuchain, NTT Laboratory, R3, ALASTRIA, Ripple, SAP, Microsoft, IoBuilders, Uport, W3C, DIF, Evernym, Consensusys. Partnerships with universities: Comillas ICAI-ICADE University, Politecnico di Milano University, Oracle.

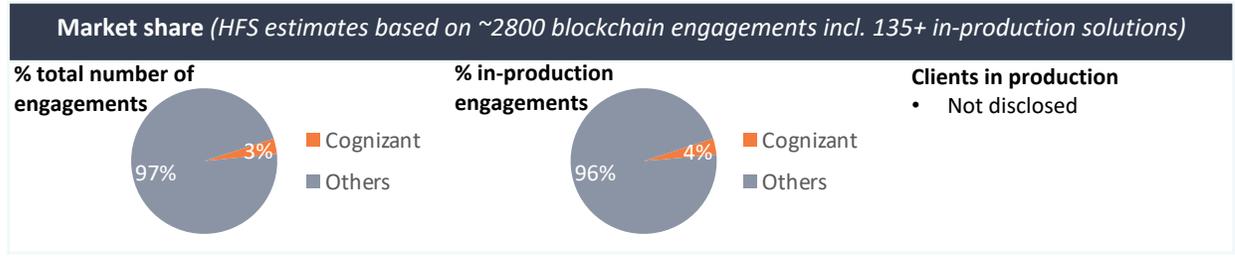
Cognizant: Full-service blockchain capability enabled by broad platform experience, robust ecosystem, and deep client relationships



Dimension	
HFS Top 10 position	# 8
Ability to execute	
Scale	# 13
Experience	# 9
Solution maturity	# 7
Value chain coverage	# 13
Innovation capability	
Intellectual property	# 3
Ecosystem	# 4
Investments	# 12
Voice of the customer	
Clients in production	# 9
Client feedback	# 8

Strengths
<ul style="list-style-type: none"> • Hands-on experience across a breadth (24+) of blockchain frameworks and industry domains enabling Cognizant to offer an unbiased expert opinion on use case and platform selection. • Deep client relationships allows Cognizant to understand how blockchain can fit into clients' broader strategies and IT architecture. Also offers a unique ability to be a "match-maker" and blockchain consortium growth catalyst. • Robust technology agnostic ecosystem allows Cognizant to capture the best-of-breed innovation in the market and leverage its expertise to integrate blockchain into enterprise architecture and develop the required tooling to productionize solutions in a quick span of time. • Cognizant's Trizetto™ product line touches over 50% of healthcare claims in North America providing Cognizant an engaged network to test and deploy blockchain products and solutions. • Full service capability to not just develop, but also to run and operate blockchain solutions in an infrastructure hosted and managed by Cognizant or in neutral third-party infrastructures. Pre-built blockchain solution accelerators, Cognizant's accelerator (ventures) group, and full-stack of digital capabilities; allows Cognizant to develop disruptive applications using blockchain.

Development opportunities
<ul style="list-style-type: none"> • Continuing market education. Lack of regulations and standards, talent crunch, security concerns, and overall market nascence are key inhibitors of enterprise adoption. Cognizant will need to continue to invest and educate the market to overcome these challenges.



Main use cases
<ul style="list-style-type: none"> • AML Sanctions & Compliance • Asset management • Trading • Claims processing • Payment • Private Placement
<ul style="list-style-type: none"> • Trade finance • Supply chain provenance • Procurement and sourcing • Provider Data Management • Value-Based Contracts • Reinsurance

Blockchain practice overview
<ul style="list-style-type: none"> • Established in 2015, Cognizant's global blockchain practice is responsible for a wide range of projects ranging from pure R&D to full scale business transformation using blockchain technology • Multiple blockchain centers-of-excellence across UK, Spain, Germany, and the Middle East. • 80+ client engagements including a consortium of 13 Indian Life Insurance companies, and MetLife's Lumenlab, among others.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • Blockchain platform expertise across Quorum, Ethereum, R3 Corda, Digital Assets, Hyperledger Fabric, MultiChain, BigChainDB, Adjoint, Hashgraph, Monax, Bitcoin, Ripple, Stellar, Chain & IPFS among others • Blockchain platforms and tools: CordaInsure, Azure BlockDeploy, Trizetto TruProvider, Blockchain Integrating Layer, Freshtrax, B-Verify, Genesis of Things, and SAP Farm to Fork. • Blockchain solution accelerators: Cryptocurrency payment solution, trade finance, loyalty platform, document signing and verification, post trade clearing and settlement, document sharing, virtual coin issuance and transfer, fund settlement, multi-sig asset transfer over blockchain, delinquency prevention over blockchain, trade finance participation deal solution using blockchain, , Automation of Life Insurance Claims on Blockchain, disability claim automation on blockchain, customer blockchain based vault creation and integration, educational degree verification on blockchain, shared inventory marketplace, Blockchain Retail Loyalty Solution, verification routing system, clinical data sharing prototype, healthcare revenue cycle prior-authorization, healthcare provider data management prototype, and carbon credit marketplace for EV.

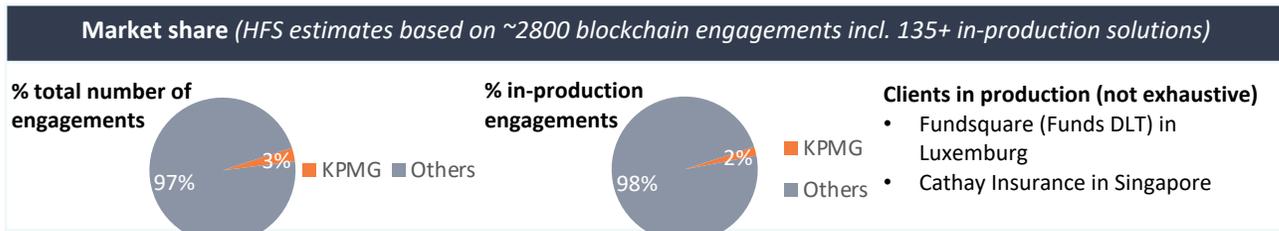
Blockchain ecosystem
<ul style="list-style-type: none"> • Member of EEA and Digital Chamber of Commerce. • Partnerships with R3, MultiChain, BigChain DB, Chain, Microsoft, AWS, Attest Inc., Digital Asset Holdings. • Member and active participant in Blockchain initiatives across industries, including the HIMSS Blockchain Taskforce in healthcare, MOBI Blockchain consortium in automotive, and OSCRE Blockchain alliance in real estate.



KPMG: Multi-disciplined and business-focused blockchain approach aimed to deliver a “whole enterprise” perspective.

Dimension	
HFS Top 10 position	# 9
Ability to execute	
Scale	# 16
Experience	# 10
Solution maturity	# 9
Value chain coverage	# 10
Innovation capability	
Intellectual property	# 9
Ecosystem	# 10
Investments	# 8
Voice of the customer	
Clients in production	# 8
Client feedback	# 5

Strengths	Development opportunities
<ul style="list-style-type: none"> Business focused. KPMG launched KPMG Blockchain Services (KBS) as an enterprise and network focused business solution, and KBS remains led by KPMG's business consulting practice, supplemented by data engineering expertise and an ecosystem of blockchain technology collaboration and alliance partners. Multi-discipline approach. KPMG blends blockchain-consulting services with foundational development capability in a number of different platforms. The objective is to provide a "whole-enterprise" perspective on blockchain that accounts for business process, technical implementation, tax implications, and assurance and risk controls. Global. KBS is a dedicated global focus supported by global advisory and by leadership in the tax and audit sectors. It has over 40 individual country leads for DLT/blockchain who engage the market with their entire range of advisory, tax, assurance, and technology solution services. Its capabilities are structured and organized around seven Anchor Country Practices and governed by Blockchain Centers of Excellence in EMA, Asia, and Americas. 	<ul style="list-style-type: none"> Converting POCs and pilots to production environments. Despite its multi-dimensional business focused approach, KPMG's experience with blockchain has fewer blockchain solutions in-production compared to its other leading players in this report. Consortium memberships. KPMG has a strong alliance network but is missing on leading enterprise blockchain consortium memberships such as EEA and Hyperledger. Relative investments. Despite strong capabilities, KPMG has not had the market visibility or traction in blockchain compared to its immediate peers (most notably Deloitte and EY). However, KPMG plans to increase its blockchain investments by nearly six times in FY19 vs FY18.



Main use-cases
<ul style="list-style-type: none"> Customer loyalty and rewards Trade finance Title records and ownership Claims processing KYC Provenance tracking Payments Crypto currency-related Track and trace

Blockchain practice overview

- KPMG's blockchain practice was created in 2016 under the name of Digital Ledger Services (DLS), and it has been rebranded to KPMG Blockchain Services (KBS).
- 100+ business professionals supporting blockchain in more than 40 active country firms across the KPMG global network, with an additional bench of some 200 technical professionals in its development and KGS groups.
- 85+ engagements with clients such as HSBC, MUFG, OCBC, Rabobank, Fundsquare, Nasdaq Nordic Fund Market Consortium, DZ Bank, Govt. of Andhra Pradesh, Cathay Insurance, and Banco Santander, among others.

Blockchain platform and technology capability

- Blockchain platforms:** Mobile payments wallet, funds distribution platform, travel insurance solution.
- Solution accelerators:** Digital Village Innovation Labs, The Node Blockchain Labs, Lighthouse Data Engineering, Ignition Centres, Advanced Analytics Insight Centres, Imperial College Global Data Observatory, and fixed assets solution.
- Blockchain delivery frameworks:** Blockchain maturity assessment framework, securing the chain governance and security framework, crypto-assets institutional buy-side/sell-side framework, blockchain in procurement delivery framework.

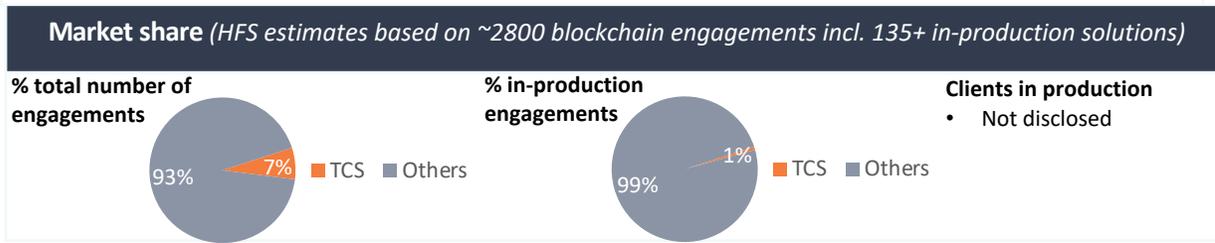
Blockchain ecosystem

- Strategic alliances with Microsoft and IBM
- Collaboration partners: Infosys, Wipro, Digital Assets, Axoni, FPT, InTech, Cegeka, Google, Oracle, HPE, Guardtime, and Finboot.
- Also involved in a variety of industry working groups such as Wall Street Blockchain Alliance, Chamber of Digital Commerce, BiTA, and Trusted IoT Alliance.

Dimension	
HFS Top 10 position	# 10
Ability to execute	
Scale	# 10
Experience	# 5
Solution maturity	# 5
Value chain coverage	# 7
Innovation capability	
Intellectual property	# 4
Ecosystem	# 7
Investments	# 8
Voice of the customer	
Clients in production	# 11
Client feedback	# 14

Strengths
<ul style="list-style-type: none"> • Long-term investments. TCS is making serious long-term investments in blockchain and other emerging technologies. Investing in developing various platform solutions by collaborating with its ecosystem participants to drive strategic adoption amongst enterprises and to realize the promise of blockchain. • Platform-agnostic advisory and wide coverage of blockchain platforms. TCS is following a multiplatform (Ethereum, Hyperledger Fabric, Corda, Monax, BigChainDB, IPFS, Ripple) strategy for its clients' engagements and is leveraging IBM Bluemix, Microsoft Azure, and in-house DLT platforms to provide blockchain as a service. • Technical competency. TCS brings to the table consultants and architects who understand how blockchain is interwoven with other technologies and what it means to drive efficiency innovation, business transformation, and business model disruption within the enterprise. TCS solution accelerators like Quartz and TCS Blockchain Sandbox Environment are helping fast-track development and deployment of smart solutions.

Development opportunities
<ul style="list-style-type: none"> • Converting POCs and pilots to production environments. Despite long-term investments and commitments, some of TCS' competitors have a better proportion of in-production solutions as a percentage of total engagements as of date. However, TCS expects this to change in the near future. • Scaling up blockchain practice. TCS has a broad end-to-end vision for blockchain services and has started to aggressively invest. It would have to continue with such investments for rapid scaling up. • Consortia memberships. TCS is yet to become a formal member of large industry consortia such as EEA and Hyperledger. While we have yet to see quantified benefits from such memberships, it represents an important decision criteria for clients.



Main use cases
<ul style="list-style-type: none"> • KYC • Contract management • Trading • Customer loyalty and rewards • Payment • Title records and ownership • Claims processing • Identity management • Procurement and sourcing • Provenance tracking

Blockchain practice overview
<ul style="list-style-type: none"> • TCS Blockchain Global Practice (established in 2017) falls under the newly instituted Business & Technology Services (B&TS) unit. • 300+ dedicated people focused on blockchain and an additional 100-200 blockchain proficient resources. • 200 engagements and 100+ use cases. • Blockchain focused innovation labs in Cincinnati, Kochi (India), and Santa Clara (upcoming).

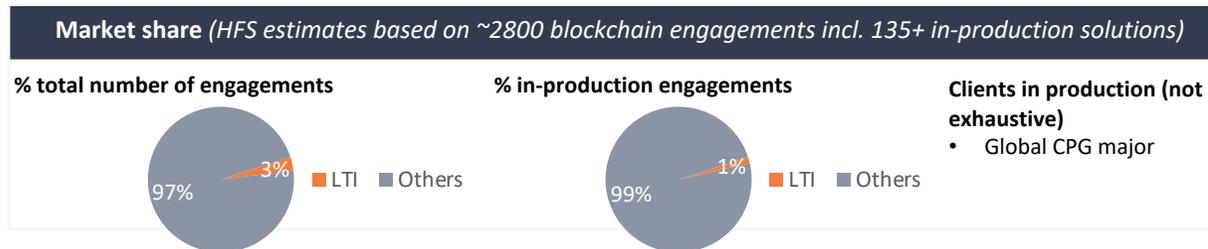
Blockchain platform and technology capability
<ul style="list-style-type: none"> • TCS' blockchain platform expertise includes Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, BigChain DB, Hyperledger Sawtooth, Tendermint, and Interplanetary File System. • Blockchain solutions (developed and in progress): Quartz platform and solution enables processing of business logic on a blockchain through smart contracts; TCS Bancs enabled with blockchain technology; digital identity platform that provides secure, private, modular, and user-controlled digital identity (DI) for people and things; data monetization platform; digital asset management; decentralized employee reward recognition; peer-to-peer platform where customers with similar interests can create groups and subscribe to products and services.

Blockchain ecosystem
<ul style="list-style-type: none"> • Partners with IBM Bluemix, Monax, Microsoft Azure, Intel, Ascribe/BigchainDB, Zcash, Airbitz, Consensus, Enigma, ENT, Factom, and Ericsson/Guardtime. • Consortia or memberships under consideration: Blockchain Research Institute (member), Hyperledger, Enterprise Ethereum Alliance, Trusted IoT Alliance, IC3, MIT Media Lab/Digital Currency Initiative.

LTI: Cross-industry technical experience with blockchain and its integration with other emerging technologies

Dimension	
HFS Top 10 position	# 11
Ability to execute	
Scale	# 8
Experience	# 13
Solution maturity	# 12
Value chain coverage	# 12
Innovation capability	
Intellectual property	# 13
Ecosystem	# 13
Investments	# 10
Voice of the customer	
Clients in production	# 9
Client feedback	# 10

Strengths	Development opportunities
<ul style="list-style-type: none"> • Robust ecosystem. Strong alliances within the blockchain ecosystem with the likes of Microsoft, IBM, SAP, Oracle, and several startups across industries to deliver impactful solutions to its clients. LTI is also a member of the Enterprise Ethereum Alliance (EEA). • Mosaic platform to integrate blockchain with other emerging technologies. Examples include smart analytics on the transactional data generated from blockchain applications, EchoChain to provide AI-based voice-enabled interface for retrieving information from Blockchain, and NFC chip-enabled authentication on blockchain. • Cross-industry technical experience. Leveraging its blockchain experience across BFS, manufacturing, oil and gas, insurance, and media and entertainment to create reusable modules that deliver pre-tested solutions faster. • Market development (especially in India). LTI recently sponsored the Nasscom Blockchain Hackathon held in Bangalore. It offers paid internship opportunity and cash awards to promising start-ups in India. LTI is also one of the eight global Research Patrons for MIT CISR. 	<ul style="list-style-type: none"> • Converting POCs and pilots to production environments. While this is a market challenge, what separates market leaders is their ability to support clients cross the POC and pilot hurdle. LTI's competitors assessed in this report have a better proportion of in-production solutions as a percentage of total engagements as of date. • Market awareness (especially outside India): Despite strong capabilities and experience, LTI's brand recall for its blockchain capabilities in US and Europe is limited. LTI will need to invest in a strong and aggressive marketing and story-telling campaign. • Scaling up blockchain practice (especially consulting). Though LTI has a broad end-to-end vision for blockchain services, the overall practices needs more investment in scaling up. There is a distinct opportunity to further expand its scale and presence for strategic business consulting.



Main use-cases	
<ul style="list-style-type: none"> • Procurement and sourcing • Payment • Provenance tracking • Royalty management • Trade finance 	<ul style="list-style-type: none"> • Finance and accounting • Supply chain visibility • Trade digitization • Supply chain financing • Inventory management

Blockchain practice overview
<ul style="list-style-type: none"> • Blockchain practice (established 2015) is part of the Digital Consulting & Advisory Services Group with a COE in Mumbai. • 180+ dedicated and 220+ blockchain proficient resources across Mumbai, Paris, Munich, and the US. • 85+ blockchain engagements.

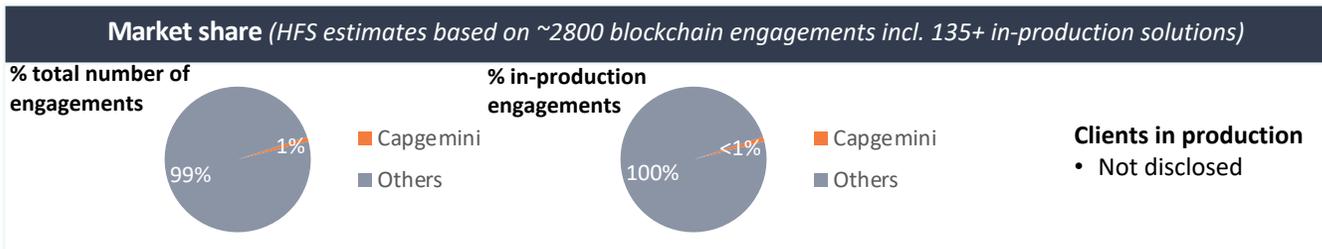
Blockchain platform and technology capability
<ul style="list-style-type: none"> • LTI's blockchain platform expertise includes Ethereum, Hyperledger, Quorum, Stellar, and Hashgraph. • Blockchain platforms: Micropayment platform, supply chain platform, and blockchain fitment assessment model. • Blockchain solutions accelerators program, blockchain kickstarter pack, and prototype package.

Blockchain ecosystem
<ul style="list-style-type: none"> • LTI is part of Microsoft Blockchain Council Members. It joined the Enterprise Ethereum Alliance and has alliances with IBM, AWS, SAP and Oracle. • Associations with premium academic institutions such as Indian Institute of Technology (IIT), Veermata Jijabai Technological Institute (VJTI), National Institute of Industrial Engineering (NITIE), and Indian Statistical Institute (ISI). • LTI is one of the eight global Research Patrons for MIT CISR.

Capgemini: Integrating DLTs with other emerging technologies to focus on business ROIs and customer experience

Dimension	
HFS Top 10 position	# 12
Ability to execute	
Scale	# 12
Experience	# 11
Solution maturity	# 14
Value chain coverage	# 9
Innovation capability	
Intellectual property	# 9
Ecosystem	# 11
Investments	# 12
Voice of the customer	
Clients in production	# 11
Client feedback	# 11

Strengths	Development opportunities
<ul style="list-style-type: none"> Expertise in emerging technologies. Capgemini has heavily invested in IP around digital transformation that includes the Applied Innovation Exchange (AIE), a framework that allows clients to contextualize and experiment with emerging technologies. It also includes the Accelerated Solutions Environment (ASE), Capgemini's co-innovation workshop and lab capability. Capgemini is developing demos related to DLT in the AIE and methodologies for the ASE. Business oriented. Capgemini uses a business-outcome-driven approach to evaluate the value of blockchain along with the full emerging technology landscape as an enabler of the digital transformation journey for its clients. Focus on customer experience. The AIEs across the globe serve as an immersive, collaborative digital facility to engage its clients offsite with blockchain technology. Acquisitions of Bachelite, a customer journey design company that can develop a user-friendly distributed platform, and Fahrenheit 212, which specializes in consulting on new business models, provide additional capabilities. 	<ul style="list-style-type: none"> Scaling up DLT practice. Capgemini has several (35+) client engagements in DLT, but overall, the number of client engagements is still low. Lack of in-production clients. Most of Capgemini's blockchain experiences are in the prototype stage. While there is an overall market adoption challenge given the nascence of blockchain, the ability to support a client through to production is emerging as a clear differentiator. Ecosystem robustness. While Capgemini has established partnerships with multiple DLT platforms, a complete ecosystem requires alliances across other technology firms, industry consortia, start-ups, academicians, and others.



Main use-cases
<ul style="list-style-type: none"> • Trade finance • Payment • Compliance • Claims processing • Procurement

Blockchain practice overview
<ul style="list-style-type: none"> • Started in 2015, Capgemini's blockchain practice is distributed across multiple business verticals dedicated to Innovation, with distributed ledger technology as one capability to be leveraged. • 150 dedicated blockchain practitioners and ~300 blockchain proficient resources. • 35+ client engagements, including Generali.

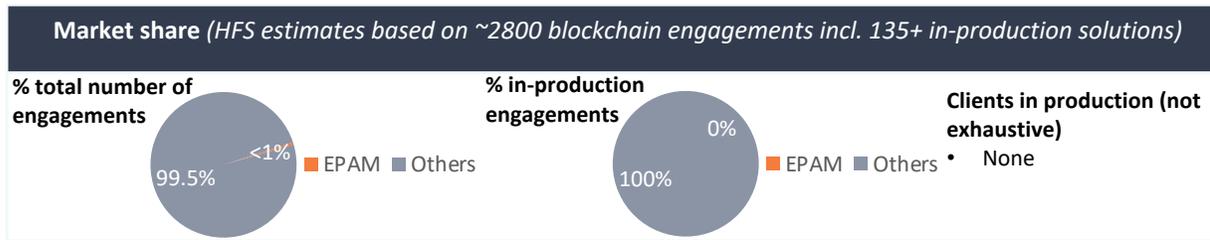
Blockchain platform and technology capability
<ul style="list-style-type: none"> • Expertise across Hyperledger Fabric, R3 Corda, Ethereum, and Bigchain DB, among others. • Blockchain platforms and tools include business case evaluation and formulation, operating model evaluation and transformation road mapping, framework design and proof of value development, pilot planning and deployment support, and deployment outsourcing. • Leverages both Applied Innovation Exchange (AIE) service and Accelerated Solution Exchange (ASE) service.

Blockchain ecosystem
<ul style="list-style-type: none"> • Capgemini engages with RiskBlock Alliance, R3, Hyperledger, and Enterprise Ethereum Alliance. • Work with closed loop and platform-based vendors including Kadena, Symbiont, and Digital Asset. • Chairs the advisory board for the Blockchain Research Institute.

EPAM: Pragmatic approach to enterprise blockchain leveraging in-house software engineering DNA

Dimension	
HFS Top 10 position	# 13
Ability to execute	
Scale	# 14
Experience	# 12
Solution maturity	# 9
Value chain coverage	# 15
Innovation capability	
Intellectual property	# 16
Ecosystem	# 17
Investments	# 12
Voice of the customer	
Clients in production	# 15
Client feedback	# 7

Strengths	Development opportunities
<ul style="list-style-type: none"> • Software engineering DNA. EPAM's key differentiator is its deep technical knowledge and a strong background and experience in software engineering. • Solution accelerators. Developed a set of solutions that helps clients jumpstart the blockchain journey, including an internal framework to identify and qualify a use case (identify-challenge-design-prototype). • Blockchain integrated with broader innovation as-a-service which is focused on incorporating agile ideation and lean engineering to develop customer-focused breakthrough solutions. Established in 1993, this program has delivered solutions for 300+ of the world's leading software vendors and has been developed by EPAM's competency centers and garages. • Blockchain platform expertise. EPAM has developed multiple production ready solutions based on a number of blockchain platforms including Ethereum, Bitcoin, Hyperledger Fabric, R3 Corda, and Multichain in exploring potential industry solutions. 	<ul style="list-style-type: none"> • Partnership ecosystem. EPAM should work for an ecosystem approach that drives collaboration across industry consortia, start-ups, academia, technology providers, and blockchain platforms. • Scaling up of blockchain initiatives. EPAM has seen a growth in its blockchain engagements as witnessed by the broader market. The size of its dedicated blockchain team has continued be the same since 2017. It needs to scale up to increase its blockchain competency and work for commercial success.



Main use cases
<ul style="list-style-type: none"> • Payments reconciliation • Supply chain transparency and counterfeit prevention • Access management • Customer loyalty and reward • Connected hospital (sharing of patient records and data)

Blockchain practice overview
<ul style="list-style-type: none"> • EPAM operates a dedicated blockchain competency center (COE) since 2015 as a separate designated business unit under FS Business Unit. Starting 2018, there is a double reporting line into EPAM's new Product Organization. • Dedicated team of 20+ people leading consulting and design for blockchain initiatives. Additional 100+ people throughout EPAM are tagged as blockchain experts and comprise the core community around DLT solutions. • 15+ blockchain engagements delivered to companies from sectors like banking, retail, healthcare, travel and hospitality, and sportswear manufacturers.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • EPAM has two blockchain solution accelerators: integration with external storage and addressing privacy with zero knowledge. • EPAM's blockchain solutions portfolio includes OTC trade capture and matching (Ethereum); digital assets management platform (Ethereum + Amazon S3 + sMPC); digital assets management platform + zero knowledge; open betting platform (Ethereum); digital notary service (NXT); and loyalty network (Ethereum).

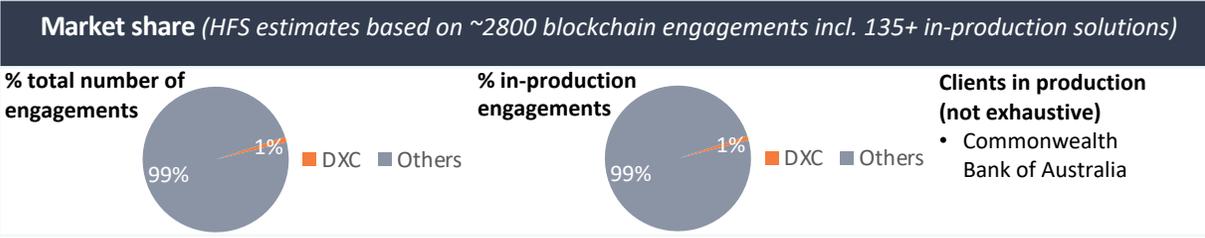
Blockchain ecosystem
<ul style="list-style-type: none"> • EPAM invested in SigmaLedger, a startup company offering a blockchain-based platform for counterfeit prevention, supply chain transparency, and digital marketing. It leverages its software engineering DNA for blockchain solutions development.

DXC: Pragmatic approach to blockchain adoption by expanding functionality of existing solutions using DLT

Dimension	
HFS Top 10 position	# 14
Ability to execute	
Scale	# 15
Experience	# 17
Solution maturity	# 6
Value chain coverage	# 5
Innovation capability	
Intellectual property	# 15
Ecosystem	# 14
Investments	# 15
Voice of the customer	
Clients in production	# 11
Client feedback	# 11

Strengths
<ul style="list-style-type: none"> • Expanding functionality of internal IP with blockchain. Existing DXC platforms such as Open HealthConnect and Digital Insurance leverage blockchain to expand functionality. With an existing client base on these solutions, the adoption is likely to be high. • Co-innovation with clients in terms of commercials, effort, and knowledge backed by a disciplined engineering approach and involvement of consulting, product teams, DXC Labs, and delivery centers (digital transformation centers) is starting to pay off with clients such as Commonwealth Bank of Australia (CBA). • Innovative programs such as DXC Invitational (start-up engagements) and DXC's Open Source program help expand DXC's ecosystem reach. • Starting to leverage internal synergies. With the establishment of the global blockchain practice in Oct 2018, DXC is starting to co-ordinate previously siloed blockchain efforts across labs, products, consulting, and delivery centers.

Development opportunities
<ul style="list-style-type: none"> • Scaling up blockchain practice: DXC blockchain practice is in an early stage of evolution. It will need to aggressively expand its overall scale of operations to be competitive going forward. • Converting POCs and pilots to production environments. While this is an overall market challenge, some of DXC's competitors have a better proportion of in-production solutions as a percentage of total engagements. Internal initiatives to drive a more coordinated blockchain initiatives will potentially help going forward. • Expanding the ecosystem. While DXC has strong relationships with IBM, AWS, and Microsoft, it will require broader ecosystem across industry consortia, blockchain platforms, start-ups, and academia to provide collaborative solutions to its clients.



Main use cases
<ul style="list-style-type: none"> • Asset management • Trade finance • Claim processing • Health record • Proof of insurance • Claim coordinator • Consent management • Supply chain augmentation

Blockchain practice overview
<ul style="list-style-type: none"> • Established global DXC Blockchain practice in October 2018 with an estimated team of 50-100 people worldwide. • 30+ engagements including Commonwealth Bank of Australia, Groupement des cartes bancaires, All Funds Bank (Spain), and VINCI Autoroutes (France).

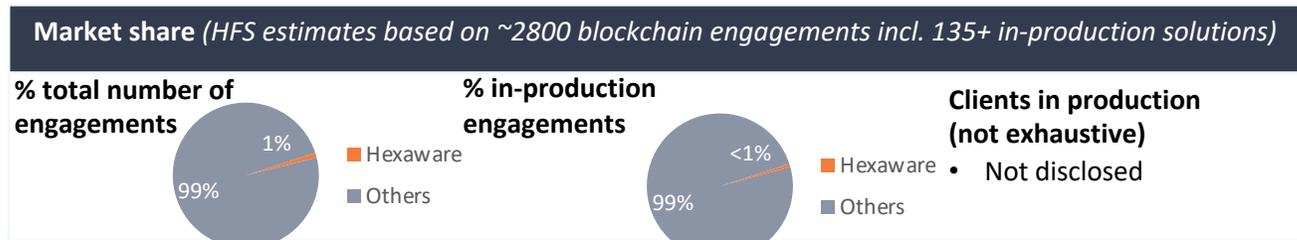
Blockchain platform and technology capability
<ul style="list-style-type: none"> • Blockchain platform expertise include Hyperledger Fabric, Ethereum, and R3 Corda. Blockchain solutions include: <ul style="list-style-type: none"> • Digital innovation platform: cross-industry solution for counterparty coordination and digital asset tracking. • Digital insurance platform: SaaS solution for multiparty coordination of participants in insurance business processes. • Open Health Connect: Solution for healthcare interoperability with blockchain-based patient data consent management. • KYC with self-sovereign identity.

Blockchain ecosystem
<ul style="list-style-type: none"> • Established relationships with IBM, Microsoft, AWS as cloud platforms and blockchain as a service. • Relationships with Hyperledger Project, R3, and Digital Asset Holdings. • Planned membership in blockchain consortia and industry groups related to blockchain technology.

Hexaware: Exploring practical usage of blockchain leveraging its existing client relationships in banking, financial services, and other industry verticals

Dimension	
HFS Top 10 position	# 15
Ability to execute	
Scale	# 9
Experience	# 14
Solution maturity	# 13
Value chain coverage	# 6
Innovation capability	
Intellectual property	# 13
Ecosystem	# 12
Investments	# 15
Voice of the customer	
Clients in production	# 11
Client feedback	# 14

Strengths	Development opportunities
<ul style="list-style-type: none"> Strength in the financial services vertical. Leveraging existing client relationships, especially buy-side capital markets to help make blockchain real for clients in BFS-focused use-cases such as payment, trade finance, and KYC. Platform-agnostic approach. Hexaware has experimented with a number of blockchain platforms including Ethereum, Hyperledger Fabric, R3 Corda, and Chain in exploring use case solutions. Ability to integrate blockchain with other emerging technologies. Exploring practical usage of blockchain technologies through Enterprise Distributed App integration with exponential technologies like IoT and systems like ERP. 	<ul style="list-style-type: none"> Scaling up blockchain practice. Hexaware's blockchain practice is an early stage of evolution and will need significant investments in scaling up. Expanding ecosystem. While Hexaware has a set of relationships with technology giants (such as IBM, Microsoft, Amazon, Oracle), it will require broader ecosystem across industry consortia, blockchain platforms, start-ups, and academia to provide collaborative solutions to its clients.



Main use-cases	
• Provenance tracking	• Microfinance
• Loan and lease management	• KYC
• Contract management	• Asset tokenization
• Mortgage lifecycle management	• Digital payments
• Real estate tokenization	• Transfer agency
• Loyalty points management	• Derivatives
	• Corporate actions

Blockchain practice overview
<ul style="list-style-type: none"> Established blockchain practice in 2017 with a dedicated team of ~40 full stack blockchain engineering and product development professionals. 30+ blockchain focused client engagements. Setting up FinTech and blockchain innovation labs in New Jersey, London, and India. Fintech and industry value chain specific offerings and assessment frameworks.

Blockchain platform and technology capability
<ul style="list-style-type: none"> Hexaware blockchain platform expertise includes Ethereum, Hyperledger Fabric, R3 Corda, Ripple, Quorum, and Factom. Blockchain tools: Multi-cloud managed blockchain, model-driven smart contract development tool, blockchain test automation tools for Ethereum and Hyperledger. Blockchain DevOps and network monitoring, blockchain data visualization, and analytics.

Blockchain ecosystem
<ul style="list-style-type: none"> Partnerships with Amazon, Microsoft, Oracle, IBM, Shocard, Hyperledger, r3, BiTa (Blockchain in Transport Alliance). Strong ecosystem alignment with start-ups focused on fintech and insurtech.

Conduent: Adding blockchain capabilities in existing industry platforms to bring trusted digital interactions to clients and their end-users

Dimension	
HFS Top 10 position	# 16
Ability to execute	
Scale	# 6
Experience	# 16
Solution maturity	# 17
Value chain coverage	# 17
Innovation capability	
Intellectual property	# 17
Ecosystem	# 14
Investments	# 10
Voice of the customer	
Clients in production	# 15
Client feedback	# 14

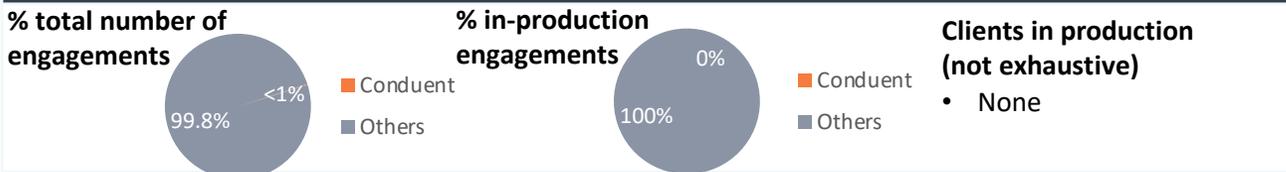
Strengths

- Expanding functionality of existing digital platforms leveraging blockchain.** Conduent is already serving millions of transactions across its constituents through its digital platforms. It plans to add blockchain to underpin its platforms and capabilities to bring trusted digital interactions to clients and end-users.
- Integrating blockchain with other emerging technologies.** Working on integrating blockchain with its AI, mobility, and IoT capabilities to bring about a transformational change to customer experience and create new markets and ecosystems. For example, mobile devices can interact with Conduent's decentralized identity platform to authenticate and validate the user. Integration with IoT sensors and logistics providers can provide transparency to suppliers and manufactures on real-time availability of goods, and hence aid planning and forecasting.

Development opportunities

- Late market entrant.** While the blockchain market is very nascent, it promises significant value creation potential for enterprises. Conduent's competitors are investing seriously in blockchain related initiatives on a relative basis.
- Scaling up blockchain practice.** Conduent blockchain practice is an early stage of evolution and has publicly committed to significant investments in scaling up.
- Expanding the ecosystem.** While Conduent is a member of EEA, it needs to expand its blockchain focused ecosystem across industry consortia, blockchain platforms, start-ups, and academia to provide collaborative solutions to its clients. Conduent recognizes this and has shared a pipeline of potential partnerships.

Market share (HFS estimates based on ~2800 blockchain engagements incl. 135+ in-production solutions)



Main use cases

- Procurement and supply chain
- Identity management
- Government human services
- Healthcare provider enrollment and eligibility

Blockchain practice overview

- Established in August 2017, Conduent's Blockchain practice is part of the larger Conduent Technology Innovation (CTI) that operates in 13 target industries.
- 20+ dedicated resources.
- 5+ blockchain engagements.

Blockchain platform and technology capability

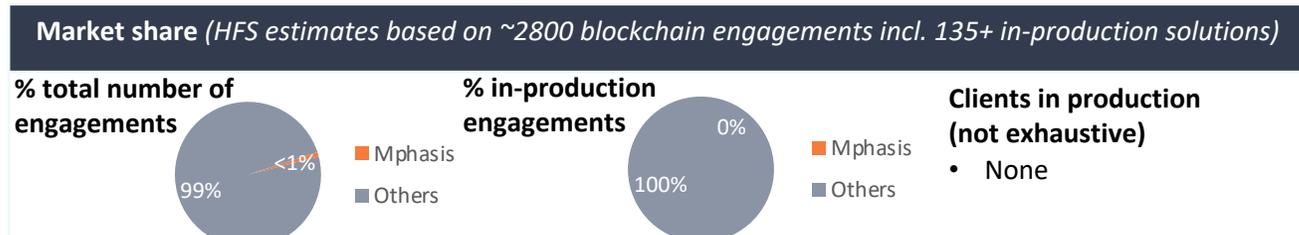
- Blockchain platform expertise includes Ethereum, Hyperledger Fabric, and R3 Corda.
- Working on integrating its blockchain platform with AI, mobility, and IoT capabilities.
- Filed a blockchain related patent.
- Additional IP on identity management and file-systems in pipeline.
- Products built using type-safe and functional languages.
- Emphasis and innovation on tools that lead to formal verification of deployed smart contracts.
- Providing thought leadership to industry with publications in IEEE Consumer Electronics.

Blockchain ecosystem

- Driving innovation within Microsoft (early access program for enterprise blockchain) to expose Kotlin APIs for developing enterprise smart contracts.
- Member of the Enterprise Ethereum Alliance and plans to join the Mobility Open Blockchain Initiative and establish a relationship with Chamber of Digital Commerce.
- Pipeline of partnerships include ConsenSys, R3, Multichain, and Hyperledger.

Dimension	
HFS Top 10 position	# 17
Ability to execute	
Scale	# 17
Experience	# 15
Solution maturity	# 11
Value chain coverage	# 11
Innovation capability	
Intellectual property	# 11
Ecosystem	# 16
Investments	# 17
Voice of the customer	
Clients in production	# 17
Client feedback	# 17

Strengths	Development opportunities
<ul style="list-style-type: none"> • Technical expertise. Mphasis blockchain COE offers technical knowledge across multiple blockchain platforms backed by proprietary tools, solution accelerators, and other reusable assets. • Deep BFSI domain and relationships. Mphasis has deep expertise across BFSI through its products, services, and existing client relationships. Its plan is to take blockchain to the market by co-creating IP with its existing clients. • Ability to integrate blockchain with other emerging technologies. Mphasis has the capability to create end-to-end blockchain solutions by combining with other digital technologies such as web, mobile, security, analytics, and ML. • Platform agnostic. Working on both Hyperledger Fabric as well as Ethereum private blockchain for development and PoCs to remain unbiased and flexible at this early stage of maturity of blockchain platforms. 	<ul style="list-style-type: none"> • Scaling up blockchain practice. Mphasis blockchain practice is an early stage of evolution and will need significant investments in scaling up. • Partnership ecosystem. While Mphasis is a founding partner of Multichain, it has limited partnerships in the space. It will require broader ecosystem across industry consortia, blockchain platforms, start-ups, and academia to provide collaborative solutions to its clients. • Relative investments. Despite inherent technology heritage, Mphasis has not had the market visibility or traction in blockchain given relatively small in-house investments thus far.



Main use cases
<ul style="list-style-type: none"> • Lending • KYC • Claims processing • Trade finance • Asset management • Health records

Blockchain practice overview
<ul style="list-style-type: none"> • Blockchain COE established in mid-2016 reporting to the head of Industry Solutions Group. • Team of 15+ people leading consulting and design for blockchain initiatives with nearly 15 client engagements.

Blockchain platform and technology capability
<ul style="list-style-type: none"> • Blockchain platform experience across Ethereum, Hyperledger Fabric, Quorum, Multichain, and BigChain DB. • Blockchain tools: DeployContracts to deploy smart contract on Ethereum or Quorum; DashBoardGeneric, which offers a blockchain explorer for Ethereum and Quorum blockchain. • Solution accelerators include MongoDBController, IPFS Java Utility, HttpRequester, and JSONController.

Blockchain ecosystem
<ul style="list-style-type: none"> • Multichain: Mphasis is one of the first founding partners of Multichain, which is an open source, freely downloadable private blockchain. • Loyakk: Develops and manages enterprise platforms, enabling businesses to manage relationship across customers, channel partners, and suppliers.

About HFS

HFS Research author



Saurabh Gupta
Chief Strategy Officer | HFS Research

Saurabh oversees HFS' global research function managing the global team of analysts across US, Europe, and Asia-Pac. He works closely with the CEO to set the strategic research focus and agenda for HFS Research, understanding and predicting the needs of the industry and ensuring that HFS maintains its position as the strongest impact thought leader for business operations and services research.

As an analyst, Saurabh leads our coverage for horizon 3 change agents such as blockchain, business services (such as finance & accounting and supply chain) as well as overarching and cross-cutting themes under the OneOffice concept like digital change management

He is a recognized thought leader and passionate problem solver in the global services industry. With 15+ years of experience across client, provider, advisory, and analyst roles, he brings a uniquely realistic and wide-ranging perspective to our industry's challenges and opportunities. Before joining HFS, Saurabh led strategy for Genpact's CFO and transformation services, helped shape the Business Process Services (BPS) strategy for AbbVie, managed Everest Group's global BPS practice, and worked as a techno-functional consultant at Infosys.

Saurabh.Gupta@hfsresearch.com

HFS Research author



Mayank Madhur
Knowledge Analyst | HFS Research

Mayank Madhur is a Knowledge Analyst at HFS Research, supporting different practice leads in area of Industry Research, IoT and Blockchain by working on secondary research, data analysis, PoV's and research writing.

Mayank has over 3.5 years of research, pre-sales and software development experience. Prior to HFS he was part of business strategy and pre sales in Altimetrik supporting vertical heads, sales and marketing team. Before it in his HCL Tech role, he worked in the delivery team of a large medical device client for R&D project.

He holds blockchain certification by IIT & IBM on "Blockchain Architecture Design and Use Cases". His other certification include certification on Google analytics, Scrum, Six Sigma etc. to name a few. Mayank holds Master's in Business Administration from Birla Institute of Technology and Science College, Pilani (BITS, Pilani University) and a Bachelor of Engineering in Electrical and Electronics from Jawaharlal Nehru National College of Engineering (Visvesvaraya Technological University), Karnataka.

Mayank.madhur@hfsresearch.com



HFS Research: Defining future business operations

- The HFS mission is to provide visionary insight into major innovations impacting business operations, including: automation, artificial intelligence, blockchain, Internet of things, digital business models, and smart analytics.
- HFS defines and visualizes the future of business operations across key industries with its OneOffice™ Framework.
- HFS influences the strategies of enterprise customers, to help them develop OneOffice backbones to be competitive and to partner with capable services providers, technology suppliers, and third-party advisors.
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