

DISRUPT AND INNOVATE  
**HARNESS THE  
POWER OF  
BLOCKCHAIN**

MAY 2023



agiledynamics.tech







**Literature on the  
assessment of  
blockchain impact on  
technology sovereignty<sup>1</sup>  
— technical suitability,  
economic feasibility, high-  
level design, adoption  
approach, business value  
potential for the growth  
markets simply does not exist.  
Consequently, there is a massive  
opportunity to be missed.**

Source: Agile Dynamics Tech  
Note: 1 - Technology Sovereignty is defined as a country's ability to develop and implement  
technology crucial for its technological independence and welfare.  
More at – 'Build your own digital sovereignty over blockchains' originally published in Gulf  
Business <https://gulfbusiness.com/build-your-own/>

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*Navigating through the complexity of analyzing feasibility of the NextGen Layer 1 Blockchain protocol*

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# INTRODUCTION

- Growth markets would benefit from skipping current solutions and adopting upcoming technologies like IoT and 5G. This also means that enabler technologies, like Blockchain that would greatly help adoption of these new technologies, would be beneficial if also adopted from day one

It's challenging to confidently claim that all developing growth markets require their own layer 1 blockchain protocol since each market has its unique set of opportunities and challenges. Nonetheless, creating a blockchain protocol tailored to meet the specific needs of a particular growth market could offer substantial advantages. Such a protocol could cater to the market's specific demands, such as facilitating certain transactions or enabling quicker and more affordable payments, potentially leading to increased adoption and engagement among the local community.

One must also take into consideration that existing layer one blockchain protocols, such as Ethereum, Solana, and BNB Chain, may be suitable for use in developing world markets. Ultimately, the decision to create a new blockchain protocol would depend on various factors such as market needs, resources, and potential for scalability.

The purpose of this study is to provide answers to questions about whether building a layer 1 blockchain protocol would benefit growth markets and, if so, what those benefits would be. The study aims to address two main questions: What are the benefits and opportunities of designing a layer 1 blockchain protocol specifically for the growth markets of South America, Africa, and Asia, and what should the NextGen layer 1 blockchain protocol look like?



# MEET THE TEAM BEHIND THE RESEARCH

We helped a wide variety of organizations embrace—and harness—the power of blockchain



**IVAN BJELAJAC**

- Ivan has been a part of the tech industry for 20+ years, first as an engineer and later on as a serial entrepreneur who has been involved in 6 successful startup exits from 2012 to 2022.
- Currently his efforts are 100% focused on building the infrastructure for fast, secure and scalable Blockchain transactions through side-chains, mainly focused on DeFi, Supply Chains and Asset Tokenization in general
- Currently Ivan is a managing partner at Attic42 where he helps founders with business strategy & execution, fundraising, networking, investor relations and go to market strategy.



**EMILIJA VUKOVIC, PHD**

- Emilija is one of the Topic Leaders for Blockchain and Digital Healthcare at Agile Dynamics, a global software development consultancy that helps companies transform their business.
- She has over ten years of experience in technology and operations strategy in the blockchain space, and healthcare.
- Her chief interest is in helping clients transform the way they deliver digital transformations; she enables them to use agile ways of working and embrace high performance practices to quickly and efficiently develop higher-quality solutions.
- Emilija also supports clients as they shape their strategic ambitions for Blockchain, ensuring they focus on valuable use cases with higher chances of success, as well as helping them deliver scalable propositions.



**PAUL LALOVICH, MSC**

- As a Business Architect (CBA)<sup>®</sup> who successfully led and supported business design and transformations across a variety of industries, economist by training, and high-tech entrepreneur by background.
- A partner at AgileDynamics.co, Paul led the Organizational Effectiveness and Strategy Execution Practice. He co-founded SyntheticEquity.io to give ecosystem stakeholders access to the growing opportunity presented by Distributed Ledger Technology (DLT) and crypto assets through tokenization of ideas and work.
- Paul worked extensively in the emerging markets of Asia, Europe and The Middle East.



## RESEARCH CONTRIBUTORS



**Vladimir Lelicanin,**  
Chief Technology Officer, MVP Workshop



**Petar Atanasovski,**  
Managing Partner, Attic42 Venture Builder



**Vuksan Simunović,**  
CEO & Co-Founder, Trapesys



**Yasser Alobaidan**  
Chairman, Jawraa



**Jonathan Emmanuel**  
CEO and Founder, Zenith Chain



**Edward Bodmer**  
Subject Matter Expert (SME) Organizational  
Effectiveness and Strategy Execution, Agile Dynamics



**Philipp Kishkovarov,**  
CTO Synthetic Equity



**Olayimika Oyeibanji,**  
DAO Consultant and Crypto Journalist,  
Agile Dynamics Tech



**Soheil Zabihi,**  
Cryptocurrency Consultant, Agile Dynamics Tech



**Ramzi Khoury,**  
Chief Executive Officer, Formulaw



**Franklin Peters**  
Chief Executive Officer, Boundlesspay



**George Petrovic**  
Web3 Knowledge Architect & Consultant,  
Cognizium

# **SECTION 02**

## **BACKGROUND - BLOCKCHAIN TECHNOLOGY OVERVIEW**







## ■ BLOCKCHAIN TECHNOLOGY – OVERVIEW AND USE CASES

### Why Blockchain matters?

In recent times, Blockchain has become highly popular in various industries, particularly in banking, thanks to the growth of Bitcoin. The disintermediation that it provides has brought about many benefits, including efficiency, transparency, cost-effectiveness, data integrity and security.

The «DISRUPT AND INNOVATE - HARNESS THE POWER OF BLOCKCHAIN» study describes the research and development of a layer 1 blockchain protocol that is suitable for the emerging markets of South America, Africa, and Asia. The study assesses the technical suitability, high-level design, adoption approach, economic feasibility, and potential business value of a blockchain solution. The framework provides a comprehensive, high-level, and generic assessment approach that helps in making informed decisions about exploring blockchain technology.

It is estimated that blockchain technology will increase the global gross domestic product (GDP) by

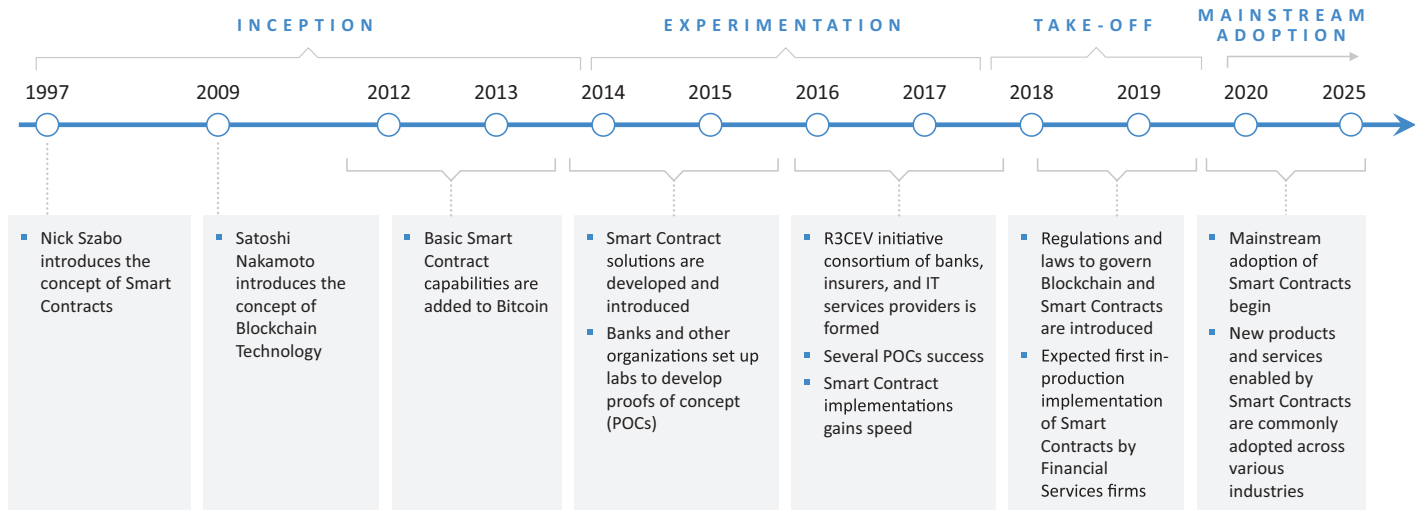
**US\$2.1 trillion**

**2% of the projected global GDP in 2030**



## TIMELINE AND HISTORY OF BLOCKCHAIN TECHNOLOGY

### Evolution of Blockchain and Smart Contract Adoption



The projected adoption mainstream in by the 2025 is based on the thought leadership of many industry experts, startups, and academia.

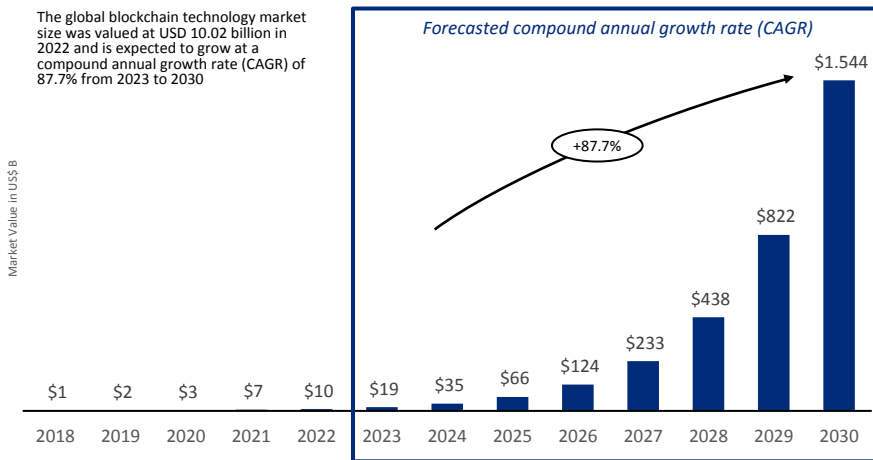


## IN 2023, WE ARE IN THE “MAINSTREAM ADOPTION” PHASE OF SMART CONTRACT ADOPTION

### Evolution of Blockchain and Smart Contract Adoption

Adoption of blockchain technology solutions has achieved massive popularity during the last 2–3 years for various business applications such as payments, exchanges, smart contracts, documentation, and digital identity. Investments by venture capitalists in the blockchain technology increased during the first half of 2022. In 2021, the total capital inflows in the blockchain space were US\$32.1 billion.

The global blockchain technology market size was valued at USD 10.02 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 87.7% from 2023 to 2030



Source: Agile Dynamics Tech research and analysis; Grand View Research, Inc.

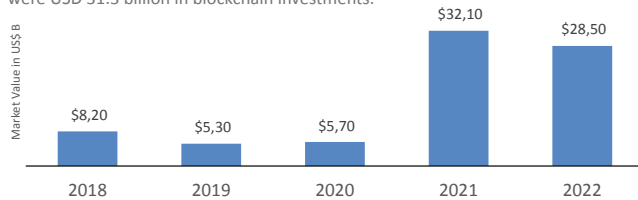
- In the last few years, the blockchain technology has drawn the attention of various stakeholders across verticals. Owing to the increased interest in this technology, various government bodies are investing in research activities to devise blockchain solutions; the government sector witnesses multiple transactions and exchanges for information every day.
- Different government entities across the globe have started adopting blockchain solutions to improve transparency and efficiency in their operations and enhance the overall experience of public service delivery.
- China's efforts to dominate the blockchain technology are highlighted by the volume of blockchain-related patents. Nearly 33,000 patents have been filed by China while the US filed over 10,000 patents. China is accelerating its applications to gain an enduring, first-mover advantage.



## BLOCKCHAIN TECHNOLOGY MARKET SIZE, SHARE AND TRENDS ANALYSIS

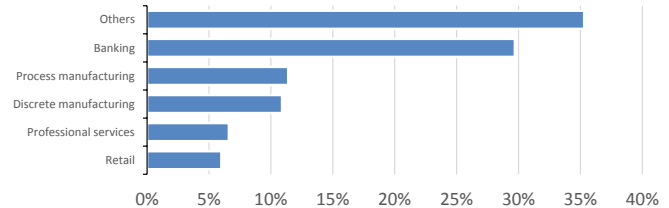
The legalization of cryptocurrency is spurring businesses and investors to invest more in blockchain technology. This has led market players to improve their services to stay competitive and gain a competitive advantage in the market.

Investments by venture capitalists in the blockchain technology increased during the first half of 2022. In 2021, the total capital inflows in the blockchain space were USD 30.5 billion. In 2022, this amount was surpassed by July. The total inflows by July 2022 were USD 31.3 billion in blockchain investments.



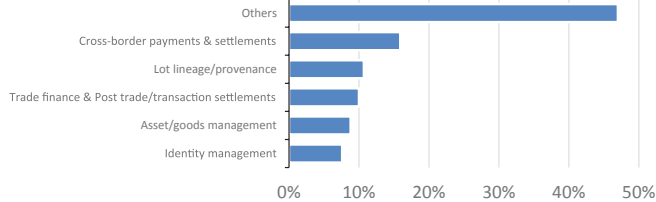
Source: bloomberg.com

The financial services sector continues to dominate the blockchain market in 2022 and accounted for more than 37% of the global blockchain revenue.



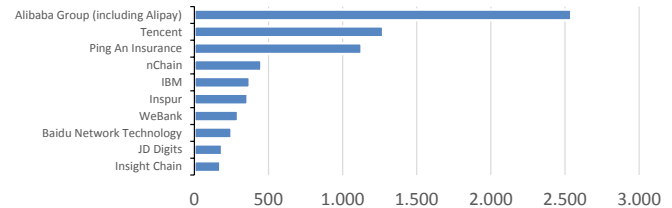
Source: IDC.com

Cross-border payments and settlements remain the most popular use cases for blockchain accounting for more than 15% of the market.



Source: IDC.com

The Alibaba Group (including Alipay) have filed the most blockchain patents (2500+) and are driving innovation in blockchain with Tencent, Ping An Insurance and IBM.

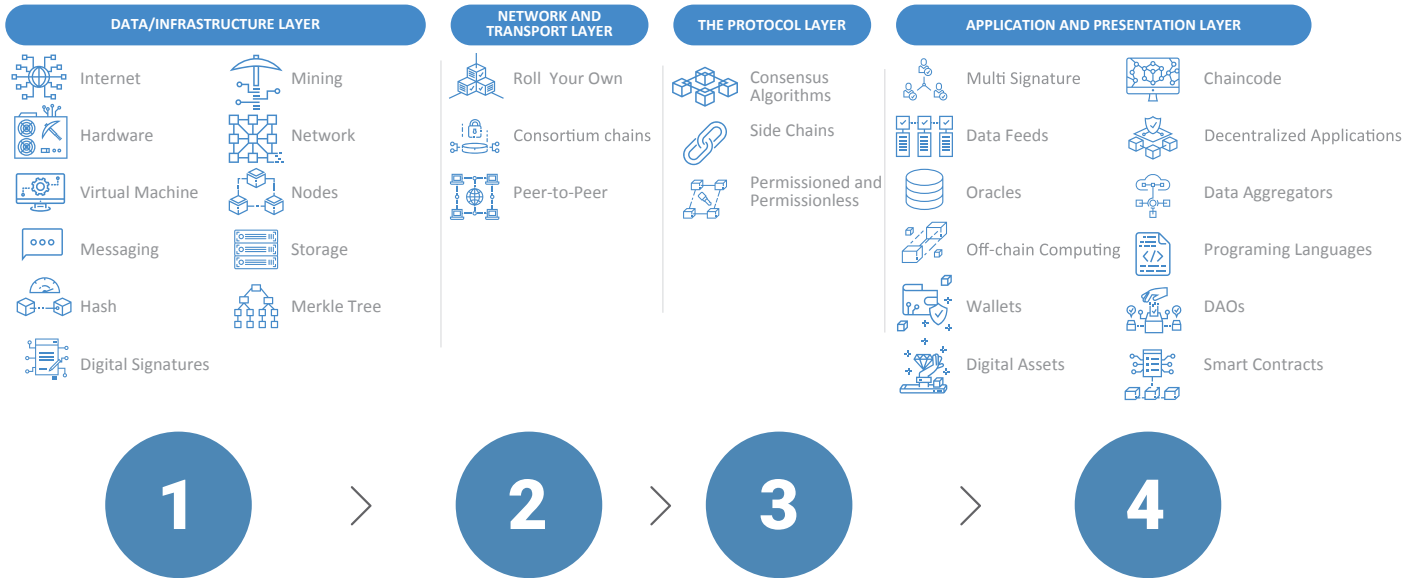


Source: incoPat



## DIFFERENT LAYERS OF BLOCKCHAIN TECHNOLOGY

Blockchain has a unique architecture that makes data securely maintained on a distributed ledger which follows predetermined protocol, that is why it is built by layered design.



Source: Agile Dynamics Tech research and analysis.

# **SECTION 03**

## **THE CONTEXT**





**Growth markets are typically defined as economies that are experiencing rapid economic growth and development. While there is no universally accepted definition of growth markets, the term is often used to refer to emerging economies in regions such as South America, Africa, and Asia.**

Source: Agile Dynamics Tech  
Defining growth markets of South America, Africa and Asia  
Markets increasingly attractive to foreign investors due to their rapidly growing economies and rising global influence



## ■ INNOVATION, ECONOMICAL AND TECHNOLOGICAL SOVEREIGNTY ARE THREE PILLARS OF STRIVING NATION

Technological sovereignty refers to a political perspective that emphasizes aligning information and communications infrastructure and technology with interests of the country.

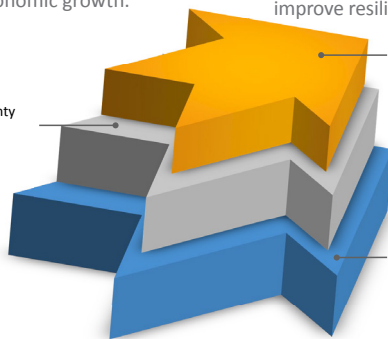
In today's globally interconnected economies, the creation of value and welfare, as well as the provision of public services, rely on the generation and widespread application of innovations.

The central aim of this research is to establish a theoretical foundation for discussion and encourage an informed dialogue on the significance of technology sovereignty. Given the current global challenges such as pandemics, climate change, and interdependent value chains, it is crucial for both nations and organizations to prepare for the future. The idea of technology sovereignty focuses on blockchain technology as a distinct and cost-effective means to stimulate innovation and foster economic growth.

Global prosperity relies on a division of labor across industries and technologies, international trade policies that prioritize openness, and scientific networks that transcend national boundaries. Adopting a protectionist stance to achieve technology sovereignty would be ineffective and could ultimately lead to counterproductive outcomes. Instead, it is crucial to implement a system that acknowledges the challenges posed by technology sovereignty, analyzes them with a forward-looking perspective, and is better equipped to handle future adversities. Such a system would not only enhance competitiveness but also improve resilience against external shocks.

### INNOVATION SOVEREIGNTY

- Technologies relevant for sovereignty
- Current criticality of technology
  - Future criticality
  - Vulnerability of the associated sociotechnical system to shocks



**ECONOMIC SOVEREIGNTY**  
Sovereignty in the performance of public duties

**TECHNOLOGY SOVEREIGNTY**  
Basis of technology sovereignty:

- Access to resources
- Current own competencies
- Current access to competencies



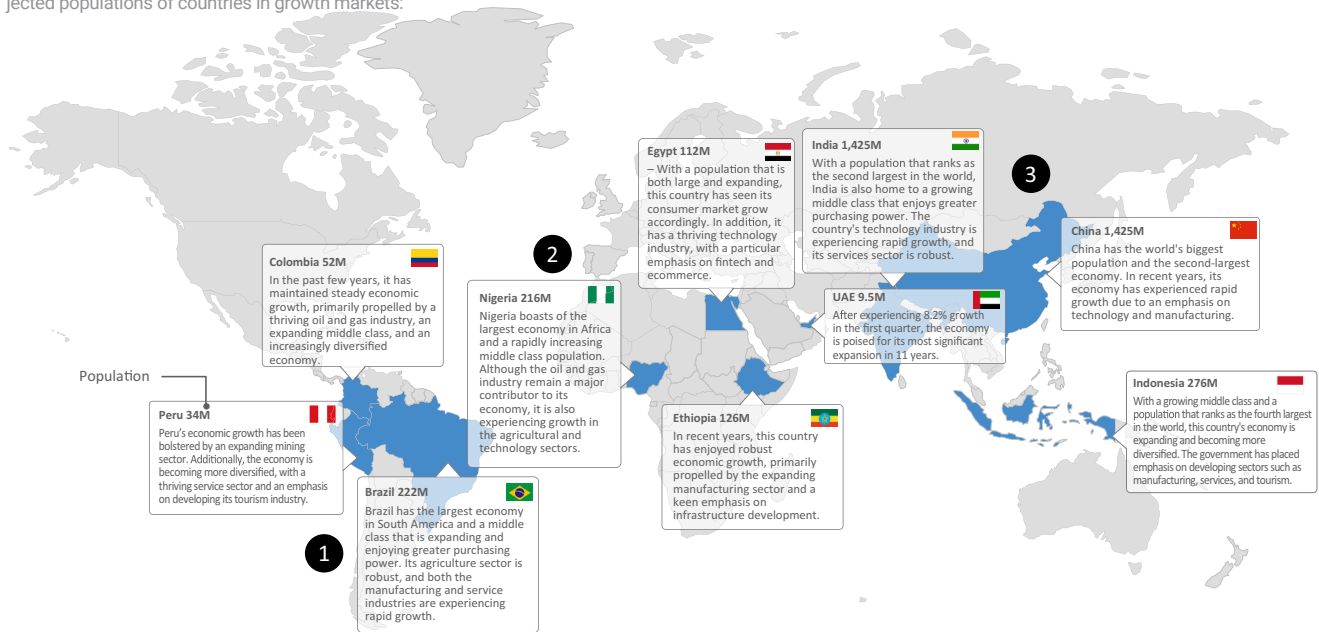




## THE GLOBAL ECONOMY BY 2030 – GROWTH MARKETS ANALYSIS

Studies predict a continual shift of economic power to emerging economies in Asia, Africa, and South America. BRICKS countries (Brazil, Russia, India, China and South Africa) are already generating more combined GDP than G7 countries (France, Italy, Germany, the UK, the US, Japan, and Canada). By 2030, BRICKS is estimated to generate more than 50% of the global GDP.

One of the major reasons for this redistribution of global economic power is the rising population in growth markets. The list below provides the estimated and projected populations of countries in growth markets:

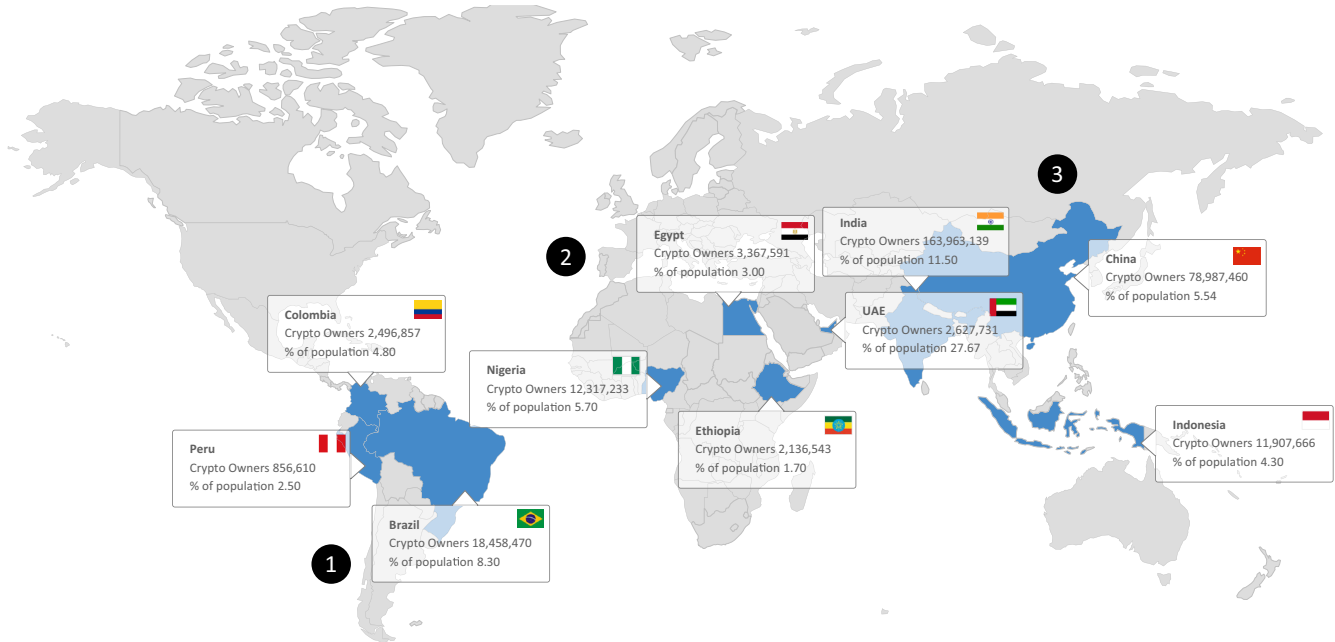


Source: United Nations population estimates and projections; Agile Dynamics Tech analysis.



## GROWTH MARKETS; CRYPTO ADOPTION AS OF TODAY

As of 2023, estimated global crypto ownership rates at an average of 4.2%, with over 420 million crypto users worldwide and this average is 7.5% across the growth markets

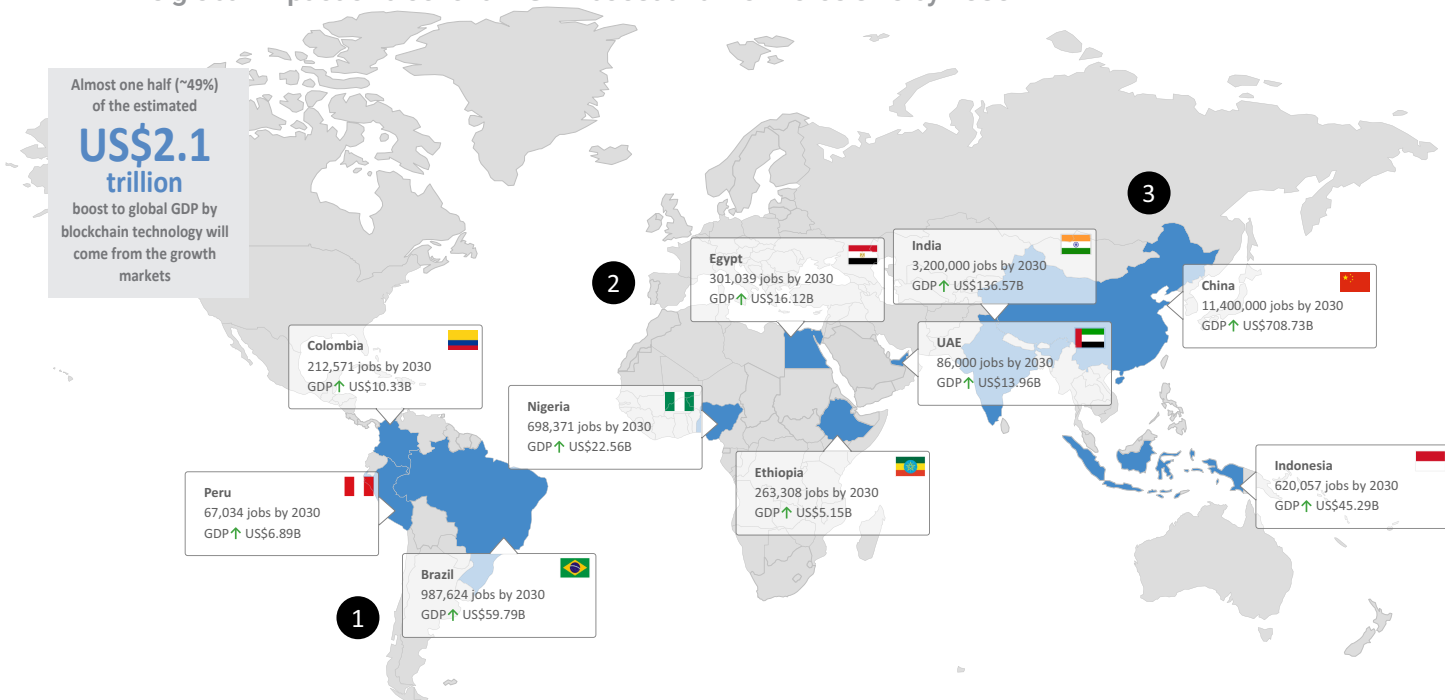


Source: TripleA Global Crypto Ownership data; Agile Dynamics Tech analysis.



## SIZING THE PRIZE IN THE BRAVE NEW WORLD

The global impact of blockchain GDP boost and workforce size by 2030<sup>1,2</sup>



Source: Agile Dynamics Tech research and analysis.



**If Africa, Latin America, and Asia fail to innovate, it is likely that their growth markets will stagnate or even decline over time. Innovation is crucial for economic growth because it drives productivity, creates new industries and jobs, and fosters competition. Without innovation, these regions may struggle to keep up with the rest of the world in terms of technological advancements and could fall behind in global trade and investment.**

Source: Agile Dynamics Tech

Innovate or Die

To be successful in the future, the rate of internal innovation must exceed the rate of external innovation

# SECTION 04

## GLOBAL MEGA TRENDS





## OVERVIEW OF THE TOP BLOCKCHAIN TRENDS OF 2023

Blockchain holds a lot of promise, so many developers work on eliminating the problems, extending the possibilities for its application, and increasing the benefits for investors



Source: Agile Dynamics Tech research and analysis.



## BLOCKCHAIN TRENDS OF 2023

Looking at our broader market and industry we see main 9 trends driving the change



- The ICO concept was criticized for its perceived lack of real value and uncertain regulations, leading to limited profit potential for many investors accustomed to the more established IPO market. Given the potential for market manipulation and limited liquidity, cryptocurrency is often viewed as a short-term investment.
- To address these issues, security tokens were introduced. These tokens are based on the concept of programmable equity, which combines the benefits of blockchain with the stake principle. Unlike ICOs, they offer investors more value, such as ownership rights and passive income in the form of dividends. As entrepreneurs are familiar with this concept, it has the potential to revolutionize the IPO business by providing greater liquidity and efficiency, combined with round-the-clock access to capital.



- As the Technology-as-a-Service model gains popularity, we can anticipate a rise in the number of blockchain platforms available as well. In essence, Blockchain-as-a-Service allows customers to leverage all the best features of this technology without having to create their own platform. They can access the cloud, build apps, execute smart contracts, and take advantage of the existing well-developed infrastructure.
- Several providers, including Amazon, have already begun offering BaaS, and we anticipate that more companies will enter this market. For example, a few months ago, Huawei introduced its own Blockchain Service, which allows its clients to use this technology through Huawei Cloud.



- The primary objective of a blockchain consortia is to facilitate productive collaboration among competitors. As the success of any blockchain platform is contingent on its community, involving more members can greatly enhance the relevance of shared data and improve the technical security of the network.
- Blockchain consortia can focus on two main areas: business, which aims to develop and maintain platforms that address specific business problems, and technology, which focuses on creating reusable platforms based on technical standards. Some consortia, like R3, can incorporate features of both types.



## BLOCKCHAIN TRENDS OF 2023 CONTINUED

Looking at our broader market and industry we see main 9 trends driving the change

**04**  
**FIAT-CRYPTO EXCHANGE**

- The lack of regulations and government support for cryptocurrency transactions has undermined confidence in their use. Although some countries, such as China and Ecuador, are experimenting with launching their own digital currencies, most governments do not support the development of cryptocurrencies, which limits their application outside the digital world.
- While fiat currencies still dominate in most countries, the most effective approach is to create a digital link between the fiat and crypto worlds. Fiat-crypto exchange is increasingly necessary across various industries that seek to expand their possibilities. Hybrid models also hold promise for real-world applications, such as land registry and the voting process.

**05**  
**ALTERNATIVE ASSET  
TOKENIZATION CLASSES**

- Asset tokenization involves the conversion of high-value assets, such as real estate or commodities, into tokens that can be exchanged on the blockchain.
- This shift from cryptocurrency to real-based digital assets has the potential to be a game-changer for small to medium-sized enterprises, as it provides them with broader market access. By leveraging the power of blockchain technology, these companies can attract more investors and benefit from the high liquidity and transparency of exchanges.

**06**  
**DATA MARKETPLACES**

- The growing use of AI requires high-quality user data, which can be difficult to obtain. To meet this demand, communities are proposing the concept of a «data marketplace,» a blockchain-based platform where individuals can sell their personal data for financial gain. One of the primary principles of blockchain is that data cannot be deleted or altered from the network, making such an environment secure and eliminating risks of leaks and other privacy violations.





## BLOCKCHAIN TRENDS OF 2023 CONTINUED

Looking at our broader market and industry we see main 9 trends driving the change

**07**  
**DECENTRALIZED ECOSYSTEMS**

- While B2C businesses typically find it relatively easy to transition into the digital world, B2B companies may face a slower pace of digitalization. Blockchain technology can assist B2B companies by enabling the creation of complex ecosystems, such as B2B2C, using smart contracts. This can facilitate efficient peer-to-peer transactions and allow competitors to collaborate and construct new business models. Such systems require the creation of a business governance model that guarantees equal rights for all ecosystem players to prevent monopolization.

**08**  
**BLOCKCHAIN INTEROPERABILITY**

- Blockchain interoperability refers to the ability to share information across different systems, making them more practical and efficient. Since no single platform can address all blockchain needs, developers can create powerful multi-channel solutions by leveraging the capabilities of different networks. Some platforms are already working on such communication, with Blocknet being an example of a solution that effectively connects nodes from different networks.

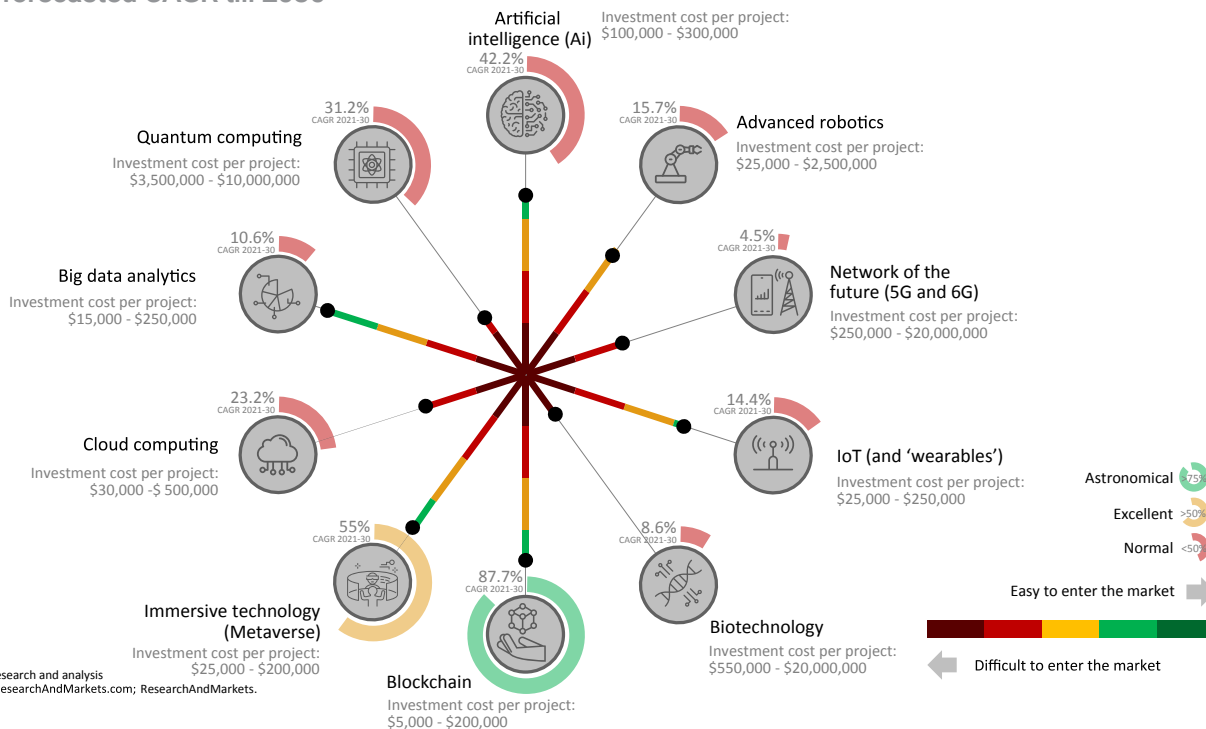
**09**  
**BLOCKCHAIN TECHNOLOGY FOR IoT**

- IoT technology still faces security and data assurance challenges. Blockchain technology can help overcome these issues by establishing a secure framework for data exchange between IoT devices. Furthermore, an IoT-enabled blockchain can enhance consumer data management by giving users more control over the information they share.



## TEN GAME CHANGING TECHNOLOGIES SHAPING THE WORLD IN 2023 AND BEYOND

Blockchain is more cost-effective than any other technology for building out your project, and having the highest forecasted CAGR till 2030



Source: Agile Dynamics Tech research and analysis  
 Additional resources include: ResearchAndMarkets.com; ResearchAndMarkets.

# **SECTION 05**

## **USE CASES MAPPING**





## ■ TO DEVELOP AN EFFECTIVE BLOCKCHAIN STRATEGY, WE MUST FIRST EVALUATE PAIN POINTS THAT BLOCKCHAIN CAN TRULY ADDRESS

### Blockchain Technology – Use Cases



Before developing an effective blockchain strategy, it's essential to identify specific pain points that blockchain technology can address. This involves a deep analysis of the potential value and overall feasibility of a particular blockchain use case.

- Organizations looking to implement blockchain should first investigate pain points that blockchain technology can eliminate for their customers. This investigation helps in the selection of a specific blockchain application that has the potential to generate a solid return on investment.
- Industry attributes and the firm's capabilities also play a role in the decision-making process. By identifying promising use cases, companies can develop their strategies based on their market positions relative to their target use cases.

### HOW AN ORGANIZATION WILL IMPLEMENT BLOCKCHAIN TECHNOLOGY DEPENDS ON THE FOLLOWING TWO FACTORS:



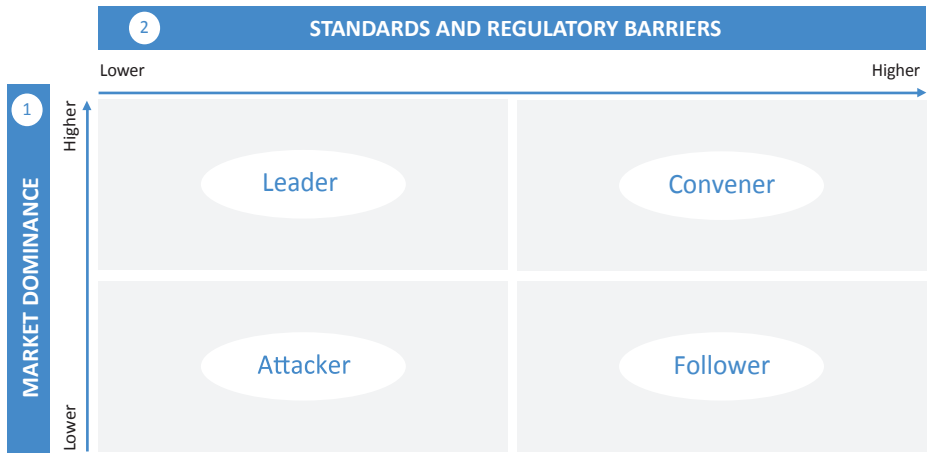
**This approach ensures that the blockchain strategy addresses the most relevant pain points and maximizes the potential return on investment.**



**THERE ARE 4 DISTINCT STRATEGIC APPROACHES TO USING BLOCKCHAIN BASED ON OUR MARKET DOMINANCE AND THE CURRENT STATE OF STANDARDS & REGULATORY BARRIERS**  
Blockchain Strategy – Blockchain Strategies Matrix (1/2)



Organizations striving to implement Blockchain should first investigate true pain points for customers that Blockchain could eliminate.



**BLOCKCHAIN'S NETWORK EFFECTS AND INTEROPERABILITY ARE ITS REAL VALUE.**

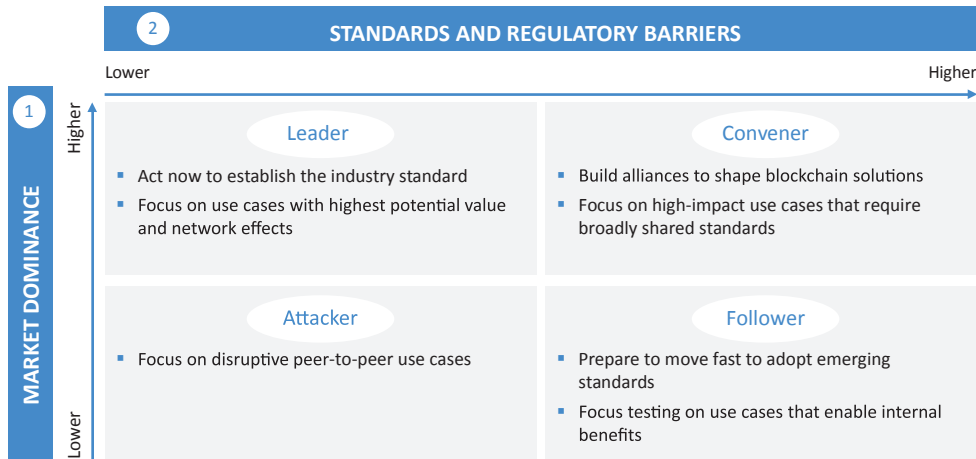
**Blockchain has strategic value for companies by reducing costs as well as the creation of new business models, in the long term.**



**THE BLOCKCHAIN STRATEGIES MATRIX CAN BE USED TO DETERMINE OUR STRATEGIC POSITION—AS A LEADER, CONVENER, ATTACKER, OR FOLLOWER**  
Blockchain Strategy – Blockchain Strategies Matrix (2/2)



Our first step is to determine which quadrant we fall under—whether our organization is a Leader, Convener, Attacker, or Follower.



**All parties should agree on a common standard to achieve this value—after this market standard emerges, investments into the non-dominant standards will have gone to waste.**



## WHEN EVALUATING THE VIABILITY OF BLOCKCHAIN APPLICATION, THERE ARE 8 FUNCTIONAL DIMENSIONS TO CONSIDER

To evaluate the feasibility of implementing blockchain technology, it is necessary to consider various factors, including:



**01**

**ADOPTION COST**


- Consider the costs and workload required to implement blockchain technology before deciding. The expected benefits should outweigh the costs, especially as funding for innovation projects is often limited.



**02**

**CAPABILITY**

- Evaluate what blockchain enables your company to do, whether it unlocks new capabilities to deliver products and services or offers limited benefits.



**03**

**USABILITY**


- Although blockchain has disruptive potential, its adoption hinges on its ease of use. Usability refers to how effectively and efficiently consumers can use a product.



**04**

**INTEGRATION**

- Some key considerations include the challenges of integrating blockchain technology into existing IT systems and processes. Ideally, the integration should be seamless.



**05**

**APPLICATION**

- Analyzing the expansion or contraction of the blockchain technology ecosystem is a critical step in assessing its potential value for a company. This includes evaluating the services provided by leading companies in the space, as well as those offered by complementary businesses. By doing so, a company can determine whether the blockchain ecosystem aligns with its business needs and goals.



**06**

**LEGAL COMPLIANCE**

- The legal implications of blockchain technology can be complex and potentially problematic, causing some organizations to proceed with caution or delay innovation altogether. However, organizations that understand and anticipate these implications can make informed decisions and take calculated risks that provide a competitive advantage over hesitant competitors.



**07**

**INTEROPERABILITY**

- Before adopting blockchain, ensure that it advances the company's competitive advantage. The new technology should complement existing technologies or replace outdated ones while maintaining interoperability.




**08**

**SECURITY AND PRIVACY**

- While increasing connectivity and access to digital services have been beneficial for consumers, there are also increased risks related to security and privacy. Cyberattacks, data breaches, and ransomware attacks can cost companies millions in damages and fines. Therefore, companies must carefully evaluate the security measures and protocols of any blockchain solution they consider implementing to ensure adequate protection against such threats.









**BLOCKCHAIN TECHNOLOGY CAN BE TAILORED TO MEET VARIOUS COMMERCIAL NEEDS AND IS TYPICALLY APPLIED TO ONE OF SIX BROAD USE CASES:**  
Blockchain Use Cases

 Blockchain Technology can be configured in multiple ways to meet the objectives and commercial requirements of a particular application. There is an excess of use cases for Blockchain for companies to choose which opportunities to pursue.

The first step in evaluating whether to use blockchain technology for a particular use case is determining whether there is enough value at stake. Organizations must then thoroughly examine specific problem areas, conducting an in-depth analysis of the potential commercial value while considering the overall feasibility of a blockchain solution.

**THE 6 BROAD CATEGORIES OF BLOCKCHAIN APPLICATIONS INCLUDE:**

 Static Registry	 Dynamic Registry
 Identity	 Payments Infrastructure
 Smart Contracts	 Other

**The above-mentioned use cases address two crucial needs:**



**Record Keeping**  
which involves the storage of static information



**Transactions**  
which involve registering tradeable information

**With a plethora of use cases to choose from, it is important for leadership to understand the intricacies of each component to determine which use case will yield a solid return on investment.**











## NOW, LET'S LOOK AT SPECIFIC EXAMPLES OF BLOCKCHAIN BEING USED ACROSS THESE 6 USE CASE CATEGORIES

### Blockchain Use Cases – Examples



From the numerous possible applications for Blockchain, it's up to an organization's leadership to decide which opportunities to pursue by narrowing down their options. Let's look at specific examples of Blockchain Technology being leveraged across these 6 categories.

 Static Registry	 Identity	 Smart Contracts	 Dynamic Registry	 Payments Infrastructure	 Other
<ul style="list-style-type: none"> <li>• Distributed database for storing reference data</li> </ul>	<ul style="list-style-type: none"> <li>• Distributed database with identity-related information</li> <li>• Particular case of static registry treated as a separate group of use cases due to extensive set of identity-specific use cases</li> </ul>	<ul style="list-style-type: none"> <li>• Set of conditions recorded on a block-chain triggering automated, self-executing actions when these pre-defined conditions are met</li> </ul>	<ul style="list-style-type: none"> <li>• Dynamic distributed database that updates as assets are exchanged on the digital platform</li> </ul>	<ul style="list-style-type: none"> <li>• Dynamic distributed database that updates as cash or cryptocurrency payments are made among participants</li> </ul>	<ul style="list-style-type: none"> <li>• Use case composed of several of the previous groups</li> <li>• Standalone use case not fitting any of the previous categories</li> </ul>



### EXAMPLE

<ul style="list-style-type: none"> <li>• Land title</li> <li>• Food safety and origin</li> <li>• Patent</li> </ul>	<ul style="list-style-type: none"> <li>• Identify fraud</li> <li>• Civil-registry and identity records</li> <li>• Voting</li> </ul>	<ul style="list-style-type: none"> <li>• Insurance-claim payout</li> <li>• Cash-equity trading</li> <li>• New-music release</li> </ul>	<ul style="list-style-type: none"> <li>• Fractional investing</li> <li>• Drug supply chain</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-border peer-to-peer payment</li> <li>• Insurance claim</li> </ul>	<ul style="list-style-type: none"> <li>• Initial coin offering</li> <li>• Blockchain as a service</li> </ul>
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**Leadership needs to understand the nuances of these components to decide which use case will generate a solid return on investment.**



## BEYOND CRYPTOCURRENCY APPLICATIONS, BLOCKCHAIN CAN ALSO BE USED IN BANKING TO FULFIL KNOW YOUR CUSTOMER (KYC) PROCESSES AND REGULATIONS

### Practical Example – Know Your Customer (KYC)



#### INDUSTRY OVERVIEW

Apart from its use in cryptocurrency, blockchain technology can also be applied in the banking industry for Know Your Customer (KYC) processes and regulations. KYC is the process of a business identifying and verifying the identity of its customers.



#### KNOW YOUR CUSTOMER

- KYC is used in several industries, but in banking, it is enforced and regulated. In many developed countries, banks are required by law to comply with KYC guidelines.
- The primary goal of KYC is to prevent criminal organizations perform money laundering activities via banks.



#### BLOCKCHAIN APPLICATIONS IN BANKING

- Improve efficiency in the KYC process by reducing duplication and errors in customer information.
- Allow for more seamless compliance with KYC regulations by linking together multiple banks on a shared blockchain network.
- Enable near real-time distribution of encrypted updates of customer information, creating a «single source of truth» for all participating banks.
- Increase security and transparency in the KYC process by storing customer information on a tamper-proof blockchain ledger.
- Help prevent money laundering and other criminal activities by enabling banks to track and monitor customer transactions effectively.



The banking industry has embraced blockchain technology more than any other industry, with a private blockchain network across multiple banks offering numerous process efficiencies, increased compliance, reduced criminal activities, and standardized customer data.



## THE INSURANCE INDUSTRY CAN UTILIZE BLOCKCHAIN TECHNOLOGY TO STREAM PAYMENTS OF PREMIUMS AND CLAIMS

### Practical Example – Insurance Claims



#### INDUSTRY OVERVIEW

Blockchain technology is applied in the insurance industry to simplify and automate payments of premiums and claims. Insurance companies also use blockchain applications to calculate risk and estimate the pricing accordingly.

#### EXAMPLE: CLAIMS HANDLING



#### CHALLENGES IN THE INSURANCE INDUSTRY

- Customers find the claims process complicated and lengthy, and insurance contracts are challenging to comprehend due to their legal language.
- Insurers, on the other hand, are confronting an increasing number of challenges related to tightening regulation and fraud activity. Fake car cash scams alone cost the insurance industry more than \$400 million annually.
- Sharing cross-industry data becomes useful when combating fraud, particularly in cases where claims are made against multiple policies held by different insurance companies.



#### BLOCKCHAIN APPLICATIONS IN THE INSURANCE INDUSTRY

- Streamline the claims process by reducing manual effort and automating asset exchanges using smart contracts.
- Increase transparency and reduce fraud in the insurance industry by storing claims and customer data on a tamper-proof blockchain ledger.
- Improve the customer experience by providing a more efficient and responsive claims process.
- Enable cross-industry sharing of data to combat fraud when claims are made against multiple policies held by different insurance companies.
- Reduce costs for registration body and insurance companies by eliminating the need for intermediaries.



A Blockchain network that is accessible to all players in the insurance industry would lead to a more efficient, automated and streamlined process for both insurers and customers. Storing claims and customer data on the Blockchain could also significantly reduce, if not completely eliminate, instances of insurance fraud.



## IN THE PUBLIC SECTOR, WE CAN USE A BLOCKCHAIN NETWORK TO STORE AND MANAGE THE HOUSING ASSET REGISTRY

### Practical Example – Public Sector



#### INDUSTRY OVERVIEW

The public sector is characterized by its vast size and fragmented nature, with its organizational structure, systems, and data separated from one another. This provides an opportunity for Digital Transformation initiatives, particularly those involving blockchain technology, to tackle inefficiencies in current systems and enhance the efficiency of public service delivery. By creating a blockchain network, back-office functions can be coordinated and streamlined across departments, agencies, and other governmental bodies.

#### EXAMPLE: HOUSING ASSET REGISTRY



#### THE EXISTING CHALLENGES IN THE PUBLIC SECTOR INCLUDE

- All property and land and related purchases must be registered with the appropriate public sector body.
- Information about property ownership is limited to the central asset registry managed by the public sector, which can be inconvenient for buyers and sellers.
- Keeping track of the numerous property transactions that accumulate over time can be very costly.
- The housing market is vulnerable to various types of property fraud, including the use of forged documents to transfer property ownership or take out a mortgage on someone else's property.
- Detecting property fraud is challenging, and the burden of detection falls on all parties, including homeowners, the government, solicitors, and mortgage lenders.



#### BLOCKCHAIN APPLICATIONS IN THE PUBLIC SECTOR

- Improve transparency and efficiency in the housing market by using a blockchain network to store and manage the housing asset registry.
- Reduce property fraud and disputes over property ownership by storing all property assets on a tamper-proof blockchain ledger.
- Increase efficiency by combining systems and data sources across different departments, agencies, and governmental bodies.
- Enable automation of asset exchanges using smart contracts.
- Reduce costs for registration bodies by eliminating the need for intermediaries.



Storing all property assets on a blockchain network offers more than just process efficiencies by merging systems and data sources. It can also minimize property fraud, enhance transparency of transaction history, and resolve disputes related to property ownership.



**DIGITAL TRANSFORMATION HAS IRREVOCABLY ALTERED THE M&E WORLD—MOST TO THE BENEFIT OF CONSUMERS—BLOCKCHAIN APPS CAN NOW HELP CONTENT PRODUCERS**  
 Practical Example – Entertainment Media



**INDUSTRY OVERVIEW**

The media and entertainment industry has gone through a major transformation during the past two decades, mostly influenced by the digitalization of content. However, challenges persist in areas such as Digital Rights Management and fair compensation for content creators when their materials are used or purchased through legitimate channels. Blockchain technology can help tackle these issues by establishing a direct connection between media and entertainment companies, authors, musicians, videographers, third-party organizations, and consumers.

**EXAMPLE: ROYALTY PAYMENT**



**THE EXISTING CHALLENGES IN ENTERTAINMENT MEDIA INCLUDE**

- Digital technology has brought about significant advancements in the music industry, benefiting customers. However, the increasing complexity of these technologies has reduced transparency for artists, making it difficult for them to determine their earnings.
- The music industry has always been highly intermediated, with several players such as record companies, music labels, agents, and managers.
- The introduction of new digital technology companies, such as streaming services and MP3 download companies, has further complicated the industry’s ecosystem.



**BLOCKCHAIN APPLICATIONS IN MEDIA AND ENTERTAINMENT**

- Provide more transparency and control for artists over how their content is used and paid for by storing original digital music files and information about artist compensation on a tamper-proof blockchain ledger.
- Prevent copyright theft and illegal file-sharing by using blockchain technology to track and verify ownership of digital content.
- Enable independent artists to sell their content directly to consumers.
- Alleviate global royalty payment and licensing problems by providing a transparent and secure platform for music distribution.
- Improve the customer experience by providing a more streamlined and efficient process for purchasing and accessing digital content.



The use of blockchain technology in legally acquiring music will have little impact on the consumer. However, the music industry and artists stand to gain significant benefits. By utilizing blockchains, artists can have greater transparency and control over how their content is used and compensated.



## BLOCKCHAIN TECHNOLOGY CAN COMPLETELY TRANSFORM THE ENERGY TRADING INDUSTRY—REPLACING THE TRANSACTION PLATFORM ITSELF WITH A SUPERIOR ONE

### Practical Example – Commodity Trading



#### INDUSTRY OVERVIEW

Commodity trading involves many complex and expensive back-office processes, including trade confirmations, volume actualization, and reconciliations. Blockchain technology can address these challenges by enabling all parties involved in a transaction to have access to the same transaction record through a distributed ledger. This would revolutionize the entire deal life cycle by reducing the need for human involvement from trade execution to payment.

#### EXAMPLE: ENERGY TRADING



#### THE EXISTING CHALLENGES IN COMMODITY TRADING INCLUDE

- Energy trading suffers from inefficiencies due to intermediaries and complex processes, which slow down the exchange of critical data.
- Increased demands for data reporting, transparency, and dissemination are driving up costs for firms in the energy trading industry.
- Compliance with numerous regulatory reporting requirements, including EMIR and MiFID II, is a challenge for companies operating in this sector.



#### BLOCKCHAIN APPLICATIONS IN COMMODITY TRADING

- Reduce costs and increase efficiency in commodity trading by providing a highly secure, low-cost, and efficient transaction platform using blockchain technology.
- Improve availability and reliability of data by enabling all parties involved in a transaction to access the same verification transaction record through a distributed ledger.
- Reduce credit risk and transacting capital requirements by minimizing human intervention from trade execution to payment.
- Facilitate regulatory reporting requirements, such as EMIR and MiFID II.
- Reduce risk of fraud, error, and invalid transactions by providing a tamper-proof blockchain ledger for all commodity trading transactions.



The energy trading industry, which currently relies on intermediaries such as brokers, exchanges, price reporting agencies, and clearing houses, is set to undergo a major disruption. While the benefits of this disruption are numerous, the current way of conducting business will be completely transformed. End-users will be able to transact directly with suppliers, which means that the role of the energy trader will no longer be necessary. This will be a significant change for the industry, but it is expected to bring about greater efficiency and cost savings.



## ENTERPRISES CAN UTILIZE BLOCKCHAIN FOR SAFE DATA TRANSFER AND MANAGEMENT

### Blockchain Applications in Managing A Virtual Data Room



#### INDUSTRY OVERVIEW

Blockchain and smart contracts can be used in managing a virtual data room and can help companies streamline workflows, improve security, and increase transparency in their data storage and management processes.

#### EXAMPLE: MANAGING A VIRTUAL DATA ROOM



#### DATA ROOMS

- Data rooms have been a staple of the business world for decades. They've evolved from simple repositories into sophisticated solutions that offer real-time collaboration, data security, and more.
- But there are still risks associated with data rooms. Centralized storage is prone to security vulnerabilities and data breaches, and enterprises often don't employ best practices in managing the data they store in their data rooms. This can lead to massive leaks of sensitive information—and it's a problem that isn't going away anytime soon.
- "Data rooms are a goldmine for hackers," said an industry expert. "It's like getting a list of all your company's trade secrets."



#### BENEFITS OF BLOCKCHAIN

- Blockchain technology is a revolutionary technology that can be used to improve the efficiency of business processes, reduce costs and risk, and increase transparency.
- The immutability of the blockchain also allows for the tracking and recording of all data transactions, ensuring accountability and reducing the risk of data leaks at a reduced cost.
- By using decentralized ledgers, participants can store documents securely and keep a record of their activities. The VDR can be used for a variety of purposes including: secure storage, record keeping and management risks.
- Using smart contracts to automate the VDR deployment and management process will ensure compliance with industry standards while reducing risk through automation.



Blockchain technology can offer significant benefits for virtual data rooms in terms of security, transparency, and efficiency. By storing documents on a decentralized ledger, companies can reduce the risk of data breaches and improve the security of sensitive information.

# **SECTION 06**

## **THE TECHNOLOGY**











## ■ BLOCKCHAIN VALUE DRIVERS – OVERVIEW

Blockchain technology has four main value drivers:

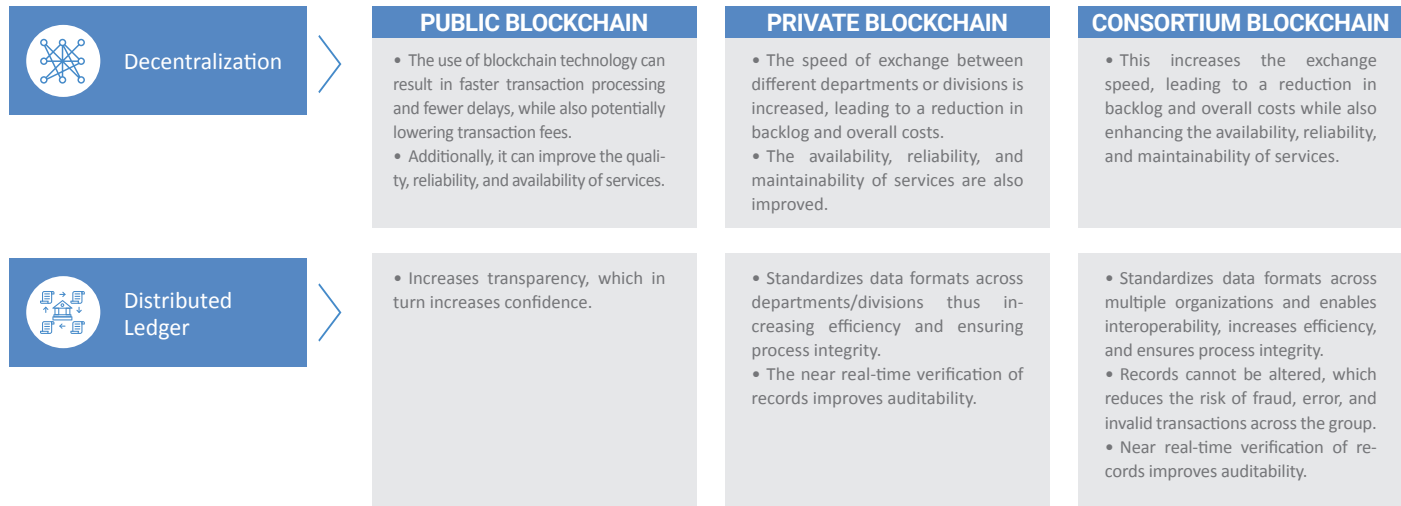
 Decentralization	<ul style="list-style-type: none"><li>• A blockchain is digitally distributed across many computers in close to real-time, and new blocks are added by the network only once a majority of participants agree it's valid. This increases confidence, transparency, and auditability.</li></ul>
 Distributed Ledger	<ul style="list-style-type: none"><li>• A blockchain uses cryptography and digital signatures to prove identity, and transactions can be traced back to cryptographic identities, which are theoretically anonymous. This also makes the blockchain unforgeable.</li></ul>
 Programmable Logic	<ul style="list-style-type: none"><li>• A blockchain is programmable, meaning it has instructions embedded within blocks. This allows transactions or other actions to be carried out only if certain conditions are met and can also be accompanied by additional data.</li></ul>
 Digital Signatures	<ul style="list-style-type: none"><li>• The blockchain technology utilizes cryptography and digital signatures to verify identity. Transactions can be tracked back to cryptographic identities that are considered anonymous. This makes the Blockchain tamper-proof and unforgeable.</li></ul>

**A blockchain makes it difficult—although not impossible—to change historical records.**



## THE VALUE PROPOSITION IS DEPENDENT ON THE TYPE OF BLOCKCHAIN NETWORK

### Blockchain Value Drivers – Decentralization and Distributed Ledger





## THE VALUE PROPOSITION IS DEPENDENT ON THE TYPE OF BLOCKCHAIN NETWORK

### Blockchain Value Drivers – Programmable Logic and Digital Signatures

	PUBLIC BLOCKCHAIN	PRIVATE BLOCKCHAIN	CONSORTIUM BLOCKCHAIN
Programmable Logic	<ul style="list-style-type: none"><li>• Stipulates the enforcement of transaction criteria.</li></ul>	<ul style="list-style-type: none"><li>• Supports the additional of new capabilities to existing processes and services.</li></ul>	<ul style="list-style-type: none"><li>• Provides the ability to integrate new capabilities into current services and processes throughout the organization.</li><li>• Ensures strict adherence to collaboration criteria.</li></ul>
Digital Signatures	<ul style="list-style-type: none"><li>• Minimize the risk of theft or fraud.</li></ul>	<ul style="list-style-type: none"><li>• Identifies customers and participating departments/divisions.</li></ul>	<ul style="list-style-type: none"><li>• Identifies customers and all participating organizations.</li></ul>

**A blockchain makes it difficult—although not impossible—to change historical records.**






**PARTICULARLY IN PUBLIC NETWORKS, WE SEE THE VALUE (AND CONTROL) SHIFT FROM THE CENTRAL INSTITUTION TO THE CONSUMER**  
Decentralization –Shift of Value and Control

The fundamental change Blockchain enables is disintermediation. Specifically, it shifts processes from a centralized model to a decentralized model. Through this, value is taken from central institutions and returned mainly to consumers



By empowering the consumer, this may be viewed as a threat to many organizations. In fact, entire industries are founded by upon the business model of acting as the intermediary.

**Blockchain Technology disrupts:**

-  How consumers and companies interact
-  How businesses collaborate with each other
-  Transparency of processes and data

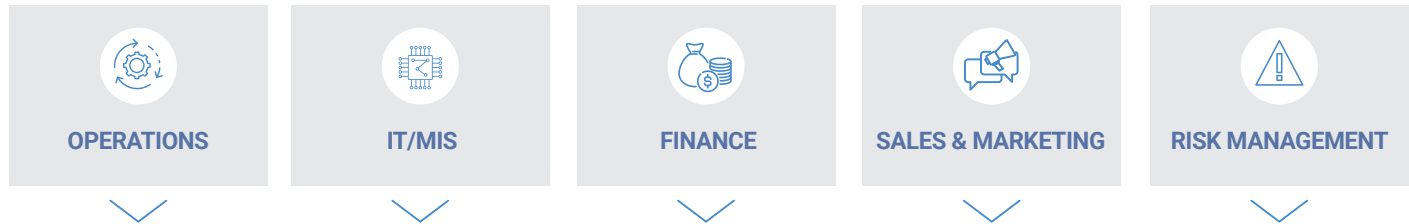
**As the shift in control moves to the consumer, organizations must rethink how they create and capture value.**



**BLOCKCHAIN TECHNOLOGY CAN DRIVE VALUE BY REDUCING COST ACROSS A WIDE ARRAY OF FUNCTIONS—TYPICALLY WITH STRONGEST APPLICABILITY IN OPERATIONS AND IT**

**Potential Cost Savings by Function**

**APPLICABILITY OF BLOCKCHAIN**



**EXAMPLE BLOCKCHAIN APPLICATIONS**

- More efficient data management (e.g. automated regulatory reporting)
- Reduced processing cycles (e.g. collateral tracking)
- Elimination of redundant infrastructure
- More efficient data management (e.g. utilities for reference data)
- Elimination of redundant systems
- More efficient data management
- Reduced reconciliation processes (e.g. single source of truth across risk, finance, etc.)
- Shift to self-service solutions (e.g. reporting, analytics)
- Reduced cost of data handling

**In most organizations, Operations and IT/MIS comprise 30-50% of the cost structure.**



## AS WITH ANY DISRUPTIVE TECHNOLOGY, BLOCKCHAIN OFFERS TREMENDOUS POTENTIAL IN OFFERING STRATEGIC VALUE—WE HAVE IDENTIFIED 3 SUCH INSIGHTS

### Blockchain Technology – Strategic Value



Blockchain technology has the potential to offer significant strategic value due to its many advantages, including decentralization, cryptographic security, transparency, and immutability.

We have identified three key insights into the strategic value of blockchain technology:

In-depth industry analysis, expert and company interviews reveal more than 90 different use cases of varying maturity for Blockchain. Evaluation and analysis of the impact and feasibility of these use cases leveraged better understanding of Blockchain's strategic value and how to capture it.

- 1 Value generation from blockchain technology is not limited to disintermediation
- 2 In the short term, the primary strategic benefit of blockchain is cost reduction
- 3 Achieving feasibility at scale is expected to take 3-5 years

- Existing institutions and multiparty transactions can capture the benefits of reduced transaction complexity and cost, improved transparency, and fraud controls through appropriate Blockchain architecture.
- While Blockchain presents new ways of conducting operations, its immediate effect is to improve efficiency and reduce costs in current processes.
- The strategic value of Blockchain can only be achieved when commercially feasible solutions can be implemented on a large scale. The reason for the long time it takes to reach scale is mainly due to the challenge of resolving the «coopetition» relationship and establishing mutually agreed-upon standards.

**The long time to reach scale is primarily because of the difficulty of resolving the “coopetition” relationship to establish common standards.**



**FOREMOST, BLOCKCHAIN DOESN'T NEED TO BE A DIS-INTERMEDIATOR TO GENERATE VALUE**

Core Strategic Insight



**STRATEGIC INSIGHT**

Blockchain technology can generate value without the need to disintermediate existing systems.



The economic benefits to capture value opportunities are driving companies to harness Blockchain, rather than be overtaken by it.

Private permissioned blockchains, hosted on private computing networks, are likely to be the commercially viable model in the near term, compared to public blockchains like Bitcoin that lack centralized authority and are considered disruptive disintermediation enablers.

Private blockchains enable controlled access and editing rights, allowing businesses to extract commercial value from blockchain implementations. Dominant players can maintain their positions as central authorities or join forces with other industry players to capture and share value. Participants can securely share data while automating control of the information being shared, sharing partner selection, and timing of data sharing.



Private, permissioned blockchains enable unique value propositions to be developed in commercial confidence, with small-scale experimentation before being scaled up. For example, IBM and Maersk Line are partnering to create a Blockchain trade platform to provide users in global shipping transactions with a secure, real-time exchange of supply-chain data and paperwork.

**The degree to which incumbents adapt Blockchain Technology will be the key factor for the scale of disintermediation in future.**



**PRIVATE, PERMISSIONED BLOCKCHAINS OFFER THE HIGHEST LEVEL OF SCALABILITY**

Architecture Options



Commercial Blockchain is likely to use private, permissioned architecture to optimize network openness and scalability.

The potential for Blockchain to become a new open standard protocol for trusted records, identity, and transactions are immense.

True peer-to-peer models can become commercially viable due to Blockchain's ability to compensate participants for their contributions with "tokens" (application-specific crypto-assets) and give them a share in any future rise in value.

**BLOCKCHAIN – ARCHITECTURE OPTIONS**

Architecture based on read, write, or commit permissions granted to the participants

		OPERATIONS	PERMISSIONED
Architecture based on ownership of the data infrastructure	PUBLIC	<ul style="list-style-type: none"> <li>• Anyone can join, read, write, and commit</li> <li>• Hosted on public servers</li> <li>• Anonymous, highly resilient</li> <li>• Low scalability</li> </ul>	<ul style="list-style-type: none"> <li>• Anyone can join and read</li> <li>• Only authorized and known participants can write and commit</li> <li>• Medium scalability</li> </ul>
	PRIVATE	<ul style="list-style-type: none"> <li>• Only authorized participants can join, read, and write</li> <li>• Hosted on private servers</li> <li>• High scalability</li> </ul>	<ul style="list-style-type: none"> <li>• Only authorized participants can join and read</li> <li>• Only the network operator can write and commit</li> <li>• Very high scalability</li> </ul>

**The commercial disruption of the Blockchain model is enormous.**





## TYPES OF BLOCKCHAIN CONSENSUS MECHANISMS

### Consensus Mechanisms



Blockchain consensus mechanisms help guarantee that all nodes on a network are synchronized and its transactions are legitimate. Such consensus mechanisms are necessary for blockchain networks to ensure that every node is connected to the same network and all transactions are regularly verified.

There is currently no single, dependable consensus mechanism for blockchain technology, but the ones that exist have been developed and refined to meet the demands of the technology. It is challenging to predict which type of blockchain consensus mechanism will be popular and effective in the long run, as the technology is relatively new. Blockchain networks cannot use a single consensus mechanism as different expectations are desirable with different blockchain applications.

BLOCKCHAIN – CONSENSUS MECHANISMS				
PROOF OF WORK	PROOF OF STAKE	DELEGATED PROOF OF STAKE	PROOF OF ELAPSED TIME	BYZANTINE FAULT TOLERANCE
The process known as mining, or Proof of Work (POW), involves nodes that solve complex mathematical puzzles that require significant computational power. These nodes, also known as miners, utilize various mining methods including CPU mining, GPU mining, FPGA mining, mining pools, ASIC mining, and others.	Proof of Stake (POS) is a consensus mechanism that uses a randomized process to determine who can create the next block. Users can become validators by locking up their tokens for a specific period. Once a user becomes a validator, they can start creating blocks. Validators can also be chosen based on the blockchain's design. Typically, users with the highest stake or those who have owned coins for a longer time are more likely to create a new block.	In this consensus mechanism, users stake their coins and vote for a set number of delegates, with their voting power being proportional to their stake. For example, if a user stakes 30 coins for a delegate while another user stakes only 3, then the first user's vote carries more weight. The delegate with the most votes is then given the opportunity to create new blocks and is rewarded with transaction fees or a predetermined number of coins.	The Proof of Elapsed Time (PoET) consensus mechanism selects the producer of a new block by randomly assigning a wait time to each user. The user whose wait time finishes the earliest is chosen to produce the block. For this mechanism to work, the system must verify that no user can run multiple nodes and that the wait time is truly random.	Byzantine Fault Tolerance is a characteristic of a distributed network system that enables the recovery of the network if some nodes fail to respond or provide incorrect information. Its primary purpose is to prevent system failure and reduce the number of faulty nodes.

**Every blockchain network cannot use the same consensus mechanism as different outcomes are desirable with different applications.**



## ■ SCALABILITY TRILEMMA

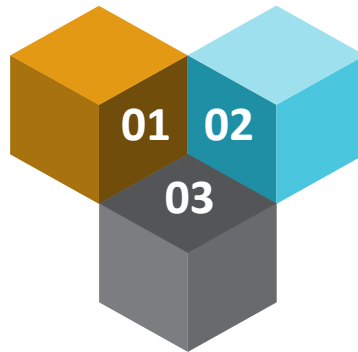
### The Scalability Trilemma



Blockchain technology faces a challenge known as the scalability trilemma. This refers to a situation where three options are available but only two of them can be achieved simultaneously. If the architecture does not overcome this challenge, then the blockchain application is set to fail at some point.

In practice, that means that if a blockchain prioritizes security and scalability at the cost of decentralization, it may resemble the current centralized and secretive systems. To achieve all three options, a fully decentralized network that is both secure and scalable is necessary.

#### The scalability trilemma options in blockchain are:



01

#### SECURITY

Achieving a high level of security is crucial for any piece of the blockchain puzzle

02

#### SCALABILITY

To expand and popularize the blockchain, scalability is of great importance

03

#### DECENTRALIZATION

Blockchain's philosophy puts decentralization at the core of its values

**If the trilemma holds, there are no good situations with just two options being true.**



## BLOCKCHAINS VALUE IN THE SHORT TERM IS IN COST REDUCTION, FOLLOWED BY REVENUE GENERATION, AND CAPITAL RELIEF

Short term value



### STRATEGIC INSIGHT

The main strategic value of blockchain technology is cost reduction of processes. More than 90% of major banks based in Europe, North America and Australia are testing and investing blockchain solutions.

The introduction of new operating models is a potential outcome of blockchain, but its initial impact is to increase operational efficiency by eliminating intermediaries and administrative costs. This allows for the recovery of lost revenues and the creation of new revenue streams for providers of blockchain services.

1. **Finance** – Blockchain can optimize processes such as cross-border payments, regulatory reporting, and trade finance.
2. **The Government Sector** – By using blockchain-based records, banks and governments can more efficiently manage record-keeping and verification functions. This can simplify interactions with citizens while also increasing data security. Additionally, blockchain-based identity records could serve as enabling solutions and standards for the broader economy.



3. **Healthcare** – Blockchain technology can improve healthcare by increasing administrative efficiency and providing researchers with access to historical datasets that do not identify individual patients. The use of smart contracts can also enable patients to have more control over their data, and even have the opportunity to commercialize data access. Additionally, blockchain can be combined with IoT sensors to ensure the integrity of cold chain processes for drugs, blood, and organs.

**Around 90% of major Australian, European, and North American banks are already testing and investing in Blockchain.**



# THE TRUE VALUE OF BLOCKCHAIN WILL ONLY BE REALIZED IF COMMERCIALY VIABLE SOLUTIONS CAN BE DEPLOYED AT SCALE, WHICH IS LIKELY 3-5 YEARS AWAY

Long term value



Even though the adoption of blockchain is significant, feasibility at scale is 3-5 years away due to 4 reasons:

The feasibility of implementing blockchain technology relies on various factors such as the type of asset, the maturity of technology, compliance with standards and regulations, and the overall ecosystem. Realizing the true value of blockchain depends on the successful deployment of commercially feasible solutions at scale.



**Regulations and Standards**

The acceptance of blockchain technology depends on the formulation and wide adoption of standards that will regulate the technology. Any form of cooperation between multiple parties in the blockchain is made simple with global standards and regulations.



**The Technology Requires Further Development**

Blockchain technology is in its development phase. Mass adoption depends on the further development of the technology. Technical configurations such as the size of the block, the consensus protocol for security, and the number of notaries for storage are design choices that can be optimized to make blockchain commercially viable. Although blockchain performance may currently be lower than traditional databases, technological advancements are reducing these constraints.



**Digitized Assets**

Perfecting the process of digitizing the potential of an asset will be crucial for the viability of blockchain technology. Assets need to be easily digitized, transacted, and managed in blockchain. The potential for digitization of the asset, such as securing physical goods on blockchain, may require enabling technologies like IoT and biometrics. However, although the blockchain record is typically immutable, the connection to the physical item or IoT sensor can still be at risk, posing a challenge to the security of the blockchain ledger.



**Cooperation**

To implement a blockchain application for digital media, it requires extensive coordination among multiple producers and consumers of digital content, who may have conflicting interests but must work together. Resolving the "coopetition paradox" or the need for cooperation between competitors to achieve mutually beneficial outcomes, is crucial for blockchain's widespread adoption.

**Blockchain feasibility depends on the type of asset, technology maturity, standards and regulations, and the ecosystem.**

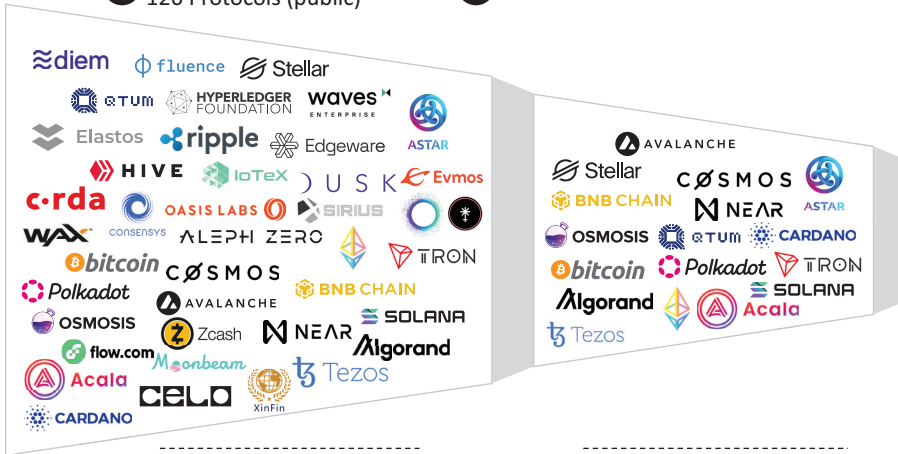


## HOW WE ARE STRUCTURING LAYER 0 AND 1 BLOCKCHAIN PLATFORMS COMPARISON (BPC) REPORT

**1 We start with a longlist:**  
126 Protocols (public)

**2 Shortlist:** 40 Protocols (public)

**3 Benchmark Coverage:** 10 Protocols (public)



The world of blockchain is growing with each passing day. With each generation of blockchain, there are new and improved features that help it to improve its performance as well as its scalability. The first generation of blockchains lacked the feature of smart contracts, which is a major factor in the growth of P2P networks for successfully implementing them in our businesses. Similarly, other factors like interoperability and performance is better in the third blockchain generation. This is why it is important that we do a tabular and comprehensive comparison of different blockchain platforms to understand their features and the growth of P2P networks for successfully implementing them in our businesses.

With this background, we analyze a select set of platforms. We compare and contrast them across their technical designs, their blockchain and ecosystem data, and the individuals and organizations behind them. Finally, we use these comparisons to draw insights into what the future of the broader smart contracting platform landscape could look like

- **Long List of 126 Protocols (public) will be considered in the selection process**
- **Input criteria:**
  - Ecosystem Growth Metrics
  - Ecosystem Properties
  - Performance Stack

- **Shortlisted by applying a filtering mechanism reflecting:**
  - Total Value Locked (TVL)
  - Total Active Users
  - Technical Metrics
  - Technical Properties



## COMPARATIVE ANALYSIS THE TOP 10 LAYER 0 AND 1 PROTOCOLS (PUBLIC)

Check out the table given below for an in-depth comparison of the blockchain protocols

Protocols/Parameters	<b>bitcoin</b>	<b>SOLANA</b>	<b>BNB CHAIN</b>	<b>NEAR</b>	<b>Polkadot</b>	<b>CARDANO</b>		<b>COSMOS</b>	<b>AVALANCHE</b>	<b>TRON</b>
Website	<a href="http://www.bitcoin.org">www.bitcoin.org</a>	<a href="http://www.solana.com">www.solana.com</a>	<a href="http://www.bnbchain.org">www.bnbchain.org</a>	<a href="http://www.near.org">www.near.org</a>	<a href="http://www.polkadot.network">www.polkadot.network</a>	<a href="http://www.cardano.org">www.cardano.org</a>	<a href="http://www.ethereum.org">www.ethereum.org</a>	<a href="http://www.cosmos.network">www.cosmos.network</a>	<a href="http://www.avalabs.org">www.avalabs.org</a>	<a href="http://www.tron.network">www.tron.network</a>
Brief (Marketing) Description	The Bitcoin blockchain is the underlying technology used by Bitcoin.	Solana is an ultra fast blockchain platform for DApps.	A high-performance blockchain designed for the Binance ecosystem.	A sharded, developer-friendly blockchain for DApps.	A sharded blockchain network enabling multiple blockchains to interact with one another.	A blockchain platform designed for smart contracts and DApps.	The pioneer open-source blockchain for smart contracts and DApps.	An interoperable network for interconnected blockchains and services.	A high-performance blockchain platform offering scalable and customisable solutions.	Protocol delivering a high-performance, scalable, and secure infrastructure for dapps and digital content distribution.
Blockchain Generation	1st	3rd	3rd	3rd	3rd	3rd	2nd	3rd	3rd	3rd
Currency	BTC	SOL	BNB(Binance Coin)	NEAR	DOT	ADA	Ether or ETH	ATOM	AVA	TRX
Consensus Mechanism	Proof of Work (PoW)	PoH (Proof of History)	Tendermint Byzantine Fault Tolerance (BFT)	POS (Nightshade)	Nominated Proof-of-Stake (NPoS)	Ouroboros proof-of-stake (PoS)	Proof of Stake (PoS) (Ethereum 2.0)	Tendermint (BTF)	Avalanche	Delegated Proof of Stake(DPoS)
Consensus Energy Consumption	High	Low (3,290 Joules per transaction)	Low (Data unavailable)	Low (Energy efficient)	Low (Not 100% energy efficient)	N/A or low	Low (Energy efficient)	Relatively low	Highly energy efficient	Highly efficient
Block Time	10 Minutes	400 Milliseconds	3 Seconds	5 Seconds	6 Seconds	20 seconds	12.15 seconds	1 second	5 seconds or less	3 seconds
Programmability	Limited	Solana supports Rust, Go, C and C++	BNB Chain supports Solidity	Programmable (Rust)	Programmable (Substrate)	Programmable (CSL & CCL)	Programmable (Solidity)	Programmable (Cosmos SDK)	Programmable (AvalancheX,EVM,etc)	Programmable
Scalability	Limited	60,000 TPS	100 TPS	Highly scalable	Highly scalable	High	High	Scalable(IBC protocol)	1000 TPS	Highly scalable
Upgradability	Conservative	Upgradable (The Solana Upgrade)	Yes	Upgradable	Upgradable	Upgradable (Modular designs)	Upgradable (Hard forks)	Upgradable	Upgradable(In-built)	Upgradable

Source: Agile Dynamics Tech analysis and research.



## COMPARATIVE ANALYSIS THE TOP 10 LAYER 0 AND 1 PROTOCOLS (PUBLIC) CONTINUED

Check out the table given below for an in-depth comparison of the blockchain protocols

Protocols/Parameters	<b>bitcoin</b>	<b>SOLANA</b>	<b>BNB CHAIN</b>	<b>NEAR</b>	<b>Polkadot</b>	<b>CARDANO</b>	<b>COSMOS</b>	<b>AVALANCHE</b>	<b>TRON</b>	
Transaction manageability	Limited (7 TPS)	Massive (60,000 TPS)	High	Flexible gas model	High	High	High	Very high	High	High
Visibility	High	High	High	High	High	High	High	High	High	High
Affordability	High	Cost-effective	Low	Low	Not fixed	Low	Low	Low	Low	High
Security	High	Low	High	Highly secure	Highly secure	Highly secure	High	High	Highly secure	High
Performance	Low	Very High	High	High	High	High	High	High	High	High
High availability	Highly available (Nodes)	Accessible to anyone with an internet connection	High	High	High	Highly available	Highly available	Highly available	Highly available	Highly available (99.999% uptime)
Extensibility	Limited	Yes (Highly Extensible)	Yes (Highly Extensible)	Yes (Highly Extensible)	High	Yes	Yes	Yes	Highly extensible	Extensible
Interoperability	Limited or slow	Yes (Wormhole)	Yes (Binance Bridge)	Yes	Yes	Yes	Yes	Yes (IBC protocol)	Highly interoperable	Highly interoperable
Open source	Yes	Yes	Yes	Yes (GitHub)	Yes	Yes	Yes	Yes	Yes	Yes
Transactions Per Block/Seconds ~	7 per second	13000 TPS	100 TPS	100 TPS with sharding	1000 TPS (Theory)	20 Transactions per block/second	15-45 TPS	High capacity	Around 1000 TPS	2000 TPS

Source: Agile Dynamics Tech analysis and research.



## COMPARATIVE ANALYSIS THE TOP 10 LAYER 0 AND 1 PROTOCOLS (PUBLIC) CONTINUED

Check out the table given below for an in-depth comparison of the blockchain protocols

Protocols/Parameters	<b>bitcoin</b>	<b>SOLANA</b>	<b>BNB CHAIN</b>	<b>NEAR</b>	<b>Polkadot</b>	<b>CARDANO</b>		<b>COSMOS</b>	<b>AVALANCHE</b>	<b>TRON</b>
Deposit Time (by Kraken)	40 Minutes	Extremely fast or instantly	Few minutes	Varies	20 Confirmations	15 confirmations	2-6 Minutes	It varies	60 confirmations	It varies
Transaction Fee/Gas Fee ~	Not fixed	\$0.00025 per transaction.	Not fixed	Not fixed	Not fixed	Very low	Not fixed	Low	Around \$0.001	Low
Level of Decentralization	High	Low	Low	High	High	High	Yes	High	High	High
Smart Contracts	Yes (Scripting language)	Yes	Yes (Solidity)	Yes (Rust)	Yes (Substrate & PRE)	Yes (CCL)	Yes (Solidity)	Yes (CosmWasm)	Yes (AvalancheX)	Yes
Decentralized Apps (dApps)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Decentralized Exchange (DEX)	No	Yes	Yes	Yes	Yes	No	Yes	Yes (Osmosis, Gravity DEX etc)	Yes	Yes
Decentralized Finance (DeFi)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
On-Chain Governance	No	Yes	Yes	Yes	Yes	Yes	Yes (EIPs)	Yes (Cosmos Hub)	Yes	Yes
Human Readable Address	No	Yes (SOL NAMES)	Yes (BCNS)	Yes	Yes	Yes (CNS)	Yes (ENS)	Yes (Starname)	Yes (AVA)	Yes
Digital Identity Management	No	No	No	No	Yes	No	Yes	Yes (IRISnet)	Yes (Atheureum)	Yes

Source: Agile Dynamics Tech analysis and research.





## COMPARATIVE ANALYSIS THE TOP 10 LAYER 0 AND 1 PROTOCOLS (PUBLIC) CONTINUED

Check out the table given below for an in-depth comparison of the blockchain protocols

Protocols/Parameters	<b>bitcoin</b>	<b>SOLANA</b>	<b>BNB CHAIN</b>	<b>NEAR</b>	<b>Polkadot</b>	<b>CARDANO</b>	<b>ETHEREUM</b>	<b>COSMOS</b>	<b>AVALANCHE</b>	<b>TRON</b>
Data Oracles	No	Yes	Yes(Binance Oracle)	Supports Third Party Solutions	Yes	Supports Third Party Solutions	Yes	Yes(ie Band Protocol)	Yes(Chainlink integration)	Yes
Data Privacy	No	No inherent privacy features.	No	Supports Third Party Solutions	No	Yes	No inherent privacy features	Yes(ie Secret Network)	Yes(AvanancheX)	Yes
Distributed Cloud Storage	No	No	Yes (BNB Greenfield)	Supports Third Party Solutions	No	Supports Third Party Solutions	Yes (IPFS & Swarm)	Yes (Airweave)	No	Yes (BitTorrent File System)
Distributed Cloud Computing	No	No	No	Supports Third Party Solutions	No	Supports Third Party Solutions	Yes (Golem & iExec)	Yes (Akash Network)	No	Yes (TRON Virtual Machine)
Interoperability	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes (IBC protocol)	Yes	Yes
Cross/Interchain Communications	No	Solana has a cross-chain communication capability	Yes (Binance Bridge)	Yes (Rainbow Bridge)	Yes	Yes	Yes	Yes	Yes	Yes(JustLink)
Scalability Options	No	Horizontal PoH	Yes	Yes	Yes(Parachains)	Yes	Yes(Rollups & Sharding)	Yes	Yes(sharding,subnets,etc)	Yes
Chains security Model	No	N/A	PoS	PoS	Nominated proof-of-stake (NPOS)	Proof of Stake (PoS)	Proof of Stake (PoS) (Ethereum 2.0)	Proof of Stake (PoS)	Multi-layer	Delegated Proof of Stake (DPoS)
Automated Slashing	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
User Base (Last publicly available data)	190,000,000	160,000	300,000	20,000,000	436,000	70,000+	329,000+	50,000+	4,600,000	117,000,000

\*The data shown in the table were collected from officially available websites and are based on the information that blockchain technology providers show to the public in a certain period of time when the study was made.

Source: Agile Dynamics Tech analysis and research.



## DESIGN FEATURES COMPARISON

Comparison Criteria	CONSENSUS MECHANISMS					ARCHITECTURE OPTIONS		
	Proof-of-Work	Proof-of-Stake	Delegated Proof-of-Stake	Proof-of-Elapsed-Time	Practical Byzantine Fault Tolerance	Public Permissionless	Public Permissioned	Private Permissioned
Energy Efficiency	Very Poor	Good	Good	Very Good	Very Good	Poor	Poor	Good
Latency Performance	Poor	Good	Good	Good	Very Good	Poor	Good	Good
Throughput Performance	Poor	Average	Very Good	Good	Very Good	Poor	Good	Good
Hardware Dependence	Very Poor	Poor	Average	Very Poor	Average			
Centralization	Very Poor	Average	Good	Average	Good			
Scalability (validating nodes)	Good	Very Good	Good	Very Good	Very Poor	Poor	Good	Good
Scalability (client nodes)	Good	Very Good	Very Good	Very Good	Very Good	Poor	Good	Good
Fault Tolerance	Poor	Very Good	Very Good	Poor	Good			
Settlement Finality	Probabilistic	Probabilistic	Probabilistic	Probabilistic	Deterministic			
Incentivization	Yes	Yes	Yes	Yes	No			
Organization Control						Very Poor	Poor	Good
External Transparency						Very Good	Very Good	Very Poor
Immutability						Very Good	Very Good	Average
Consensus Participation						Permission less	Permissioned	Permissioned
Data Accessibility (read)						Public	Public	Private
Data Accessibility (write)						Public	Public	Private
Actor Identities (clients)						Unknown	Unknown	Known
Actor Identities (validators)						Unknown	Known	Known

Source: Agile Dynamics Tech analysis and research.



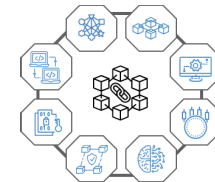
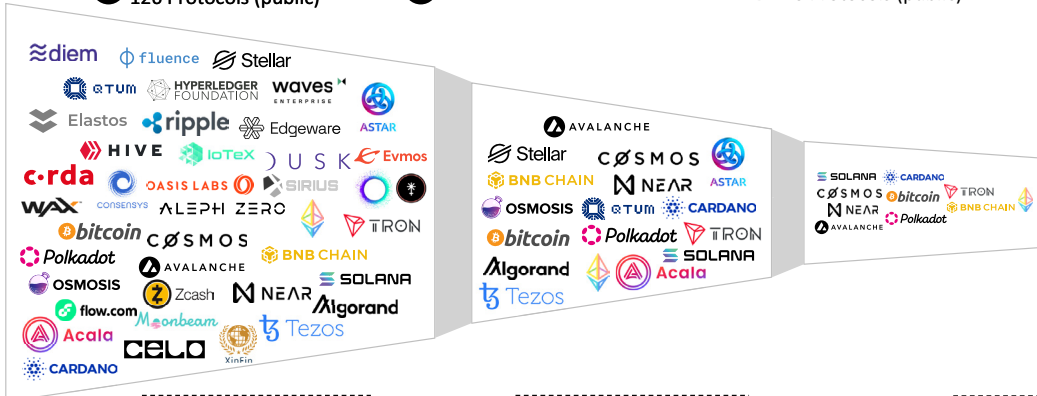
## DEFINING THE DESIGN FEATURES COMPARISON THE NEXT GEN CHAIN

**1 We start with a longlist:**  
126 Protocols (public)

**2 Shortlist:** 40 Protocols (public)

**3 Benchmark Coverage:**  
10 Protocols (public)

**4 The Next Gen Chain:**  
L1 Protocol Fit for Purpose  
designed for the Growth  
Markets



The Next Gen Chain

- Long List of 126 Protocols (public) will be considered in the selection process
- Input criteria:
  - Ecosystem Growth Metrics
  - Ecosystem Properties
  - Performance Stack

- Shortlisted by applying a filtering mechanism reflecting:
  - Total Value Locked (TVL)
  - Total Active Users
  - Technical Metrics
  - Technical Properties

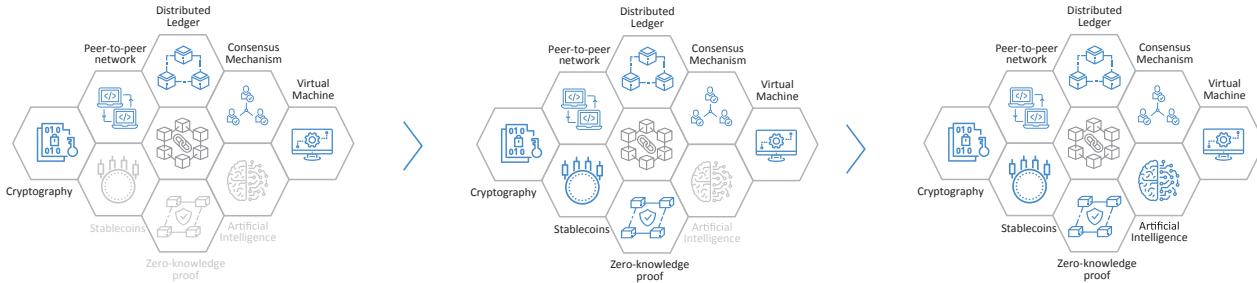
- Design features comparison:
  - Energy Efficiency
  - Latency Performance
  - Throughput Performance
  - Hardware Dependence
  - Centralization
  - Scalability (validating nodes)
  - Scalability (client nodes)
  - Fault Tolerance
- Settlement Finality
- Incentivization
- Organization Control
- External Transparency
- Immutability
- Consensus Participation
- Data Accessibility (read)
- Data Accessibility (write)
- Actor Identities (clients)
- Actor Identities (validators)

Source: Agile Dynamics Tech analysis and research.



## BLOCKCHAIN TECHNOLOGY MATURITY JOURNEY MODEL

The framework below determines the most important areas for future development. There are 3 phrases of blockchain maturity:



### EMERGING BLOCKCHAIN TECHNOLOGY

This marks the inception of blockchain technology during its initial experimental phase. At this stage, blockchain had limited applications and was primarily utilized for cryptocurrency transactions. Common challenges faced by layer 1 in this generation include sluggish performance, lack of support and service level agreements, and unpredictable expenses. This stage of development supports basic features such as:

- An electronic ledger which serves as a database that continuously updates with all transactions.
- A P2P network in which each party can act as both a client and a server.
- The consensus mechanism that establishes rules to synchronize nodes on the peer-to-peer network and agree on which transactions are valid and can be added to the blockchain through smart contracts.
- Cryptography which ensures the security, integrity, and verification of information on the ledger or information transmitted between nodes.

### NEXT-GEN BLOCKCHAIN

In this stage, blockchain technology has gained wider acceptance, and Zero-knowledge proofs (ZKPs) have become a fundamental element of the blockchain network. This adoption of ZKPs can enhance the network's privacy, scalability, security, and verification capabilities, while stablecoins are used to control gas fees. Additionally, this phase introduced 100 professional validators to improve performance. Price stability is achieved through the stablecoin peg, and user experience is enhanced through CSM. This stage of blockchain maturity is characterized by:

- Zero-knowledge proofs (ZKPs) that enhance privacy on the blockchain by enabling users to prove asset ownership without disclosing personal information or details about the asset itself. ZKPs are especially useful in applications where privacy is crucial, such as financial transactions and voting systems.
- ZKPs also improve scalability by allowing certain calculations to be performed off-chain and verified on-chain, which reduces the computational burden on the network.
- Stablecoins help stabilize and predict gas fees, which can be used to incentivize network participants to maintain and secure the blockchain network. Additionally, stablecoins can be utilized to pay for smart contract execution on the network.

### FOURTH GENERATION CHAIN

During this stage, the integration of AI into the blockchain network can help to enhance the efficiency, security, and transparency of blockchain-based applications, making it a core part of the technology. This is the most advanced stage of the maturity where the integration of AI into the blockchain network can help to enhance the efficiency, security, and transparency of blockchain-based applications, making it a core part of the technology.

- AI can be integrated into smart contracts to automate decision-making and contract execution, making the process more efficient and trustworthy.
- AI can be used to analyze large amounts of data on the blockchain to detect patterns and trends that humans may miss.
- AI can be used to improve governance in blockchain networks. For example, AI-powered decentralized autonomous organizations (DAOs) can be used to enable decentralized decision-making and eliminate the need for centralized authorities.
- AI can be used to improve the security of the blockchain network by detecting and preventing cyber-attacks, identifying vulnerabilities, and predicting potential threats.

Source: Agile Dynamics Tech analysis and research.



## THE NEXT GEN CHAIN DESIGN CRITERIA

### Blockchain consensus mechanisms and key characteristics



Design Criteria	Desired Possible Outcome
Energy Efficiency	High
Latency Performance	High
Throughput Performance	High
Hardware Dependence	None
Decentralization	Limited to 100 nodes
Scalability (validating nodes)	High
Scalability (client nodes)	Very Good
Fault Tolerance	High
Settlement Finality	Instant Finality
Incentivization	In fiat or own token
External Transparency	Very Good
Immutability	Very Good
Consensus Participation	Permissioned
Data Accessibility (read)	Public
Data Accessibility (write)	Public
Actor Identities (clients)	Known
Actor Identities (validators)	Known

Source: Ivan Bjelajac; Agile Dynamics Tech analysis and research.



## THE NEXT GEN CHAIN OVERVIEW

A permissionless, decentralized, and scalable blockchain protocol and focused on interoperability challenges



**The Next Gen Chain is a decentralized blockchain protocol designed to provide arguably the fastest and most efficient cross-chain interoperability, speed, scalability, and security. The blockchain is also designed to enable micro-validation and tokenization.**

- With the architectural design of the Next Gen Chain, developers and users alike can seamlessly move crypto assets, data, tokens, etc., across chains securely and at an affordable rate. The Next Gen Chain virtual machine can execute over 100,000 transactions in a second, with lower transaction fees.
- The Next Gen Chain decentralized cross-chain asset transfer solution has created a safer, cheaper, and faster alternative to bridges. It has made cross-chain asset transfers readily accessible and seamless for both developers and end-users. The successful decentralized transfer of assets from an EVM chain to a non-EVM chain and vice versa by The Next Gen Chain has afforded developers the opportunity to build more interoperable applications that work efficiently across different blockchain protocols.
- Security-wise, the Next Gen Chain is protected by mobile proof-of-participation and proof-of-consensus. The blockchain deploys zero-knowledge proof to validate fast transactions without mining or specialist hardware. Additionally, any smart device can participate in the decentralized consensus mechanism.
- The Next Gen Chain comprises initiators, validators, and constructors. Initiators are the nodes that introduce the transactions into The Next Gen Chain network. Their job is to ensure the basic validation for compulsory information before forwarding the transaction for validation. On the other hand, the validators are nodes that can validate the transactions based on account state history. Within the Next Gen Chain ecosystem, active mobile devices possessing limited resources are effectively utilized to fast-track the transaction validation process. The constructors are nodes saddled with the responsibility of synchronizing the global state and creating blocks. For fast and secure transaction validation, the Next Gen Chain creates a minimum of 4 groups of nodes, and the count is directly proportional to the number of active nodes within the network. For more details on the architecture we are happy to share project white paper.

Source: Agile Dynamics Tech.

# **SECTION 07**

## **IMPLEMENTATION CHALLENGES**

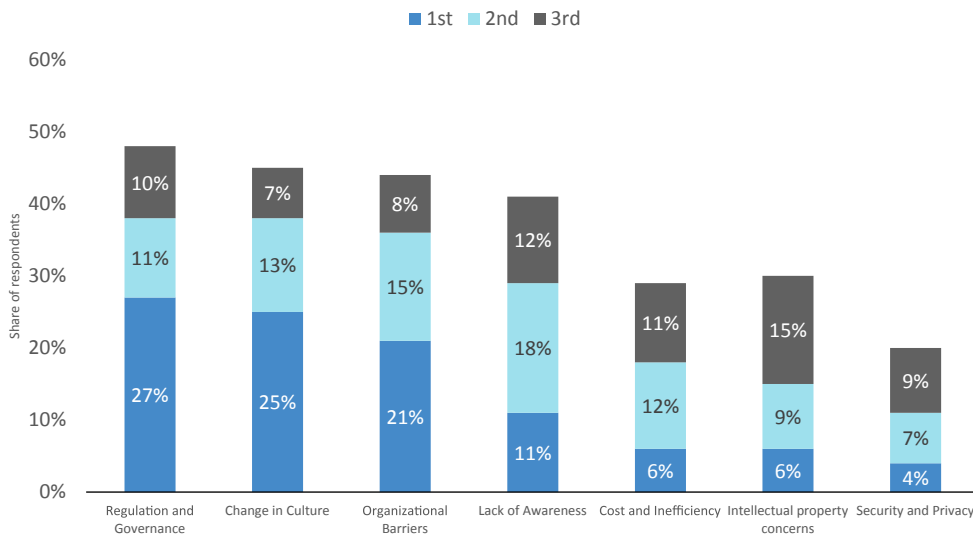




## THE BIGGEST BARRIERS TO BLOCKCHAIN TECHNOLOGY ADOPTION WORLDWIDE

There is a number of barriers to implementation that need to be considered, but not all of them are equally important

Despite the transformative potential of blockchain, there are still barriers to its adoption. Some argue that the technology is still in its infancy and faces limitations, particularly with scalability. This study provides a comprehensive review of the barriers hindering the adoption and integration of blockchain technology to close the knowledge gap.



According to research, regulatory uncertainty is the most frequently cited barrier to blockchain adoption worldwide. About 48% of respondents ranked it as one of the top three barriers affecting their organization in the next three to five years, with 27% ranking it as the number one barrier. Investment costs, security risks, and scalability issues were considered the least significant barriers. Respondents were asked to rank the top three barriers to blockchain adoption that they believed would affect their organization.




Source: Agile Dynamics Tech research and analysis; Grand View Research, Inc.





## THERE ARE CURRENTLY 6 MAIN CHALLENGES THAT FORESTALL BLOCKCHAIN IMPLEMENTATION

### Key challenges of blockchain implementation

 Lack of Awareness	>	Industry leaders still lack awareness of blockchain technology
 Organizational Difficulties	>	Lack of cooperation hinders blockchain adoption and reduces blockchains inherent value.
 Culture Change	>	The adoption of blockchain requires a culture shift from a centralized to a decentralized approach.
 Regulations and Standards	>	Governments have always struggled to keep up with the quick pace of technology.
 Security and Privacy	>	Enforcing strict rules and maintaining the security and privacy of shared ledgers is crucial.
 Cost-Efficiency	>	To become fully efficient, blockchain technology needs to reach a certain level of mass adoption.

**Blockchain Technology implementation is about 80% business process change and 20% technology implementation.**



**IN MOST INDUSTRIES, THERE IS A LACK OF AWARENESS AND UNDERSTANDING OF BLOCKCHAIN TECHNOLOGY**  
Key Challenges – Lack of Awareness

**OVERVIEW**

- Lack of awareness of Blockchain Technology is the primary challenge faced by most industries, with the exception of banking.
- There is a widespread lack of understanding of how this technology works.
- These issues restrict investment and exploration in Blockchain Technology

**KEY QUESTIONS**

- Who is the thought leader on Blockchain Technology within our industry?
- Who do I turn to in my organization to explain Blockchains?
- How do we increase our understanding of Blockchain?
- Is a Blockchain right for our organization?
- How are thinking of applying Blockchain? How would this affect things organizationally and culturally?
- Who do I interact with within our organization to collaborate and deliver a Blockchain solution?
- What are competitors saying about Blockchain?



## ■ BLOCKCHAIN TECHNOLOGY CHALLENGES – LACK OF AWARENESS

Most industry leaders have a lack of awareness of blockchain technology, apart from the banking industry. There is a widespread lack of understanding of how this technology works, which hinders investment and exploration in blockchain technology.

### OVERVIEW

- The value from Blockchain Technology is derived from collaboration—across business units, among different organizations.
- Due to politics, lack of communication, and other organizational barriers, it is often difficult to encourage such collaboration—particularly among competing organizations.
- In fact, in many industries, multiple organizations are developing their own Blockchains and applications—thus reducing the potential of the distributed ledger
- Multiple Blockchains within a given industry will also inevitably lead to a standards war, which is highly inefficient and costly (particular to the losers of the standards war)
- This also stalls adoption from consumers, as they may be unsure which Blockchain Network to adopt

### KEY QUESTIONS

- Who is the expert on blockchain technology in your industry?
- How can you improve your knowledge of blockchain?
- Whom to approach within an organization to gain an understanding of blockchain technology?
- Is blockchain suitable for your organization?
- How to implement blockchain and what would be the organizational and cultural impact?
- What does the competition think about blockchain and have they implemented blockchain to facilitate processes?



## BLOCKCHAIN TECHNOLOGY CHALLENGES – ORGANIZATIONAL DIFFICULTIES

The value of blockchain lies in its ability to facilitate collaboration between business units and different organizations. However, achieving such collaboration can be difficult due to politics, lack of communication, and other organizational barriers, especially when dealing with competing organizations.

This has resulted in multiple organizations developing their own blockchains and applications within the same industry, which reduces the potential of a distributed ledger. This trend may also lead to a standards war that is highly inefficient and costly, particularly for the losers of the standards war. As a result, it can slow down consumer adoption as they may be uncertain which blockchain network to adopt.

### OVERVIEW

- Shifting from centralization to decentralization represents a significant change in culture.
- Resistance is always met when facing change, particularly one of this magnitude that relates to a shift in control.
- This represents a challenge even to industries and organizations that have already embraced Digital Transformation initiatives
- The change in culture is marked by a shift in trust and authority to a decentralized network vs. a powerful, recognized central institution

### KEY QUESTIONS

- Which challenges can blockchain help address in your industry, and are these shared by other organizations?
- What factors could hinder collaboration between your organization and external parties?
- What factors could hinder collaboration among business divisions within your organization?
- Will adopting a blockchain still allow for competition in the market?
- How can you take a proactive role in fostering collaboration in the industry?
- How many organizations in the industry need to adopt blockchain to achieve critical mass?
- What are the necessary standards that should be established in your industry to facilitate collaboration and adoption of blockchain?



## BLOCKCHAIN TECHNOLOGY CHALLENGES – CULTURE CHANGE

Transitioning from a centralized model to a decentralized one entails a major cultural shift. Resistance is commonly encountered during any kind of change, especially one as significant as this, which involves a transfer of control. Even industries and organizations that have already embraced digital transformation initiatives face this challenge. The shift in culture involves a transfer of trust and authority from a powerful, recognized central institution to a decentralized network.

### OVERVIEW

- Blockchains are a productivity paradox, because the redundancy can be perceived as inefficient and significantly increases cost.
- This redundancy is due to each node (or participant) performing the same tasks on its own copy of the data as every other node in the network.
- To realize the efficiency benefits of Blockchain Technology, the network must reach some critical mass of nodes.
- The returns to individual processing nodes may diminish as the networks grows in size
- Thus, the Blockchain applications must harness network effects to deliver value to consumers or to the industry at large

### KEY QUESTIONS

- What are the potential pilot areas for initial blockchain applications?
- Which groups or stakeholders will be most impacted by adopting blockchain?
- Are these groups currently receptive to blockchain technology or innovative technology at all?
- Which parts of your organization are most vulnerable to disruption by adopting blockchain technology?
- How does blockchain affect your strategy, legacy IT systems, organizational structure, talent, business processes, and governance?



## BLOCKCHAIN TECHNOLOGY CHALLENGES – REGULATIONS AND STANDARDS

Technology advancements have often posed challenges to regulatory frameworks. When implementing blockchain applications, it is important to consider existing regulatory structures.

One of the challenges with blockchain is that it can reduce oversight and governance. For example, Bitcoin has been used to bypass regulations and address inefficiencies in traditional payment systems. This also resulted in its use by criminals, leading to scrutiny from regulatory and legislative bodies.

### OVERVIEW

- Regulations have always struggled to keep up with technology advancements.
- Blockchain applications should work within existing regulatory structures.
- However, Bitcoin has bypassed regulation completely to tackle inefficiencies in conventional intermediated payment networks.
- This, however, has led to the usage of bitcoin by criminals, which has attracted the attention of financial regulators, legislative bodies, and law enforcement.
- Another challenge is Blockchain reduces oversight and governance.
- Decentralized networks are less resilient to crises, which increases the risks to consumers.

### KEY QUESTIONS

- What impact do current regulations have on your implementation of blockchain technology?
- What information do regulators need to be aware of regarding your implementation?
- How can you collaborate with regulators to launch your implementation successfully?
- In what areas do the current regulations fall short?
- What additional measures can you take to ensure regulatory compliance beyond the existing regulations?



## BLOCKCHAIN TECHNOLOGY CHALLENGES – SECURITY AND PRIVACY

Unlike Bitcoin, which provides anonymity, many other potential applications of blockchain technology would require smart contracts and transactions to be associated with known identities. This creates concerns regarding the privacy and security of data stored on a shared ledger.

In public networks, issues related to privacy, value, security, and trust are always highly significant. Some technologists argue that no technology can ever be completely secure.

### OVERVIEW

- Unlike Bitcoin which offers anonymity, many other potential applications of Blockchain Technology would require smart transactions and contracts to be linked to known identities.
- This raises the issue of privacy and security of data that is stored on a shared ledger.
- For public networks, the issue of privacy and related concepts of value, security, and trust are always highly prevalent.
- Some technologists argue no technology is completely secure

### KEY QUESTIONS

- How will you ensure the security of your blockchain application?
- Is privacy a key consideration in the design of your blockchain application?
- Who has authorization to access the distributed ledger and what mechanisms are in place to control access to the ledger?
- How are updates to the blockchain application determined and implemented?
- What is your strategy for engaging with customers?

# **SECTION 08**

## **KEY BENEFITS**



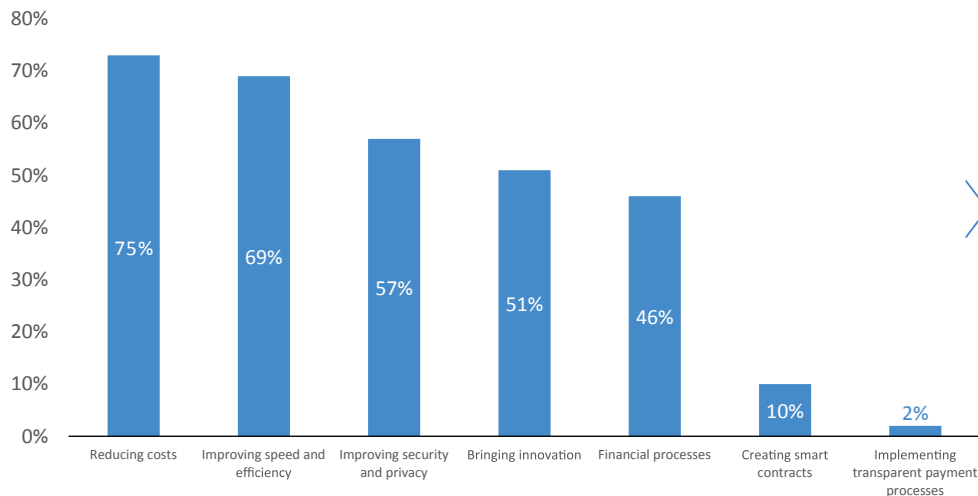




## LEADING BENEFITS OF BLOCKCHAIN TECHNOLOGY WORLDWIDE

73% of respondents indicated a reduction in operational costs would be one of the main advantages

This statistic shows the leading benefits to be derived from blockchain technology, according to a recent survey. At that time, 73 percent of respondents indicated a reduction in operational costs would be one of the main advantages of blockchain technology.



- Two crucial points are critical to keeping in mind before we explore the top 7 benefits of Blockchain.
- First, although sharing the same technological foundation, not all Blockchains perform identically. Larger Blockchains may be rather slow and expensive, while smaller ones with fewer users may be quicker and more efficient.
- Second, Blockchain Technology is a developing field. Whatever benefits it currently supports will inevitably become much more pronounced in the future.
- Blockchain technology offers numerous benefits to businesses and introduces new ways to revamp existing business models while lowering costs, reducing intermediary time consumption, and increasing trust in an ecosystem.

Source: Agile Dynamics Tech research and analysis; n = 800 respondents.



## BLOCKCHAIN TECHNOLOGY – BENEFITS

According to a recent survey, reducing operational costs was indicated by 75% of respondents as one of the main advantages of blockchain technology. However, there are two critical points to consider before exploring the top 7 benefits of blockchain. Firstly, not all blockchains perform identically, as larger ones may be slower and more expensive than smaller ones. Secondly, as a developing field, the benefits of blockchain technology will become more pronounced in the future. Overall, blockchain technology offers numerous benefits to businesses, such as revamping existing business models, lowering costs, reducing intermediary time consumption, and increasing trust in an ecosystem. The top 7 benefits of blockchain are:



**01**

**IMPROVING SPEED AND EFFICIENCY**

- Automation through blockchain technology can also maximize efficiency and reduce human errors. Transactions can be completed in a matter of seconds, significantly reducing the time and resources required for traditional processes. Various industries are exploring blockchain-based systems to solve complex problems and improve inefficiencies.



**02**

**REDUCING COSTS**

- Blockchain technology can result in cost savings by streamlining clearing and settlement processes. Blockchain development firms can assist businesses in saving money by eliminating the need for middlemen (such as vendors and third-party providers) who traditionally provided processing services that blockchain can now handle.



**03**

**INNOVATING**

- Pilot programs allow participating universities to store data about their graduates and their degrees on the blockchain, which authorized hiring managers can access. It is worth noting that blockchain technology is still evolving and will offer even more benefits in the future.



## BENEFITS OF BLOCKCHAIN FOR BUSINESSES

Looking at our target markets we see 7 main trends affecting Blockchain Technology space

**04**

**SMART CONTRACT**

- Smart contracts are the most notable blockchain application for business transformation. A self-executing contract, the terms and conditions of both parties are encoded into the contract and stored immutably on a decentralized blockchain network. As a result, when the contract conditions are fulfilled, the associated codes are automatically executed.

**05**

**TRANSPARENT PAYMENT PROCESSES**

- Blockchain networks have also facilitated collaboration with digital payments and improved cash flow in startups and organizations by eliminating third-party intermediaries and increasing transparency.

**06**

**BUILDING TRUST**

- Blockchains most frequently mentioned benefit is the facilitation of trust, demonstrated in early blockchain use cases by enabling transactions between entities that did not have direct relationships but needed to share data or payments. Cryptocurrencies, particularly Bitcoin, serve as an excellent example of how blockchain builds trust.

**07**

**IMPROVING FINANCIAL PROCESSES**

- Blockchain is a decentralized and immutable ledger that simplifies transaction recording. This feature enhances the security, transparency, traceability, and trustworthiness of financial processes within a business network. The use of blockchain enables users to transfer currency confidently, knowing that the transaction is secure and reliable.



## BLOCKCHAIN TECHNOLOGY BENEFITS – REDUCING COSTS

Organizations leverage blockchain technology to operate more efficiently, reduce costs and the likelihood of errors, risks, capital requirements, and vulnerability to cyber attacks.

A whole range of industries is reducing the costs of business processes.



Governments

- Blockchain technology has the potential to revolutionize government operations and generate significant cost savings by enabling efficient registration and verification functions. In many cases, public data is currently difficult to access and opaque, leading to inefficiencies and potential errors. By leveraging blockchain-based records and smart contracts, interactions with citizens can be simplified and data security can be increased, from birth certificates to tax records.



Health care

- The healthcare industry stands to benefit greatly from blockchain as well, as it can facilitate greater administrative efficiency and provide researchers with access to valuable historical data sets. With blockchain-based healthcare records, patients can have more control over their data and even market access to it with smart contracts.



Financial services

- Blockchains central transformative impact aligns closely with the basic functions of financial verification and asset transfer services. Its solutions have the potential to address current weaknesses in cross-border payments and trade finance by reducing the number of intermediaries required and enabling geographical independence. Furthermore, blockchain-based solutions can bring additional savings in post-trading settlement in capital markets and regulatory reporting.



Supply Chain Management

- The utilization of blockchain technology enables supply chain businesses to exchange and reach consensus on crucial information without the need for intermediaries to facilitate complex negotiations. With the data synchronized across the network in a verifiable manner, complex contract negotiations can be carried out peer-to-peer, eliminating the need for expensive central intermediaries.



## BLOCKCHAIN TECHNOLOGY BENEFITS – IMPROVING SPEED AND EFFICIENCY OF TRADITIONAL PROCESSES


An expanding range of practical applications of blockchain technology in various fields and industries are generating value by increasing the speed and efficiency of traditional processes. Those who want to establish their blockchains as market solutions must invest early to secure future success.

Consider the following use cases:



Trade Finance

- Businesses have long been troubled by the slow and burdensome methods of trade financing, which can disrupt operations and make it difficult to manage liquidity. However, blockchain technology has the potential to streamline trade finance deals and simplify cross-border transactions, allowing enterprises to transact with each other more easily regardless of geographic boundaries.



Peer-to-Peer Transactions

- While P2P payment services are convenient, they often impose restrictions on transactions based on geography or charge usage fees, and their security vulnerabilities are a concern for customers who entrust them with their financial information. By leveraging the benefits of blockchain, these limitations are overcome.



Money Laundering Protection

- Blockchain's encryption capabilities make it a valuable tool in the fight against money laundering. This is due to its ability to facilitate record keeping, which is essential in the "Know Your Customer" (KYC) process. KYC is the practice of verifying the identities of clients to prevent financial crimes such as money laundering.



Cross-border transactions

- Blockchain technology offers a secure and efficient method of creating an immutable record of sensitive activities, making it well-suited for international payments and money transfers. Through automation and the reduction of intermediaries, blockchain can streamline the entire process and improve efficiency.



## BLOCKCHAIN TECHNOLOGY BENEFITS – INNOVATING

The blockchain as a concept is different from the centralized services it can replace. It provides a breeding ground for innovation that can be built on top of existing blockchain technology. It also presents a means to digitize physical assets in a manner never seen before. All of this is driving innovation in growth markets.



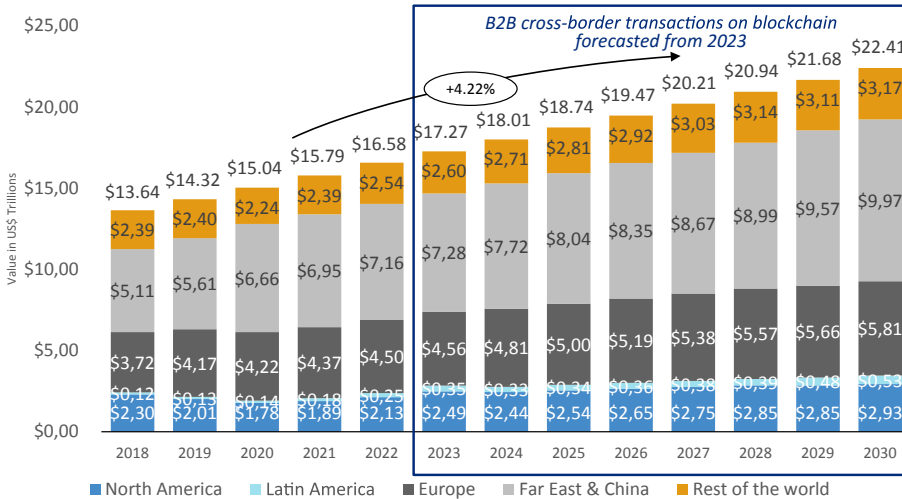
Source: Agile Dynamics Tech analysis and research; Global Innovation Index Database, WIPO, 2022.



## FINANCIAL PROCESSES, A TRILLION-DOLLAR MARKET RIPE FOR DISRUPTION

Cost savings will see 3,300% growth by 2030 across B2B cross-border transactions

Blockchain to facilitate savings of \$10 billion globally in cross-border payments, as operational efficiencies take effect. When used for cross-border payments, blockchain provides payment processing in seconds rather than days, drives a 40–80% reduction in transaction processing costs, and ensures topflight security and end-to-end traceability of payment-related data. The deployment of blockchain for cross-border settlement will drive increasingly significant cost savings for banks; rising from \$301 million in 2021 to \$10 billion in 2030.



- Blockchain implementation in cross-border settlement will enable stakeholders to leverage improved payment transparency and traceability; a critical advantage in an omnichannel payments market.
- As a result of an expansion in the number of integrations with major payment players across broad trade corridors, blockchain solutions such as RippleNet and Visa B2B Connect are already offering significant payment efficiencies compared with legacy systems. Additionally, Ripple has joined the ISO 20022 Standards Body; placing it in a strong position to establish blockchain as part of international payment standards.
- The main driver for the popularity of blockchain payment solutions is their ability to provide fast, secure, transparent, and cost-effective processing of cross-border payment transactions.

Source: Agile Dynamics Tech research and analysis; juniperresearch.com.



## CREATING SMART CONTRACTS -WHAT SMART CONTRACTS PROMISE TO DO

Blockchain technology with its characteristics of immutability, transparency, anonymity, decentralization, and security can help growth markets leapfrog several levels of digital maturity



**AUTONOMY**

- Decentralization is the key benefit of using blockchain technology to underlie smart contracts. They function without the involvement of any third parties, maintaining autonomy.



**TRANSPARENCY**

- The terms and conditions of smart contracts are recorded explicitly, minimizing the scope of disputes to zero. The terms and conditions of smart contracts are accessible to all parties and minimizes the scope of any dispute.



**SPEED**

- Smart contracts run on software codes, enabling faster transaction execution than real-world contracts that require hours of manual documentation.



**DATA STORAGE**

- Smart Contracts are designed to capture and store important transaction details permanently, providing a reliable record for future reference.



**ACCURACY**

- All the terms and conditions are recorded, explicit, and available to all parties.



**TRUST**

- One of the key benefits of Smart Contracts is their ability to offer transparency, security, and autonomy, reducing the possibility of bias, manipulation, or errors and fostering trust in the system.



**COST-EFFICIENT PROCESSES**

- With the automation of many tasks and the elimination of third-party intermediaries, smart contracts also offer a cost-effective alternative to traditional methods.



**BACKUP**

- Smart contracts replicate all transactions, making it easier for parties to maintain a backup of all data even in the event of storage device failure.





## BLOCKCHAIN TECHNOLOGY BENEFITS – TRANSPARENT PAYMENT PROCESSING

Financial services providers lack of transparency is a significant contributor to the high costs of remittances, as it deprives remitters of the opportunity to compare prices and make an informed decision. It is expected that the development of blockchain will disrupt the market and provide the following benefits:



Removes intermediaries

- The current payments system requires the involvement of mediators and intermediaries. To complete a payment, individuals need to go through multiple intermediaries and authorizations, including payment gateways, exchange modes, issuers, and more. However, blockchain payment systems offer a solution as they allow for easy settlement of transactions while ensuring the authenticity of transactions without the presence of middlemen. This allows for peer-to-peer transfers or payments, secure storage of transaction data, and quick development of cryptocurrency wallets for payments.



Provide safe and quick cross-border payments

- Blockchain payment systems can significantly reduce payment processing time, which usually takes several days, to just a few hours, allowing for faster and smoother transactions. Blockchain also eliminates the need for intermediaries, as it ensures the authenticity of payments with a high level of transparency. This reduces the cost of cross-border payments and makes the process more efficient. Blockchain technology provides a high level of security for payments and information, as all transaction data stored on the blockchain is immutable, meaning that it cannot be altered or tampered with.



Automation with smart contracts

- Smart contracts provide a great advantage for businesses and companies by enabling automation. They can automate payment flows, facilitate instant payments, and reduce payment time. When writing smart contracts, it is important to include all the conditions required for transferring payment. Once the necessary credentials are met, the designated person is automatically paid.



Provide transparency and security

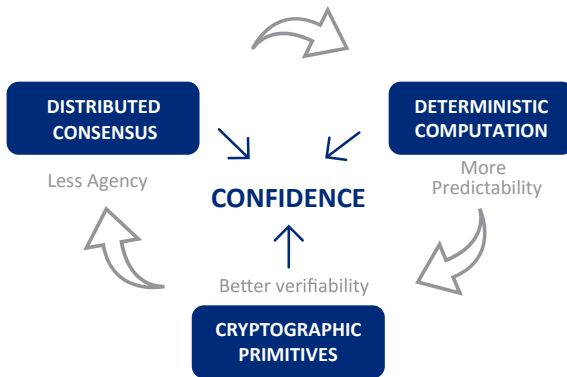
- Blockchain technology provides a crucial benefit of offering a high level of transparency. All transactions that occur through a blockchain network are stored in the blockchain, making them immutable and visible to everyone.



## BLOCKCHAIN TECHNOLOGY BENEFITS – BUILDING TRUST

### Trust, the real innovation behind blockchain

Trust is an integral component of any business relationship, serving as the foundation for success and a key aspect of how we care for our business networks. Intermediaries are often utilized in these relationships to establish trust, and it's critical that we trust these intermediaries. Banks, for example, verify counterparties and ensure that transactions are conducted accurately. Lawyers, on the other hand, help prevent the illegal distribution or duplication of products. While the use of intermediaries can be effective, it can also be a complicated, time-consuming, and expensive process, and it poses security risks in this age of hackers. Imagine a scenario where business partners could connect directly, with a high level of trust and minimal effort. That's what blockchain promises to deliver.



### Blockchain Infuses Confidence in Processes

- The goal of blockchain-based systems is not to eliminate trust, but rather to increase confidence in the system to indirectly reduce the need for trust. This higher level of confidence can facilitate transactions by reducing perceived risks.
- Instead of relying on trust in private activities, blockchains aim to replace it with verifiable confidence in the behavior of a public and immutable computation.

Source: Blockchain as a confidence machine: The problem of trust & challenges of governance -Primavera De Filippi, Morshed Mannan and Wessel Reijers.

# **SECTION 09**

## **THE CONCLUSION**





## BUILDING A MORE SCALABLE, INTEROPERABLE LAYER 1 NETWORK FOR THE GROWTH MARKETS

Designing and developing layer 1 blockchain protocol could offer significant advantages to growth markets as well as challenges by facing a tough competition in onboarding users and tackling the scalability trilemma

**01** 

**NEW BUSINESS MODELS**

- Layer 1 blockchain solutions are widely recognized as the foundation of a network, offering high throughput and economic viability, effective risk management, and security. Owning a stake in a layer 1 blockchain protocol provides a seat at the table and ensures business continuity. Furthermore, one of the key benefits of layer 1 blockchain solutions is the potential for improved ecosystem development. By providing a solid foundation, layer 1 scaling solutions can support the integration of new tools, technology developments, and business models.

**02** 

**TECHNOLOGY SOVEREIGNTY**

- The world's fastest-growing emerging technology is blockchain, with a projected compound annual growth rate (CAGR) of 87.7% from 2023 to 2030. The blockchain market is expected to reach a total addressable market (TAM) of US\$1.5 trillion during this time period. Cybersecurity (87.7%), cloud computing (17.5%), artificial intelligence (40%), and metaverse (42%) are expected to follow blockchain in terms of growth rate. Blockchain is the most cost-effective technology for developing a project too, with project costs ranging from \$5k to \$200k, and offers the highest return on investment (ROI) and the potential to disrupt while driving innovation.

**03** 

**SOFT POWER**

- Creating the next level of Internet infrastructure to meet the needs of developing markets presents a distinctive opportunity for the technology and leadership communities of these nations to work together for the greater good. Meeting the rising need for connectivity will necessitate the development of a vast amount of new infrastructure, and nations at the forefront of innovation and economic growth can benefit from this venture by building their reputation and influence while creating a more equitable world.

**04** 

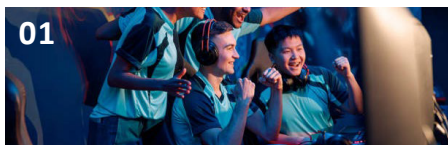
**CAPITALIZING ON BENEFITS**

- Blockchain is widely recognized as a game-changing technology with many advantages. Its potential applications have gone beyond cryptocurrencies and are now prevalent in various sectors, including healthcare, e-commerce, publishing, finance, and insurance. According to financial modeling experts and economists at Agile Dynamics Tech, the adoption of blockchain technology has the potential to increase global GDP by US\$2.1T or 2% of the projected global GDP in 2030.



## KEY TAKEAWAYS

Blockchain has the power to change how people live across the globe, especially in growth markets. Only time will tell how blockchain will evolve, but all indicates that changes are needed and welcome. While it may be ambiguous how blockchain will change the status quo, we can predict how some industries will be affected:



### BLOCKCHAIN GAMING

- Blockchain technology has great potential for revolutionizing the gaming industry and enhancing the gaming experience. Africa, which is the fifth-largest gaming market in the world, has a large gaming population, indicating significant potential for the adoption of blockchain technology.
- The current gaming industry often operates in a way that does not give players ownership over their in-game purchases. However with blockchain technology, players can have ownership of their assets. This is because blockchain-based games use smart contracts to govern transactions within the game, which sets them apart from traditional games.
- By launching a blockchain-powered game, all in-game assets that players purchase using smart contracts can be transferred to their public addresses, providing a more transparent and secure system for players.



### HEALTH RECORDS ON THE CHAIN

- Blockchain technology has the potential to revolutionize the way medical data is shared and accessed securely among multiple parties. This is a significant challenge in digital health, where the confidentiality and security of medical data are of utmost importance, but where improving the quality of care requires better coordination of patient data management across the healthcare system and the application of analytics to population-level medical data.
- Adopting blockchain to ensure the accuracy and security of health records while establishing a single source of truth is a huge opportunity for the emerging markets. With blockchain, doctors, hospitals, and laboratories can request patient information that has a verifiable origin and safeguards the patient's identity from external sources.
- By using blockchain technology to create a user-centric electronic health record, while maintaining a single, true version of the users data, the healthcare system can provide better care and outcomes for patients while also enhancing data privacy and security.



### CROSS-BORDER PAYMENTS AND SETTLEMENTS

- The current trading practices are often seen as inefficient due to the involvement of multiple intermediaries (such as brokers, custodians, and payment agents), settlement risks, and unpredictable settlement cycles. However, with the implementation of blockchain technology, the post-trade operations can be simplified by consolidating securities registers and enabling real-time settlement. This will increase the speed of execution, reduce transaction costs, and enhance efficiency.
- Moreover, there is potential to develop marketplaces focused on trade and finance in three main categories: supply chain management, commodities logistics, and post-trade settlement. These marketplaces can simplify access for both supply and demand parties, increase liquidity, stimulate competition, and improve efficiency. This will create long-term opportunities for the development of trade and finance.



## RESEARCH METHODOLOGY

Research study on market will performed in five phases which include Secondary research, primary research, subject matter expert advice, quality check and final review. The process opted for conducting thorough research to make authentic and dynamic research reports is as follows:

Based on the understanding of requirements, we conducted secondary research to identify the Segment specifications, qualitative and quantitative data along with the factors responsible for the growth of said market. The secondary sources referred for the study include press releases, company annual reports and research papers related to the industry. Various sources such as industry magazines, trade journals, government websites and associations were also reviewed for gathering precise data on opportunities for business expansions in said market. Moreover, quantitative as well as qualitative data was also extracted from paid databases, which included Reuters, Factiva, Bloomberg, One Source, and Hoovers, which proved to be useful for in depth technical study of the market.

The Secondary research carried out at the primary level then verified by primary research. Primary research was undertaken with various industry experts on acceptance of appointment for conducting telephonic interviews, sending questionnaire through emails and in some cases face-to-face interactions. The secondary data collected was then verified by various industry participants which included Segment managers, marketing managers, VPs, CEOs, purchasing managers, subject matter experts, End Users.

An interview with the mentioned participants aids in validation of our research findings regarding the Segment. It helps in provision of first hand data on factors such as market size, growth, regional trends, market trends and competition in the industry. This makes our research findings authentic and precise which helps the clients in decision-making process.



## FORECASTING MODELS

- MACRO & MICRO ECONOMIC FACTOR ANALYSIS - Economic indicators such as country GDP, Purchasing power parity (PPP), Disposable income levels, etc. are taken into consideration while estimating the country-level markets.
- PRODUCTTREND ANALYSIS - Identification of product phase, product penetration, technological know-how, etc. are deep-dived into in order to understand the product trends.
- STATISTICAL TOOLS - Use of statistical tools and methods to eradicate the skewed results from primary as well as secondary sources are observed while estimating the long term forecasts.
- TREND PROJECTION - Factors such as sales and demand from past trends are considered to estimate the future market growths.
- EXPONENTIAL SMOOTHING - With decreasing weight for past observations, and smoothening of time series data using the exponential window function.



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- Our clients industries are extremely competitive, and the maintenance of confidentiality with respect to our clients plans and data is critical. Agile Dynamics Tech rigorously applies internal confidentiality practices to protect the confidentiality of all client information.
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