

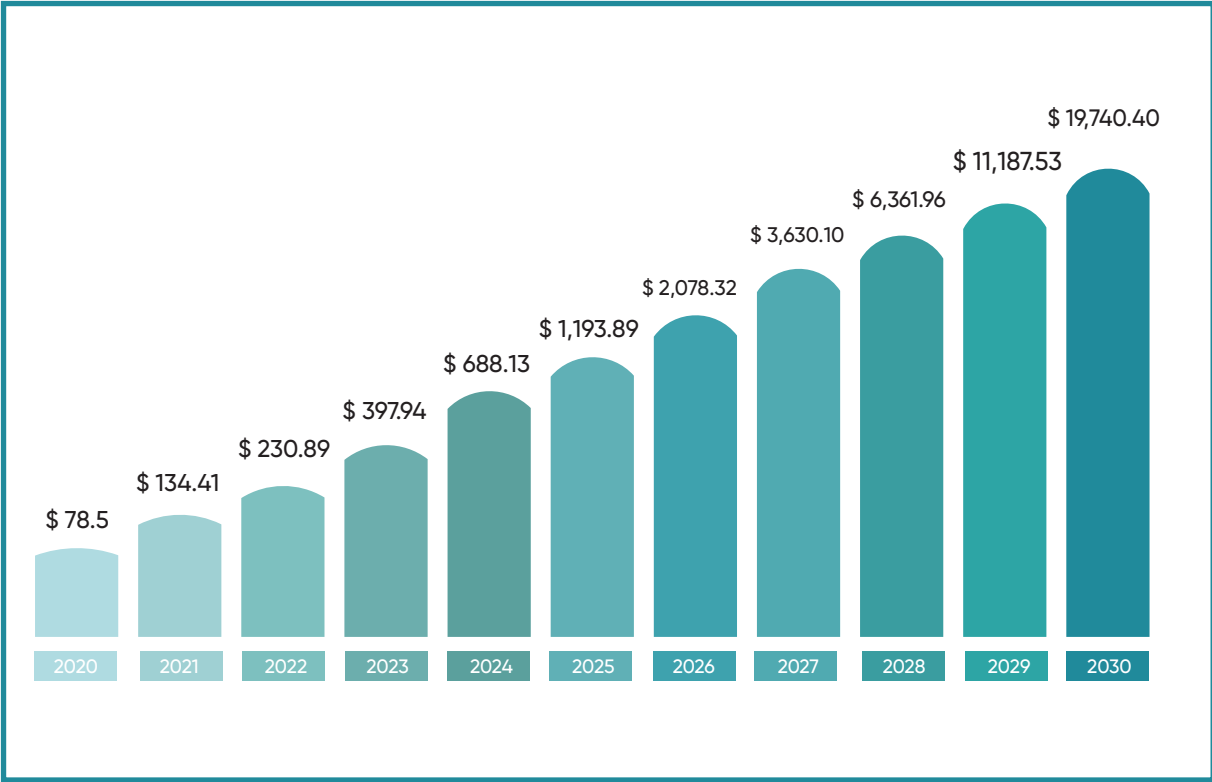
BLOCKCHAIN

THE JOURNEY BEYOND FINTECH



Ever since the world took notice of blockchain technology use cases, we have witnessed a general consensus that immutable ledgers would become the backbone of digital transactions in the near future. However, the past few months were a rude awakening. Prices of cryptocurrencies tanked, and trading volumes of non-fungible tokens moved from a canter to a crawl, with bankruptcy staring the early pioneers in their face. That all these goings-on resulted in a rethink is obvious. However, once we cut through the clutter and parsed out bad businesses and bad actors, what was left only reinforced the belief that the uses of digital assets and their underlying technologies remain robust.

Applications for the next generation internet have sprung up across industries that could potentially have a transformative impact. Among the first to jump on this bandwagon is the financial services industry, with daily volumes of decentralized finance exchanges exceeding \$10 billion, per a Mckinsey* note. Though the volumes have since dropped considerably, the learnings from these experiments are guiding blockchain usage in other sectors. While it is true that the regulatory frameworks for Web3 are still under debate, that consumer protection is at the core of these efforts remains unquestioned. Even as other industry verticals continue to take early steps towards the use of this nascent technology, the fintech industry is moving fast.



BLOCKCHAIN IOT MARKET SIZE, 2020 TO 2030 [USD MILLION]

(SOURCE: PRECEDENCE RESEARCH)

Given that decentralization is at the core of blockchain implementation and creation of the immutable ledger, implementation of Web3 automatically lends itself to a complete transformation of established corporate structures and operations. Picture a world where contracts are automatically executed without human intervention or chance of fraud; imagine a world where international transactions are simple, safe, and quick, and where banking limitations no longer apply; envision a future where most corporate operations are automated, transparent, and auditable, resulting in unprecedented levels of trust and productivity. All of these make fintech the future, promising to simplify and streamline existing financial systems.

The blockchain technology growth projections

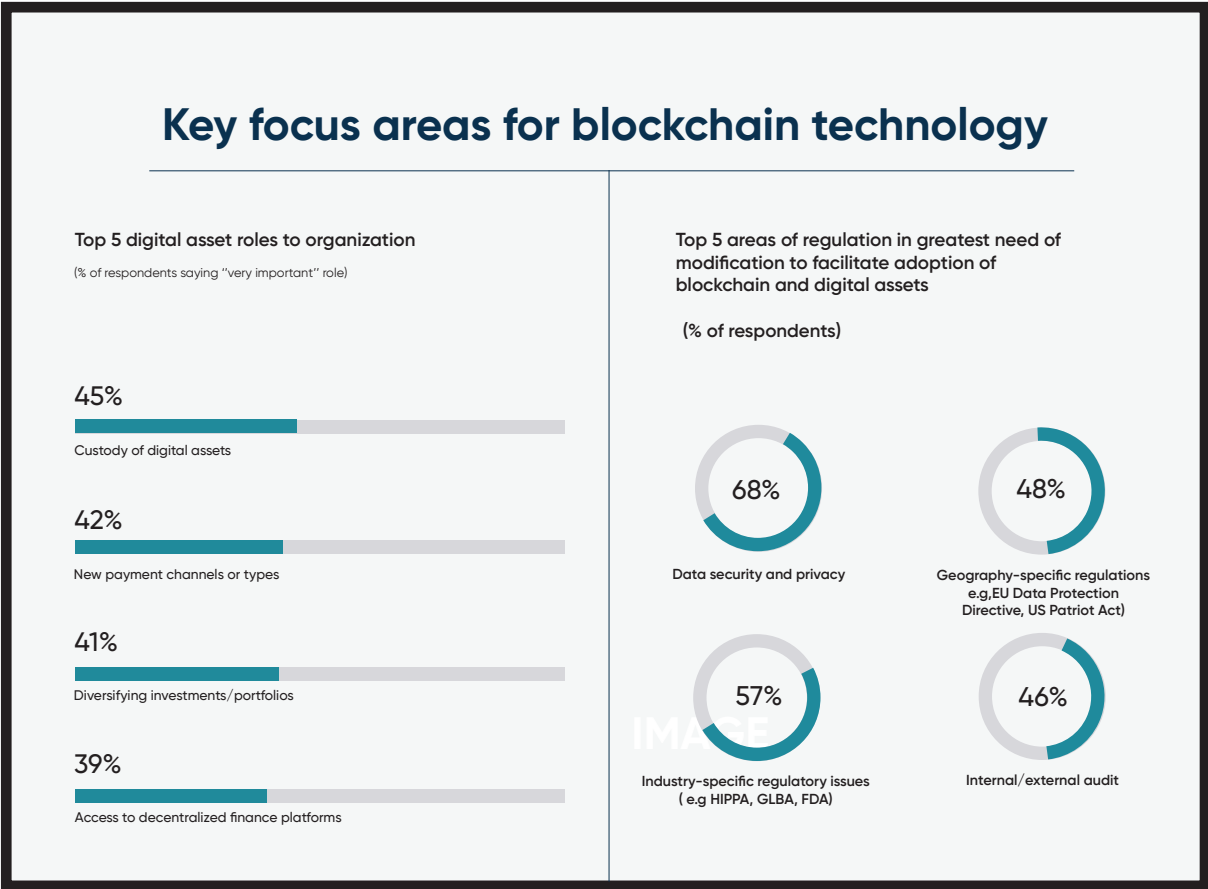
The public ledger, which is at the heart of blockchain technology, is ideally adapted for documenting formal contracts, with several use cases being experimented upon by governments and private enterprises. A recent report from IBM noted that three-quarters of the respondents to a survey of industry leaders agreed that the traditional ways of doing business were not sustainable and the situation demanded technology innovation. By automating redundant processes and sharing data among private enterprises network members in a decentralized way, blockchain could potentially reduce traditional friction between systems, especially in government where hardened organizational silos reduce efficiencies.

Data from MarketsandMarkets suggests that the worldwide blockchain industry is expected to develop at a CAGR of 66.2% from an anticipated USD 7.4 billion in 2022 to USD 94.0 billion by 2027. The widespread use of blockchain technology for payments, smart contracts, and digital identities should drive growth in this sector. This exponential rise demonstrates that blockchain technology is deployable across industries, emphasizing its potential to become a game-changer in the way business is done today.

Blockchain use cases in public and private governance

Given this scenario, agreements that conventionally demand the participation of a notary to register a contract and public announcements and acknowledgement of ownership can now function without either. There are already several examples of blockchain uses in governance: the UN World Food Program created Building Blocks using ethereum to deliver aid, starting with a project in Pakistan, followed by Bangladesh and Jordan; the British government teamed up with GovCoin to develop a blockchain for welfare payments; Denmark joined hands with Coinify to use blockchain in foreign aid delivery.

And that's not all. Use of blockchain technology has increased across the healthcare industry – from securing patient medical records to managing pharma supply chains. New York-based Coral Health uses ledgers to connect doctors, laboratories, and public health bodies. It uses smart contracts to speed up administrative processes that keep data safe and ensure better accuracy for treatment plans. Another interesting use case relates to Ankr, a cloud-based blockchain infrastructure for business that lets anyone with idle computers or extra data space rent them out for data mining. All of these above use cases prove beyond doubt that blockchain technology not only reduces administrative friction but also saves time and money.

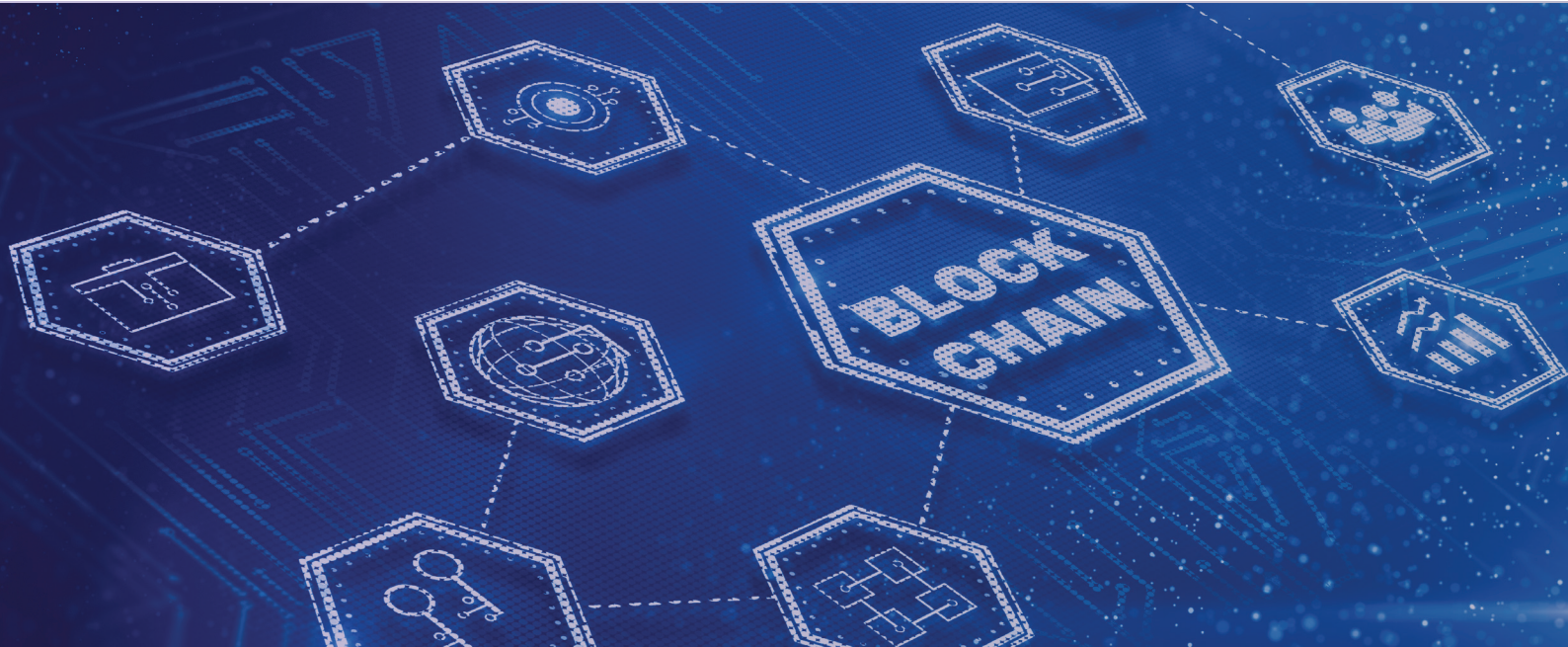


(SOURCE: DELOITTE)


A survey conducted by Deloitte indicates that 81% of respondents agree that blockchain technology is broadly scalable and has achieved mainstream adoption. Moreover, research conducted by PwC states that by 2030, blockchain could generate \$3 trillion in commercial value each year, with 10-20% of the global economic infrastructure operating on blockchain-based platforms. These findings reinforce that blockchain has implications beyond cryptocurrencies, presenting opportunities for positive disruptions.

Given that blockchain provides an immutable audit trace for transactions, it would allow businesses to authenticate the origin and delivery of data. Moreover, it facilitates static and dynamic record-keeping, improves data security, and facilitates automated transactions via smart contracts, says McKinsey. In a parallel study, Accenture highlights the potential use of blockchain analytics in the federal sector by contributing to marketplace monitoring, compliance enforcement, and targeted investigations. Given these use cases, it is quite obvious that blockchain can cause positive disruptions in enterprise-level operations.

Enterprise-level challenges posed by blockchain adoption



While blockchain technology continues to develop and encompass different industry verticals, there are challenges that need to be addressed. For starters, there are novel and unexplored assets such as stablecoins, central bank digital currencies (CBDC), governance tokens, and NFTs that could drive new use cases resulting in corporate demand. As these emerge, infrastructure too needs to evolve and mature to support them. Some of these include custody and asset servicing, clearing and settlement, tokenization and issuance, risk and compliance, and wallets. All of these have been virtually ignored by legacy systems. Entities such as banks and other financial institutions could utilize the opportunity to partner with startups to innovate. Some of the challenges are



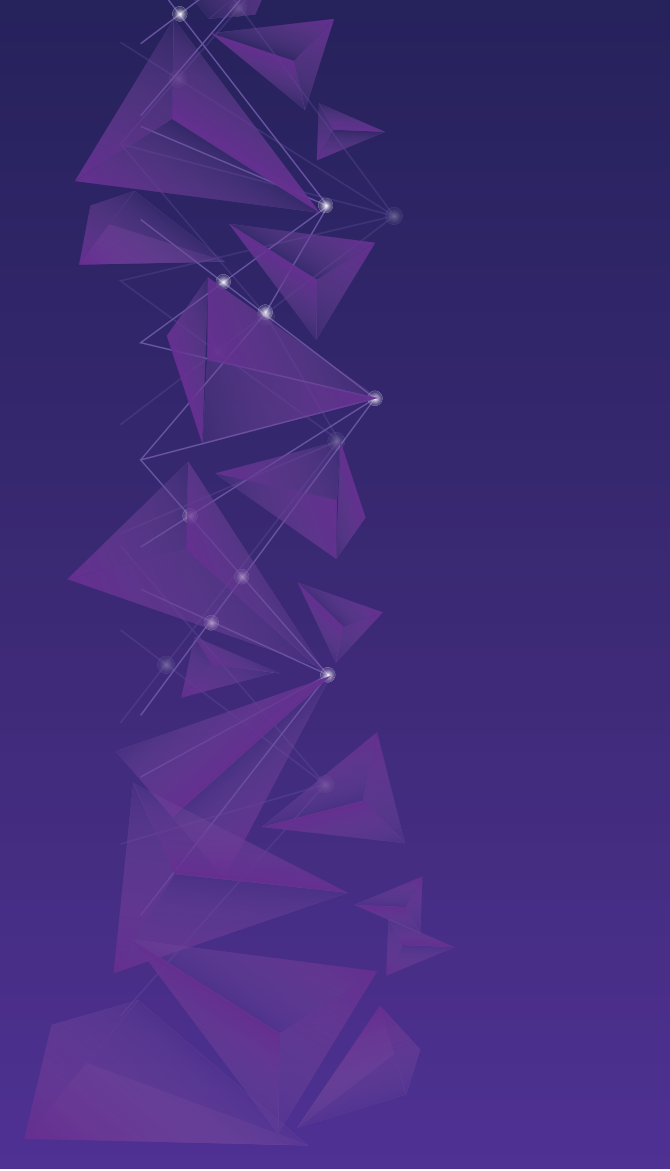
Scalability and performance limitations could be a significant challenge for blockchain adoption, particularly in public networks. The inherent technological limits of blockchains pose a significant challenge to their scaling. Every node contributes to the growing ledger of transaction history by recording information on newly executed transactions. As the number of nodes grows, it becomes more difficult to set up and maintain the hardware required to keep it running smoothly.

High transaction costs could be another key element influencing blockchain scalability, as transaction validation requires more computational power for mining. Users must pay transaction fees for verification, and as networks spread, users are ready to pay higher prices. This, however, might result in an accumulation of unprocessed transactions, causing delays.

Block size is another significant aspect whereby expansion of total network transactions affects the growth capacity of each block, making execution more time-consuming. Block size increases alongside the number of transactions, resulting in longer response times. There is a significant amount of time spent validating transactions, particularly during high-volume periods.

Regulatory and legal considerations for businesses also represent a challenge. The decentralized nature of blockchain may contradict current data protection and privacy legislation, such as the General Data Protection Regulation (GDPR) of the European Union. Certain countries have explicitly outlawed Bitcoin, while others have attempted, with little success, to regulate blockchain networks.

Interoperability and standardization pose a threat due to the fragmented structure of the blockchain ecosystem, where several platforms and protocols exist, causing interoperability challenges. Lack of interoperability hampers the capacity of various blockchain networks to communicate and exchange data seamlessly. This may make exchanging resources and data more difficult than carrying out cross-chain transactions.



Privacy and security in a public ledger system is an obvious challenge and enterprises must handle sensitive consumer information with additional precautions to maintain consumer trust. To address the privacy issue, it is essential to amend the registers and limit data access so only authorized consumers can view the information. This is especially important in cryptocurrencies such as Bitcoin.

Skill and talent gap could crop up more and more as private and public networks adopt blockchain-based ledger management. Since blockchain is a relatively new and rapidly evolving technology, there is a shortage of professionals with extensive experience and knowledge in blockchain implementation.

Cost and resource allocation could prove an impediment as blockchain adoption requires massive investments in infrastructure, development, and maintenance. To guarantee the cost-effectiveness of blockchain adoption, enterprises must carefully examine the return on investment and deploy resources efficiently.



All challenges come with their inherent solutions

Many of these complex challenges are being addressed simultaneously by several startups. A Gartner survey predicts a market value of \$176 billion for blockchain tech, which could explode to \$3.1 trillion by the start of the next decade. Total startups in this segment, which stood at 66 in 2012, grew to 777 in 2017 and touched nearly 1200 in the first half of 2022, raising a whopping \$30.3 billion. Suffice to say that the value proposition for consumers – that of unifying data, functionality, and value – is what investors perceive as the future of business operations. Some solutions that these startups are working on include:

Sharding as a scaling solution involves processing transactions in parallel that involves breaking the blockchain network into smaller segments or shards. This delivers increased throughput and scalability. Layer 2 protocols, such as Bitcoin's Lightning Network, allow off-chain transactions to decrease the load on the main blockchain. Over a thousand transactions per second (TPS) can be processed using the layer-2 scaling method.

Regulatory frameworks and compliance is another challenge over which governments have already expressed their willingness to collaborate in order to develop extensive rules and regulations. These would address challenges such as classification of digital assets, anti-money laundering (AML), and know-your-customer (KYC) requirements.

Interoperability protocols and industry collaboration allow for communication and interaction between blockchain networks. Developing interoperability protocols for decentralized networks, such as cross-chain bridges and InterBlockchain Communication (IBC) standards, enables the transmission of data and assets across various blockchains. Hyperledger and Enterprise Ethereum Alliance, the two prominent enterprise blockchain platforms, agreed in 2022 to collaborate to define interoperability standards.

Industry-wide standards for multiple blockchain protocols are also in the works. These would assist enterprises in application development, validating proofs of concept, sharing blockchain solutions, and interacting with existing systems more efficiently. There are currently a number of initiatives that promise to facilitate interoperability between various blockchain networks, such as Ark, which claims to offer universal interoperability and cross-blockchain transactions.

Enhanced security measures and privacy is another aspect bringing startups and governments together to address these issues. Strong encryption, multi-factor authentication, and secure key management systems are some of the additional security measures being implemented. Zero-knowledge proofs and secure multi-party computing are two examples of privacy-enhancing technologies that make it possible to verify transactions without disclosing private data.

Cost challenges are being addressed through increased use of cloud-based blockchain platforms that provide scalable infrastructure without requiring substantial up-front hardware investments. Additionally, improving energy efficiency and optimizing blockchain protocols are also being used to reduce operational costs. Collaborative efforts within the blockchain community also help save costs by exchanging resources, research, and development efforts.

Bridging the skills gap requires a multi-pronged strategy of including blockchain-led programs at the academic levels, industry collaborations with such institutions, and community-driven initiatives such as hackathons and skill enhancement programs. Use of blockchain as a service (BaaS) could be another strategy that spreads the skills across a broader spectrum of enterprises.

Many of these solutions are already being tested by organizations as they seek to overcome the challenges associated with blockchain adoption. Scalability, regulatory compliance, interoperability, security, privacy, cost, and skills can be effectively addressed, unlocking the full potential of blockchain technology across various industries.



The road ahead for blockchain technology

The advantages of blockchain technology for enterprises include improved performance and transparency. Blockchain enables secure and tamper-proof record-keeping by virtue of its decentralized and immutable nature, thereby reducing the need for middlemen and enhancing transactional trust. Smart contracts automate and expedite processes, eliminating human error and decreasing administrative expenses. Real-time visibility into data and transactions promotes transparency, allowing businesses to monitor and verify the origin of products, thereby augmenting supply chain efficiency and boosting consumer confidence.

By eliminating middlemen, companies can streamline their operations while lowering transaction costs. Smart contracts automate payment procedures, reducing administrative costs and enhancing cash flow management. Additionally, blockchain-based tokenization enables fractional ownership of assets, facilitating the development of digital assets and peer-to-peer transactions to generate new revenue streams.

Traditional financial institutions and regulatory structures are challenged by blockchain technology. Decentralized finance (DeFi) platforms provide financial services such as lending, borrowing, and asset management without the need for agents, posing a challenge to conventional banking models. Regulatory bodies are tasked with adapting existing regulations or developing novel regulations that tackle the distinctive qualities of blockchain and cryptocurrencies, such as the classification of digital assets, investor protection, and anti-money laundering measures. Blockchain innovators, financial institutions, and regulators should collaborate to strike a balance between innovation and regulatory compliance.

In Conclusion...

The future presents numerous opportunities and repercussions. Businesses can utilize blockchain technology to increase their efficacy, transparency, cost savings, and revenue generation. Given blockchain's disruptive nature, established financial institutions and regulatory agencies must adapt, finding an optimal balance between innovation and oversight. Adopting organizations should adhere to best practices and strategies, considering business objectives, feasibility, collaboration, and security. Blockchain technology has the potential to revolutionize multiple industries and reshape the future of business with cautious planning and execution. The future of finance may be decentralized and powered by blockchain technology.

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