GBBC
Global Blockchain
Business Council

INSIGHT REPORT

GLOBAL STANDARD MAPPING INITIATIVE (GSMI) 2020

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GLOBAL BLOCKCHAIN BUSINESS COUNCIL

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SECTION I

JOINT SUMMARY

As blockchain technology continues to evolve, calls for clarity regarding technical, regulatory, and governance models have intensified. Decisions around these foundational elements will shape the trajectory and potential of blockchain technology. However there has been little work to catalogue and evaluate the current bedrock upon which the ecosystem can build, despite increased activity in each of these arenas. As global innovators create solutions to address society's toughest challenges, universally accepted standards are needed to facilitate impactful and responsible cross-border innovation.

The Global Standards Mapping Initiative (GSMI) represents an unprecedented effort to map and analyze the current blockchain landscape. Cataloguing outputs from over 30 standards-setting entities, 185 jurisdictions, and nearly 400 industry consortia, the GSMI is divided into two distinct components:

1. Technical standards; and
2. Legislation and guidance released by sovereign and international bodies; and industry best practices and standards.

This work is a joint effort led by the Global Blockchain Business Council and the World Economic Forum, with core collaborators: Accenture; Digital Currency Initiative, MIT Media Lab; ESG Intelligence; Global Digital Finance (GDF); Hyperledger, The Linux Foundation; ING; the Milken Institute; SIX Digital Exchange (SDX); and other global entities.. The cross-organizational effort was a truly global collaboration and alignment of previously disparate initiatives. We hope it serves as a model for future ecosystem-wide efforts.

These reports are intended to serve as a comprehensive resource for the blockchain community and beyond, assessing the current landscape and evaluating where there may be gaps, overlaps, inconsistencies, and conflicts. We welcome feedback, additional contributions, and partnership as we build upon the reports and update the datasets.

We would like to thank our many partners, members, and supporters who worked tirelessly and enthusiastically over the past months to produce GSMI 2020, version 1.0.

Coordinating Partners:
- The Global Blockchain Business Council (GBBC)
- World Economic Forum

Technical Collaborators:
- Digital Currency Initiative, MIT Media Lab
- ING (Co-Lead)
- World Economic Forum Blockchain Council Standards Working Group

Research Collaborators:
- Accenture
- Astana International Financial Centre (AIFC)
- ESG Intelligence
- Fudan Fanhai Fintech Research Center (FFFRC)
- Global Digital Finance (GDF)
- IFC-Milken Institute Capital Markets Scholars (Hermann Traore, Musab Ibrahim)
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- Bitfury Group
- Circulor
- Covington & Burling
- Digital Currency Initiative, MIT Media Lab
- Digital Impact and Governance Initiative (DIGI) – New America
- Evertas
- Facebook/Novi
- Froriep
- Hyperledger, The Linux Foundation
- IFC-Milken Institute Capital Markets Scholars
- J.P. Morgan
- Kaiko
- Latham & Watkins LLP
- Procter & Gamble (P&G)
- QR Capital
- Ropes & Gray LLP
- Shearman & Sterling LLP
- Steptoe & Johnson LLP
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SECTION II

TAXONOMY

Distributed Ledger Technology (DLT)	A system of electronic records that enables independent entities to establish a consensus around a shared ledger without relying on a central authority to provide or authenticate the authoritative version of the records. The consensus is established by the authoritative ordering of cryptographically validated ("signed") transactions made persistent by replicating the data across multiple nodes and tamper-free by linking them via cryptographic hashes. The shared result of the consensus process serves as the authoritative version of the records.
Blockchain	A database that places records of transactions in blocks on a DLT network. Each block is linked (or "chained") to the previous block, using cryptographic signatures that make the transactions they contain immutable.
Digital Asset	An asset in binary form that comes with a right to use, that has clearly defined notions of issuance, termination, ownership, and transfer of ownership, a definable monetary value, which may be between specific counterparties, and which may be based on a right to use, or may be based on the principle of limited supply. A digital asset is not necessarily analogous to a security.
Crypto Asset	A crypto asset is a digital asset that is secured using cryptography. All cryptocurrencies are crypto assets, but not all crypto assets are cryptocurrencies.
Cryptocurrencies	Digital representations of value with no redemption rights against a central party and may function within the community (enabled through peer-to-peer networks) of its users as a medium of exchange, unit of account or store of value, without having legal tender status. They may also act as an incentive mechanism and/or facilitate functions performed on the network they are created in; their value is driven by market supply/demand therein.

Central Bank Digital Currency (CBDC)	A fiat currency issued in digital form by a central bank.
Stablecoins	Tokens designed to minimize/eliminate price fluctuations relative or in reference to other asset(s) which are not issued by a central bank, financial market infrastructure (FMI), bank, credit institution or highly regulated depository institution. May represent a claim on the issuing entity, if any, and/or the underlying assets.
Security Token	Token issued solely on DLT that satisfies the applicable regulator definition of a security or a token that represents on DLT underlying securities/ financial instruments issued on a different platform.
Utility Token	A means of accessing a DLT platform and/or medium of exchange which participants on that platform may use for the provision of goods and services provided on that platform or tokens that are not native to the underlying network but are used for accessing applications that are built on top of another DLT platform.
Virtual Currencies	Virtual currencies are "a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value."[1]

Definitions are sourced from the International Securities Services Association (ISSA)[2] and the Global Financial Markets Association (GFMA).[3]

The inclusion of these definitions in this report does not signify endorsement of the definitions by the GSMI.

SECTION III

INTRODUCTION TO LEGAL AND REGULATORY ANALYSIS

Since the release of Satoshi Nakamoto's bitcoin white paper in 2008, digital assets and blockchain technology have captured the imagination of many. This year, the research firm Gartner predicted blockchain technology would reshape industries and generate annual business value of more than USD $3 trillion by 2030.[4] Digital, decentralized, tamperproof ledgers could actualize a world where intermediaries and costs are reduced while trust, efficiency, traceability, transparency, and accessibility are expanded. But before large-scale transformation can occur, perhaps paradoxically for a decentralized technology, thoughtful and workable frameworks and standards must be implemented.

This report is dedicated to outlining the landscape of guidance and regulations from sovereign bodies that impact digital assets and blockchain technology. By mapping existing standards globally, we hope to identify key gaps, inconsistencies, and conflicts. It is important to note that the legal and regulatory landscape is constantly changing; in the final days of drafting this report the European Commission adopted the Digital Finance Package, which includes "Digital Finance Strategy, a Retail Payments Strategy, legislative proposals for an EU regulatory framework on crypto-assets, and proposals for an EU regulatory framework on digital operational resilience."[5] The discussion, and possible passage, of these legislative proposals will surely have ripple effects around the world.

We have focused our study on the following 185 jurisdictions:

ALBANIA
ALGERIA
ANTIGUA AND BARBUDA
ARGENTINA
ARMENIA
AUSTRALIA
AUSTRIA
AZERBAIJAN
BAHAMAS
BAHRAIN
BANGLADESH
BARBADOS
BELARUS
BELGIUM
BELIZE
BENIN
BERMUDA
BOLIVIA
BRAZIL
BRUNEI
BULGARIA
BURKINA FASO
BURUNDI
CAMBODIA
CANADA
CAYMAN ISLANDS
CHILE
CHINA
COLOMBIA
CROATIA
CYPRUS
CZECH REPUBLIC
DENMARK
DOMINICAN REPUBLIC
ECUADOR
EGYPT
ESTONIA
EUROPEAN UNION
FINLAND
FRANCE
GERMANY
GHANA
GIBRALTAR
GREECE
GUINEA-BISSAU
HONG KONG
HUNGARY
ICELAND
INDIA
INDONESIA
IRAN
IRELAND
ISLE OF MAN
ISRAEL
ITALY
IVORY COAST
JAMAICA
JAPAN
JERSEY
JORDAN
KAZAKHSTAN
KENYA
KOSOVO
KUWAIT
KYRGYZSTAN
LAOS
LATVIA
LEBANON
LIBERIA
LIBYA
LIECHTENSTEIN
LITHUANIA
LUXEMBOURG
MALAWI
MALAYSIA
MALI
MALTA
MARSHALL ISLANDS
MAURITIUS
MEXICO
MONACO
MOROCCO
MYANMAR
NAMIBIA
NEPAL
NETHERLANDS
NEW ZEALAND
NIGER
NIGERIA
NORWAY
PAKISTAN
PALAU
PANAMA
PAPUA NEW GUINEA
PARAGUAY
PHILIPPINES
POLAND
PORTUGAL
QATAR
REPUBLIC OF GEORGIA
ROMANIA
RUSSIA
RWANDA
SAINT KITTS AND NEVIS
SAMOA
SAN MARINO
SENEGAL
SIERRA LEONE
SINGAPORE
SLOVAKIA
SLOVENIA
SOLOMON ISLANDS
SOUTH AFRICA
SOUTH KOREA
SPAIN
SRI LANKA
SWEDEN
SWITZERLAND
TAIWAN
TANZANIA
THAILAND
TOGO
TRINIDAD AND TOBAGO
TUNISIA
TURKEY
UGANDA
UKRAINE
UNITED ARAB EMIRATES
UNITED KINGDOM
UNITED STATES OF AMERICA
49 U.S. STATES
URUGUAY
UZBEKISTAN
VENEZUELA
WEST AFRICAN ECONOMIC AND MONETARY UNION
ZAMBIA
ZIMBABWE

SECTION IV

KEY ISSUES AND FINDINGS

How do you standardize and regulate a technology that is inherently borderless? How do you achieve a level of global consensus on approaches? What role should governments play in creating guardrails to facilitate digital asset and blockchain innovation, and what role should supranational bodies play? As the technology remains in its relative infancy, many of these questions will need to wait for precise and universally accepted answers. Much existing regulation and standardization focuses specifically on digital assets, as opposed to blockchain technology. However, new uses for the technology are constantly emerging and the need for regulatory clarity remains constant and dynamic.

Analysis of our sample revealed an assortment of trends and challenges across the 185 jurisdictions examined. The findings have been divided into 10 categories.

THIS REPORT CENTERS ON TWO CRUCIAL QUESTIONS:

First, what is the current landscape of global legal, regulatory, and industry standards?

Second, how can we shape global standardization and regulation in a sustainable, informed, and effective way?

ONE **CONSUMER PROTECTION**	Warnings issued to consumers, investors, and businesses concerning digital assets.
TWO **FINANCIAL SURVEILLANCE (ANTI-MONEY LAUNDERING OR "AML"/KNOW YOUR CUSTOMER OR "KYC"/COUNTER TERRORIST FINANCING OR "CTF")**	Laws, guidance, and regulations established by sovereign bodies to ensure the legality of transactions conducted with digital assets.
THREE **REGULATION OF DIGITAL ASSETS**	Regulatory and legislative tools used by governments to respond to the emergence of blockchain, digital assets, and initial coin offerings (ICOs).
FOUR **TAXATION**	Tax issues related to the use of digital assets, including trading and mining.
FIVE **CENTRAL BANK DIGITAL CURRENCY (CBDC)**	Digital currencies issued by central banks; CBDCs are not necessarily blockchain-based.
SIX **BANKING**	Regulations on banks interacting with digital assets and digital asset businesses, as well as pilot projects in the banking sector.
SEVEN **BAN ON CRYPTOCURRENCIES**	Jurisdictions that have taken measures to ban cryptocurrencies.
EIGHT **SOVEREIGN STRATEGIES**	Strategies implemented by jurisdictions to develop blockchain nationally or regionally.
NINE **REGULATORY SANDBOXES**	Frameworks implemented by regulators that allow financial technology firms and other businesses to conduct live experiments in a controlled environment and under a regulator's supervision.
TEN **GOVERNMENT PROJECTS/ GOVERNMENT SERVICES**	Uses of blockchain either for internal government processes or government service delivery.

Most concerns highlighted in our analysis fall into the following categories:

ONE **CONSUMER PROTECTION**
TWO **FINANCIAL SURVEILLANCE (AML/KYC/CTF)**
THREE **REGULATION OF DIGITAL ASSETS**
FOUR **TAXATION**

ONE

CONSUMER PROTECTION

Across jurisdictions, a plurality of of government actions were related to consumer protection. Many of the 185 jurisdictions analyzed have issued formal alerts to investors about the potential risk and consequences of investing in digital assets. Globally, public authorities consider this asset class to be high risk due to a lack of a clear controlling entity and limited to no legal recourse in the event of error, failure, or malfeasance.

The first consumer alerts for digital assets were issued in 2013. These alerts were triggered by significant fluctuations in the price of bitcoin and other digital assets seen in late 2013 and early 2014 (the price of bitcoin dropped by 29% over three days in December 2013, and by 32% over 10 days in February 2014).[6] During this period, a wave of warnings about digital assets was released by central banks around the world.

The United States first released a consumer warning in July 2013, with the Securities and Exchange Commission (SEC) warning specifically about fraud schemes related to virtual currencies: "Virtual currencies, such as bitcoin, have recently become popular and are intended to serve as a type of money… Fraudsters may also be attracted to using virtual currencies to perpetrate their frauds because transactions in virtual currencies supposedly have greater privacy benefits and less regulatory oversight than transactions in conventional currencies."[7] This was followed by further warnings from regulatory agencies in late 2013 and early 2014, with another spike in late 2017 due to a wave of initial coin offerings (ICOs).

At the European Union level, the European Banking Authority (EBA) released the first warning in December 2013.[8] The warning stated the following:

> **"EBA is issuing this warning to highlight the possible risks you may face when buying, holding or trading virtual currencies such as Bitcoin. Virtual currencies continue to hit the headlines and are enjoying increasing popularity. However, you need to be aware of the risks associated with virtual currencies, including losing your money.**
>
> **No specific regulatory protections exist that would cover you for losses if a platform that exchanges or holds your virtual currencies fails or goes out of business. While the EBA is currently assessing all relevant issues associated with virtual currencies, in order to identify whether virtual currencies can and should be regulated and supervised, you are advised to familiarize yourself with the risks associated with them."**

Following the EBA's 2013 statement, in February 2018, the European Securities and Markets Authority, the EBA, and the European Insurance and Occupational Pensions Authority, released a joint warning on virtual currencies.[9] Warnings from other jurisdictions followed with a similar tone and format. In general, central banks have been skeptical of digital assets; countries in which central banks are charged with regulating digital assets tend to be more restrictive compared to countries in which financial market regulators are charged with regulating these assets. For example, in 2017, an executive board member of Deutsche Bundesbank, Germany's central bank, dismissed virtual currencies, saying the following:

> **"[Digital assets] are a fabrication. That is not to consign them straight to the category of 'fraud'. Yet they have no intrinsic value, just an exchange value. You can't consume or use them, only exchange them… [they] have no issuer, no footing in the real economy. No one has to redeem them. They are a fabrication and propagate according to a fictitious set-up in virtual systems which, in some cases, can be altered or newly created at the whim of a small group of participants."[10]**

The only country that defines non-state backed virtual currencies as legal tender, meaning they must be accepted as repayment of a debt, is Lichtenstein, which defines virtual currencies as "digital monetary units, which can be exchanged for legal tender, used to purchase goods or services, or to preserve value and thus assume the function of legal tender." [11]

TWO

FINANCIAL SURVEILLANCE (AML/KYC/CTF)

The majority of jurisdictions studied have introduced financial surveillance schemes which apply to digital assets. More skeptical jurisdictions have framed these assets as a mechanism to circumvent traditional AML rules.

In the European Union (EU), for example, Directive 2018/843 of the European Parliament was adopted on May 30, 2018.[12] It is the fifth AML directive, and it strengthens existing AML legislation while encouraging cooperation amongst AML supervisors. This directive explicitly includes virtual currency conversion platforms and reinforces the obligation to register and make these entities accessible (e.g. they must be registered as actual beneficiaries of legal entities). The resulting registry must be publicly available and accessible to any interested party. EU member states are required to publish a summary of their national risk assessment and the EU Commission is required to publish a report on the implementation of this fifth directive by 2022, and then every three years subsequently. The 2018/843 directive was supposed to be integrated into national legislation across EU member states within 18 months of its initial adoption and no later than January 10, 2020. However, according to the EU Commission's website, the rate of adoption for the directive in the EU was 41 percent as of June 2020.[13]

THE FOLLOWING COUNTRIES HAVE IMPLEMENTED THE DIRECTIVE FULLY:

BULGARIA
CROATIA
DENMARK
FINLAND
FRANCE
GERMANY
ITALY
LATVIA
LITHUANIA
MALTA
SWEDEN

THE FOLLOWING COUNTRIES HAVE IMPLEMENTED THE DIRECTIVE PARTIALLY:

AUSTRIA
BELGIUM
CZECH REPUBLIC
ESTONIA
IRELAND
GREECE
HUNGARY
LUXEMBOURG
NETHERLANDS
POLAND
SLOVAKIA
SLOVENIA[14]

Jurisdictions across Asia, Latin America, and Europe have looked to guidance from the Financial Action Task Force (FATF) to define their strategies. Only a fraction of jurisdictions surveyed have created new digital currency frameworks to facilitate compliance with FATF standards; others have opted instead to amend existing laws to combat money laundering involving crypto assets.

The latest FATF action was the announcement of the Travel Rule in June 2019; this Rule is an update to the existing FATF Recommendation 16, which concerns cross-border and domestic wire transfers.[15] Under Recommendation 16's Travel Rule, the originators and beneficiaries of all transfers of digital funds must exchange identifying information. Additionally, the originators and beneficiaries involved in a transfer must be able to guarantee the accuracy of the information they send. The rule will apply to all virtual asset service providers, financial institutions, and obliged entities. FATF continues to release guidance on crypto asset activity, including a recent report on Virtual Asset Red Flag Indicators of Money Laundering and Terrorist Financing, released September 14, 2020.[16]

THREE

REGULATION OF DIGITAL ASSETS

How can jurisdictions regulate an activity or industry whose actual potential has yet to be discovered and understood? This is the perennially perplexing question those tasked with regulating emerging technologies must ask themselves.

Blockchain applications for financial services are an obvious place for regulation and guidance. Globally, financial regulation has tightened since the 2008 economic crisis. Since then, determining how digital assets will be treated and classified has become a renewed responsibility for governments around the globe.

Some jurisdictions, including France, Lichtenstein, and Jersey, are interested in regulating uses of the technology, rather than the technology itself. These places (as well as others that have embraced a similar approach) maintain they have done so in a spirit of openness, emphasizing the need for dynamic models.

France's proposed framework has relied on requests for comment and consultation. Proponents of this approach laud the consultation phases, arguing that they allow regulators to consider diverse perspectives from stakeholders and identify the most functional framework possible.

Most jurisdictions implementing wholesale regulatory frameworks for blockchain and digital assets are small states. Malta, Jersey, Lichtenstein, and Mauritius fall into this category. For these states, promotion of blockchain is a priority, as it allows them to attract capital that may otherwise go elsewhere.

Compelling models for attracting blockchain-related investment and development also include the creation of special zones like the Busan Regulation-Free Special Zone for Blockchain in Korea, "Technological Free Zones" (Zonas Livres Tecnológicas) in Portugal, the High Technologies Park in Belarus, and the Astana International Financial Center (AIFC) in Kazakhstan.

The list below shows jurisdictions that have announced their intention to create securities frameworks. Additional details and the current status on each can be found on our interactive map.

ALBANIA
BAHAMAS
BAHRAIN
BELARUS
BERMUDA
CANADA
CAYMAN ISLANDS
CZECH REPUBLIC
EUROPEAN UNION
FRANCE
GERMANY
GIBRALTAR
IRELAND
ICELAND
INDONESIA
ISLE OF MAN
ITALY
JAPAN
JERSEY
KAZAKHSTAN
LIECHTENSTEIN
LITHUANIA
LUXEMBOURG
MALAYSIA
MALTA
MEXICO
MONACO
MAURITIUS
PHILIPPINES
RUSSIA
SAINT KITTS/NEVIS
SAN MARINO
SINGAPORE
SWEDEN
SWITZERLAND
THAILAND
UNITED ARAB EMIRATES
UNITED KINGDOM
UNITED STATES OF AMERICA
VENEZUELA

FOUR

TAXATION

Generally, crypto assets are treated as property for tax purposes, though this can be complicated by forks and airdrops. In the U.S., the Internal Revenue Service (IRS) first issued guidance in 2014, followed up by numerous reminders to taxpayers of their obligations. In 2019, the IRS issued guidance in an attempt to clarify the tax treatment of virtual currencies (which it defines as a "digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value.")[17] received through forks and airdrops.[18] Most recently, the IRS issued a memorandum in which it ruled that "a taxpayer who receives convertible virtual currency in exchange for performing a microtask through a crowdsourcing platform has received consideration in exchange for performing a service, and the convertible virtual currency received is taxable as ordinary income."[19] In Europe, most jurisdictions equate taxation on virtual currencies with capital gains tax. Following a ruling by the European Court of Justice in October 2015, the Value Added Tax (VAT) is not generally applicable to virtual currencies in Europe.[20]

Additionally, EU member states have yet to create a comprehensive tax framework for mining, which may come as a surprise given the immense amount of energy required to mine some blockchains, including bitcoin. Other countries have recognized and addressed this dynamic: Iran in 2019 established a licensing regime for crypto miners which requires them to pay higher energy costs than the average Iranian business. So far, Iran has licensed over 1,000 miners.[21]

The United Kingdom has comprehensive tax guidance for individuals and businesses.[22] Individuals who hold crypto assets as a personal investment must pay capital gains tax when they dispose of the assets (either selling for money, exchanging for a different crypto asset, using it to pay for goods or services, or giving it to another person), though in some situations an individual trading crypto assets "with such frequency, level of organization and sophistication that the activity amounts to a financial trade in itself," would be liable for income tax rather than capital gains tax.[23] Those who receive crypto assets as a form of non-cash payment from their employers, or who receive it from mining, transaction confirmation, or airdrops must pay income tax and national insurance contributions.

Jurisdictions have generally opted to fit crypto assets into existing taxation frameworks rather than create new frameworks. While this has allowed for quick implementation of tax on crypto assets, many jurisdictions have struggled with enforcement. For example, the U.S. IRS has sent out multiple rounds of letters to individuals it suspects have not properly reported transactions involving virtual currency.[24] It has also put out a request for submissions for a virtual currency tracking program[25] and contracted multiple firms to improve tracking. [26]

FIVE

CENTRAL BANK DIGITAL CURRENCY (CBDC)

Since 2008, central banks around the world have issued alerts about the risks posed by bitcoin and other digital assets. Despite an open opposition to crypto currencies, many central banks are also investigating blockchain technology's applications. Since 2016, several central banks have announced CBDC projects. The trend has spread in Europe since 2018, perhaps most notably in France, Germany, Sweden, and the Netherlands, where central banks have launched pilot projects to experiment with CBDCs. It should be noted that not all CBDC projects utilize blockchain technology.

CBDCs are a digital representation of a country's fiat currency. It is important to understand that CBDCs are not "backed" by fiat currency, as some stablecoins are, but rather are equivalent on a 1:1 basis to such fiat currency. They are government-issued digital assets designed to replace or supplement traditional currencies. The term CBDC is broad because its implementation involves several critical decisions on the part of an issuing central bank. The main question to be answered is whether a CBDC should be general purpose in the sense that it can be used by the general population. Otherwise, the issuing authority may decide to make it available for wholesale transactions, which means that the CBDC is only used for settlements between banks. Finally, a CBDC could also be used exclusively by central banks.

The table below shows CBDC projects around the world. Details on each of these projects can be found on our interactive map.[27]

	AFRICA	AMERICAS	ASIA	EUROPE	OCEANIA
Research Phase: Established working groups to explore the use cases, impact, and feasibility of CBDC.	SOUTH AFRICA RWANDA GHANA TUNISIA EGYPT	USA CHILE ECUADOR	KAZAKHSTAN PAKISTAN TURKEY IRAN INDONESIA PHILIPPINES JAPAN	EUROPEAN CENTRAL BANK UK GERMANY ICELAND NORWAY DENMARK NETHERLANDS SWITZERLAND FINLAND RUSSIA	AUSTRALIA NEW ZEALAND
Development Phase: Initiated technical build and early testing of CBDC in controlled environments.		CANADA VENEZUELA BRAZIL EASTERN CARIBBEAN CENTRAL BANK	CAMBODIA UAE LEBANON ISRAEL	FRANCE	
Pilot Phase: Began testing of CBDC.		URUGUAY BAHAMAS	CHINA THAILAND SOUTH KOREA	SWEDEN UKRAINE	MARSHALL ISLANDS

The Chinese government has long taken interest in innovation opportunities offered by blockchain.[28] China is currently working on the release of its national digital currency, the Digital Currency Electronic Payment (DCEP). DCEP trials have already started with some of the country's largest banks and corporations, and in some of the country's most developed regions. China's digital currency project uses a central, state-owned database to control the issuance and exchange of funds. The value of DCEP will be pegged 1:1 with the yuan and issued to citizens through a selected network of commercial banks. The People's Bank of China has developed an authorized application that provides users with access to a digital wallet.

Although many central banks use some form of digital currency as reserves or settlement account balances, no central bank has yet issued an operational general CBDC.

However, several banks are already in different stages of research and development; these projects involve five major world currencies: the US Dollar, the Euro, the Japanese Yen, the British Pound, and the Chinese Renminbi (or yuan).

In the United States, the Federal Reserve has been slower to act, with Federal Reserve Board Governor Lael Brainard recently announcing that the institution is experimenting with blockchain and distributed ledger technology (DLT) in the context of a CBDC. On August 13, 2020, Brainard said the COVID-19 pandemic was a "dramatic reminder of the importance of a resilient and trusted payments infrastructure that is accessible to all Americans." She explained the task of getting a US digital dollar right, noting the critical role of the dollar in global markets as the global reserve currency. "Given the dollar's important role, it is essential that the Federal Reserve remains on the frontier of research and policy development regarding CBDCs."[29] Brian Brooks, Acting Comptroller of the Currency, also expressed support for a blockchain-based CBDC as an upgrade to the current US banking system.[30]

In Japan, the central bank has appointed its senior economist to lead a research team on a Yen-based CBDC,[31] while the Bank of England has contracted with Accenture for development of their CBDC. Meanwhile, the European Central Bank has stated a retail CBDC is its "main focus."[32]

The Philippines has also confirmed it is considering issuing its own digital currency, while Thailand is already in the testing phase.

Over 40 CBDC initiatives have been announced, including: Australia, Bahamas, Brazil, Cambodia, Canada, Chile, Denmark, Ecuador, Egypt, European Central Bank, Finland, France, Germany, Ghana, Iceland, Indonesia, Iran, Israel, Japan, Kazakhstan, Lebanon, Marshall Islands, New Zealand, Norway, Pakistan, China, Philippines, South Korea, Rwanda, South Africa, Sweden, Switzerland, Thailand, Netherlands, Tunisia, Turkey, Ukraine, United Arabic Emirates, United Kingdom, Uruguay, United States of America, and Venezuela.

To date, no CBDC has achieved widespread use, though that could change shortly, as countries like China and the Marshall Islands have begun serious tests with an eye towards issuance.

SIX
BANKING

Some jurisdictions have taken special care to insulate banks and financial institutions from the risks associated with virtual currencies. Most notably, the Reserve Bank of India in 2018 ordered regulated entities not to provide services to any person or entity dealing with digital assets.[33] This ruling effectively banned virtual currency businesses in the country, though the order was struck down by the Supreme Court of India in March 2020, reopening the door to the industry.[34] In a court ruling that had the opposite effect, the Supreme Court of Chile ruled that the state-owned bank was allowed to deny services to a digital asset exchange.[35]

The Bank of Thailand took a different approach when it announced that local banks were allowed to create subsidiaries for dealing with digital assets, though they may only do business with businesses approved by the Thailand Securities and Exchange Commission. This gave Thai banks the ability to issue digital tokens, provide brokerage services, and invest in virtual currencies.[36] Switzerland's Financial Market Supervisory Authority (FINMA) has also been more open to banks interacting with digital assets, and has granted banking and securities dealers licenses to digital asset-focused financial services providers. These licenses enable institutions to provide a suite of financial services for digital assets, including custody and trading.[37]

This year, the U.S. Office of the Comptroller of the Currency (OCC) published a letter clarifying that national banks and federal savings associations have the authority to provide cryptocurrency custody services for customers.[38] Most recently, the OCC published an interpretive letter stating that national bank may hold stablecoin reserves as a service to bank customers, given that the stablecoin is "backed on a 1:1 basis by a single fiat currency where the bank verifies at least daily that reserve account balances are always equal to or greater than the number of the issuer's outstanding stablecoins."[39] At the state level, Wyoming has been a trailblazer and in 2019 passed a bill creating Special Purpose Depository Institutions, which are bank-like entities that are better able to service digital assets.[40]

Other countries, including Saudi Arabia, have sought to use blockchain technology to improve banking. Most recently, the Saudi Arabian Monetary Authority (SAMA) "used blockchain technology to deposit part of the liquidity that SAMA had previously announced, to be injected into the banking sector, as part of SAMA's actions aimed at enhancing the sector's capabilities to continue its role in providing credit facilities." [41]

Regulators initially took a cautious approach towards allowing banks to interact with digital assets and to service digital asset businesses. However, as the technology has matured, regulators have become more open to allowing digital assets into the traditional financial infrastructure, while jurisdictions like Wyoming have created entirely new frameworks that are more accepting of digital assets.

SEVEN

BAN ON CRYPTOCURRENCIES

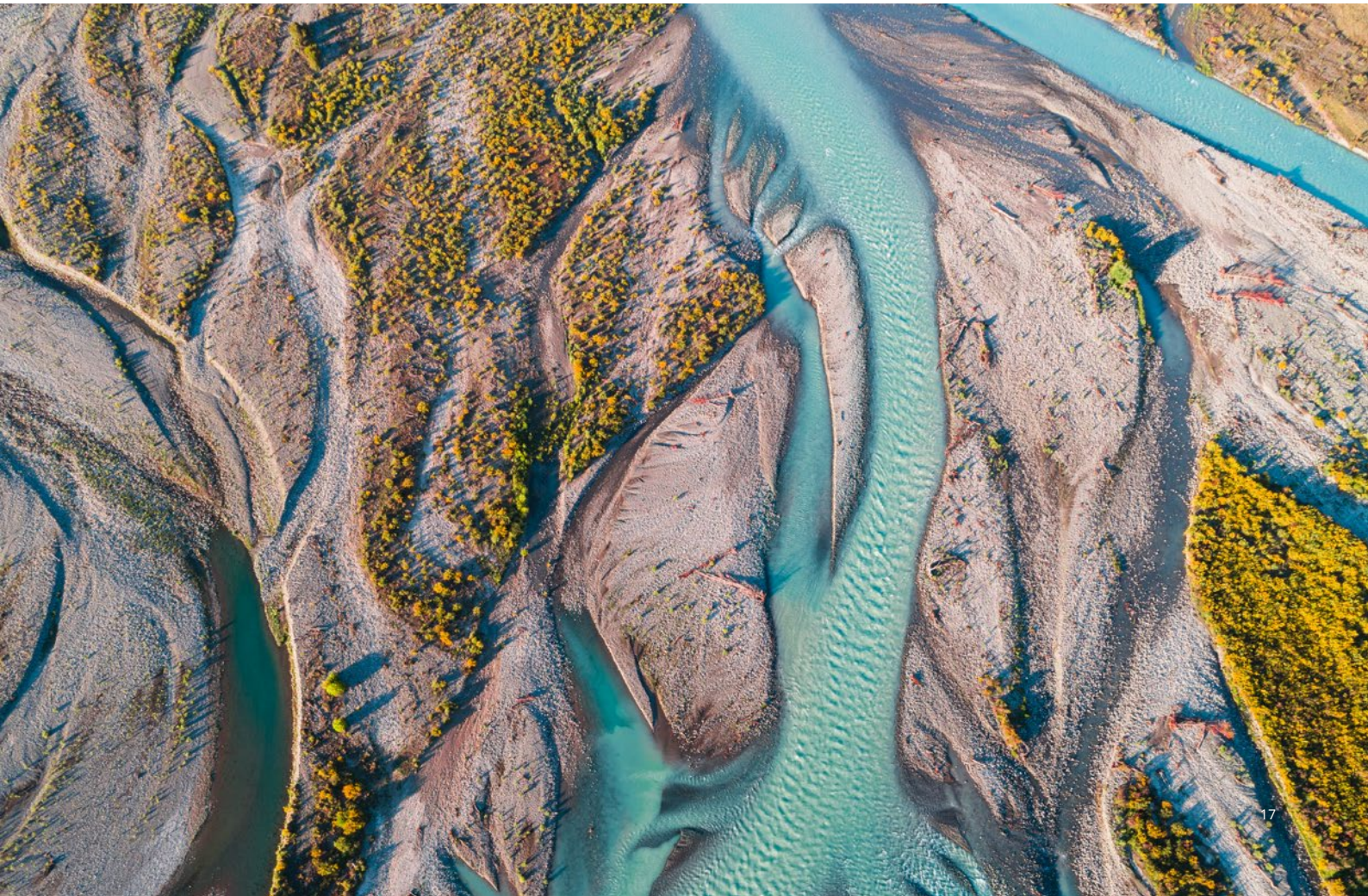
One of the observations unearthed by a review on global approaches to regulating blockchain is that while most jurisdictions state an openness to blockchain itself, many are skeptical about the use of cryptocurrencies. Some countries have gone as far as to prohibit the use of cryptocurrencies in their jurisdictions. Algeria and Egypt offer stark examples of this. The prohibition of cryptocurrencies is often justified by the fact that digital assets represent a risk of asset loss to users; many central banks claim they could pose a danger to the stability of existing monetary and financial systems.

THE JURISDICTIONS BELOW HAVE BANNED TRANSACTING AND HOLDING CRYPTOCURRENCIES:

ALGERIA
BANGLADESH
BOLIVIA
BURUNDI
EGYPT
LIBYA
MOROCCO
NEPAL
PAKISTAN
PALAU
QATAR
TANZANIA
UZBEKISTAN
VIETNAM
WEST AFRICAN ECONOMIC AND MONETARY UNION
(INCLUDING 7 COUNTRIES: BENIN, BURKINA FASO, IVORY COAST, MALI, NIGER, SENEGAL, AND TOGO)

THE JURISDICTIONS BELOW HAVE BANNED FINANCIAL INSTITUTIONS FROM TRANSACTING WITH AND HOLDING CRYPTOCURRENCIES:

IRAN | **KUWAIT** | **LAOS** | **MYANMAR**



EIGHT

SOVEREIGN STRATEGIES

Certain countries have made the strategic decision to use blockchain as a means for modernizing their economies. This is evidenced, most often, by the publication of "white papers" that define the national strategy for the development of blockchain and DLT. Although the plans adopted from one country to the next vary, it is important to note that every country that has published a white paper of this nature has done so with the aim of creating a regulatory framework that accommodates and fosters innovation, providing legal certainty and protection for consumers and investors alike. For example, Australia's National Blockchain Roadmap identifies regulatory roadblocks while calling for increased blockchain education, investment, and development. It also presents specific sectoral opportunities, which include blockchain for wine exports, trusted academic and professional credentials, and KYC processes.[42]

NINE

REGULATORY SANDBOXES

As part of their development and approach to regulating blockchain technology, several countries have chosen to rely on regulatory sandboxes. A regulatory sandbox is a framework set up by a regulator that allows fintech firms and other innovators to conduct live experiments in a controlled environment under a regulator's supervision.

Sandboxes are useful for early stage innovation. They allow the development of rules for novel solutions by testing them in a controlled environment. The United Kingdom was the first country to deploy this model. According to a report published by the UK's Financial Conduct Authority (FCA) in October 2017, 90% of companies in the UK's first cohort of sandbox participants who successfully completed tests continue to operate in the market.[43] FCA's global regulatory sandbox project aims to remove global regulatory boundaries. The Global Financial Innovation Network (GFIN), for example, is considering how to provide companies with an environment that allows them to test cross-border solutions.

A few jurisdictions are especially notable for their thoughtful, innovative approaches to creating regulatory frameworks for blockchain. Australia launched its fintech sandbox, directed by the Australian Securities and Investment Commission (ASIC), in 2016. However, it was reported that only seven companies took advantage of the sandbox in the three years that followed and in February 2020 the government passed legislation to lengthen the time. The Canadian Securities Administrators launched its own regulatory sandbox in 2017. Canada, too, expanded its sandbox in 2020 by signing a cooperation and data-sharing agreement with the Financial Supervisory Commission of Taiwan (FSC), which will allow fintech firms to access both markets.[45]

TEN

GOVERNMENT PROJECTS/ GOVERNMENT SERVICES

Jurisdictions worldwide are using blockchain to support administrative management of government services. The most obvious example of this is Estonia, which has openly embraced the technology. In 2017, Wired magazine named Estonia "the most advanced digital society in the world," citing one of its latest innovations – e-residency. Indeed, in 2014, Estonia became the first country in the world to open its digital services to foreign nationals. For a one-time fee, non-nationals can become "e-residents," allowing them to incorporate and manage a company online, and thereby gain access to the full European Union market. "In Estonia's capital, 99% of public services are accessible online," said Kersti Kaljulaid, President of Estonia.[46] The government has implemented the so called "once-only principle" meaning when a citizen submits any type of data to the government, they should never be asked for it again. Sandra Sarav, Global Affairs Director with the Estonian Government CIO Office, explained that "another principle is digital by default; whenever we come up with new services or there's an interaction with the state it should be able to be done digitally. And digital means end-to-end fully digital — there's no in-person visit required."

The Estonian government has been testing blockchain technology since 2008 and was the first country to use blockchain on a national level. "Paper can be cheated and paper can be faked, but information in a register can't," said Taavi Kotka, Estonia's Chief Information Officer and the man tasked with setting the IT agenda for the world's most digitally advanced society.

Since 2012, blockchain has been in operational use in Estonia's registries, including judicial, health, and commercial. The Estonian government has plans to extend DLT use to other spheres including personal medicine, cybersecurity, and "data embassies." Estonia is experimenting with "data embassies" as a new way to keep the country's data and online infrastructure secure. The hope is that these embassies would allow citizens' data to be stored on foreign soil to protect the country from targeted cyberattacks. Friendly countries would host servers housing Estonia's critical data and applications and, in case of an attack, the Estonian government could switch over to those external databases to keep the country running.

44 percent of Estonians vote online, 98 percent of tax declarations are filed online, 98 percent of Estonians have a digital ID, and 99 percent of health data is digitized and stored on a blockchain-backed system.[47] The Estonian Ministry of Justice has also leveraged blockchain technology to create the e-Law system, an online database that allows the public to read every draft law introduced since February 2003. As a result, Estonia has the second-fastest court proceedings in Europe, with the second shortest amount of time needed to resolve civil, commercial, administrative, and other cases.[48]

Many other jurisdictions have explored blockchain as a tool for building digital property registries. In 2016, the Georgian National Agency of Public Registry (NAPR) started work on their land titling system and launched the first ever blockchain land-registry system. It strengthened property owners' rights, enhanced trust in government, and reinforced data security. More than 1.5 million land titles are registered, with a 3-minute average registration time. In 2019, Sweden moved to a new phase of their implementation of an internal, blockchain-based property registry. African states including Ghana, Kenya, and Rwanda have announced their pursuit of this solution. The Republic of Georgia has also announced its intention to introduce smart contracts in real estate registrations to enhance transparency and efficiency and reduce costs.

Canada and the Netherlands are currently conducting a pilot project that uses blockchain-based digital identity to improve travel between the two countries.[49] A passenger's digital wallet will contain biometric information, government-issued identification, and attestations from various stakeholders. The aim of the project is to accelerate and simplify security and border control for trusted travelers.

SWITZERLAND

When compared to its European neighbors, Switzerland has taken a pragmatic approach to regulating digital assets and blockchain. Switzerland is also unique in that its approach has been driven almost exclusively by its financial regulator, the Financial Market Supervisory Authority (FINMA). This began in 2014, when FINMA issued a fact sheet stating that purchase and sale of bitcoins on a commercial basis and the operation of trading platforms for digital assets were subject to the country's AML law. Since then, FINMA has issued regulatory guidance on ICOs and fintech licenses, as well as guidance to bring the country into compliance with the FATF's 2019 update. However, there are indications that the legislature could get involved, as the Federal Council released a report in December 2018 on the legal framework for blockchain in the financial sector; this report identified problem spots, and the Federal Council in March 2019 published a draft law to address these relatively minor issues. Most recently, Switzerland passed the Blockchain Act, a law intended to create more legal certainty and fewer obstacles for blockchain applications while also minimizing abuse; it is expected to come into force February 2021.[50] The law covers the exchange of digital securities and sets standards for exchanges, establishing a "firm legal basis for exchanging digital-only securities and reclaiming digital assets from bankrupt countries."[51]

Switzerland's regulations and existing financial infrastructure have made it a top destination for innovative firms. Switzerland is also home to Zug, also known as "Crypto Valley," which has been open to digital assets and blockchain since 2014. With a low corporate tax rate and loose regulations on digital assets, has been successful in attracting blockchain companies. In January 2020, a study found that the number of companies working with digital assets and blockchain in Zug had reached 842[52], an extremely high number for a canton with a population of about 120,000.[53]

UNITED STATES OF AMERICA

The United States' web of federal and state laws and regulations has led to a complicated regulatory landscape for digital assets. This is perhaps most evident in the differing rulings of state regulators on whether certain digital asset businesses need to obtain a money transmitter license, as well as differing definitions of blockchain, distributed ledger technology, virtual currency, digital assets, and more. In 2015, New York established the BitLicense regulation, which requires virtual currency businesses to apply for a license from the

Department of Financial Services (DFS). Since then, states like Vermont and Wyoming have taken more open approaches to virtual currency and blockchain, with Vermont passing a law to create Blockchain-Based Limited Liability Companies and Wyoming creating the aforementioned SPDIs.

At the federal level, the Securities and Exchange Commission (SEC) has regulatory authority over securities, and has taken the position that certain tokens should be deemed securities, while the Commodity Futures Trading Commission (CFTC) has authority over tokens deemed to be commodities, which includes bitcoin and ether. Many blockchain industry stakeholders have called for federal legislation to clarify agencies' roles and tax treatment of digital assets, among other outstanding issues. While a number of bills have been introduced to address these issues, none have gained much traction in Congress.

Despite the convoluted regulatory framework, the United States remains a hub for innovation, and many states and federal agencies are experimenting with blockchain technology; there have been investigations, tests, and pilot projects at the Food and Drug Administration, Department of Treasury, Department of Health and Human Services, General Services Administration, and more.[54] Most recently, the Federal Reserve announced that it was conducting experiments related to CBDCs. [55]

CHINA

China has taken a unique "blockchain, not bitcoin" approach to regulating innovation in the industry. The Chinese government has long recognized the strategic importance of blockchain technology and has supported innovation in the space, while at the same time restricting virtual currency use cases. China's support for blockchain was made explicit in October 2019, with President Xi Jinping backing the technology as a national imperative and urging the country to "seize the opportunities."[56] Blockchain initiatives such as the Blockchain-based Service Network (BSN), a blockchain/cloud interoperability network that was launched with 100 city nodes in China in April 2020, is catalyzing enterprise blockchain adoption on the mainland and will serve as the backbone of the Digital Silk Road internationally.

China's stance on digital assets have been more nuanced. Starting first with a ban on ICO activity September 2017, China has continued to restrict crypto activity on the mainland including blocking access to all domestic and foreign exchanges and ICO websites, as well as clamping down on bitcoin mining activity on the mainland.[57] However, at the same time, China is rapidly developing its strategy to create policy frameworks for regulated digital assets. There are already many testbeds underway on the mainland, such as in Shenzhen, Shanghai, and Hainan, where stakeholders are piloting limited forms of securitized token offerings and other digital asset experimentation. Thus, the current restrictions for digital assets on the mainland belies the intent of China to become a global leader in regulated digital assets sooner rather than later.

An obvious example of this intent is China's national digital currency, the Digital Currency Electronic Payment (DCEP), which has been in development since 2014. China's digital currency project uses a two-tier strategy where a centralized, state-controlled platform is for issuance, exchange, clearing, and settlement,, but allows for the potential of blockchain solutions to integrate into the ecosystem downstream. The value of DCEP will be pegged 1:1 with the RMB and will be initially issued to citizens through a selected network of commercial banks. Limited DCEP trials (originally announced in Shenzhen, Chengdu, and Suzhou, Xiong'an) have been ongoing since April 2020, with the country's major banks, telecoms, payment companies, and even foreign companies such as Starbucks and McDonalds participating.[58] In August, 2020, China scaled to nation-wide pilots to stress-test the technology in the country's most economically important regions, including the Beijing/Tianjin economic region, Yangtze Delta (Shanghai/Jiangsu/Zhejiang provinces), and Greater Bay Area (Guangdong province which includes Guangzhou/Shenzhen, as well as notably Hong Kong/Macau internationally). The People's Bank of China has hinted that policy frameworks for the DCEP could be ready as soon as the end of 2020, and that commercial deployment would be made in time for the 2022 Winter Olympics.

BERMUDA

Bermuda is a unique jurisdiction in that it has already implemented multiple iterations of its digital asset regulatory framework, which was first introduced in 2018. In May 2018, Parliament passed the Companies and Limited Liability Company (Initial Coin Offering) Amendment Act 2018 (known as the "ICO Act"), which regulated all digital tokens issued through ICOs. The ICO Act gave the Minister of Finance authority to approve or reject ICOs and established disclosure, audit, and compliance requirements.

The following month, Parliament passed the Digital Asset Business Act 2018 (DABA), which established a licensing regime for digital asset businesses, gave the Bermuda Monetary Authority (BMA) jurisdiction over these businesses, and amended existing AML laws to include digital asset businesses. This law requires licensed businesses to prepare annual audited financial statements and notify the BMA prior to accepting a new 10% shareholder. It also establishes a procedure for warnings and civil penalties up to $10 million.

Finally, the Parliament of Bermuda passed the Digital Asset Issuance Act 2020, which replaced the ICO Act. The new law replaced the term "initial coin offering" with "digital asset issuance," and established a more structured application process for issuance, similar to the process established in DABA. Bermuda has proved successful in attracting innovative companies that may have otherwise gone to different jurisdictions; its replacement of the ICO Act shows an understanding of new fundraising methods beyond the ICO.

SINGAPORE

Like Bermuda, Singapore took a wait-and-see approach to blockchain and digital assets. Then, in January 2019, Parliament passed the Payment Services Act 2019, which streamlined existing laws for payment services under the Payment Systems (Oversight) Act 2006 and the Money-Changing and Remittance Businesses Act 1979 and established new requirements relevant to digital asset businesses.

The Monetary Authority of Singapore (MAS) has since issued A Guide to Digital Token Offerings, last revised in May 2020, which refers to the Payment Services Act, the Securities and Futures Act (SFA), and the Financial Advisers Act. The Guide explains that issuance of "digital tokens may be regulated by MAS if the digital tokens are capital markets products under the SFA." Tokens which are not a medium of exchange accepted by the public, payment for goods or services, or discharge of debt are not considered digital payment tokens and are not subject to SFA requirements.

MAS has worked closely with the industry, most recently culminating in the Association for Cryptocurrency Enterprises and Start-ups (ACCESS) releasing a Code of Practice, a guide to help digital asset businesses improve regulatory compliance. Previously, MAS began work in 2016 on Project Ubin with J.P. Morgan, eventually involving other industry players; in 2020, MAS completed Phase 5, the final experimental phase, which demonstrated that it had "successfully developed a blockchain-based multi-currency payments network that enables payments to be carried out in different currencies on the same network."[59]

Meanwhile, Enterprise Singapore, the government agency in charge of promoting SMEs, and Temasek, the state-owned investment company, have invested in and supported numerous blockchain businesses. Singapore's relatively clear and concise rules for digital asset businesses, as well as its cooperation with and promotion of the industry, has made it an important hub for blockchain innovation.

UNITED ARAB EMIRATES

The United Arab Emirates has taken a unique approach to blockchain by fully embracing the technology to improve government efficiency. Beginning in 2016, Sheikh Hamdan Bin Mohammad Bin Rashid Al Maktoum launched the Dubai

Blockchain Strategy to improve efficiency by making 100 percent of Dubai's government transactions on a blockchain network by 2020.[61] The strategy also sought to create more blockchain jobs. In 2018, he announced the Emirates Blockchain Strategy 2021, under which 50% of UAE's government transactions will use blockchain by 2021.[61]

The UAE's cities have been especially supportive of blockchain businesses, and in January 2020, the Dubai Multi Commodities Center (DMCC) announced the creation of its own "DMCC Crypto Valley," which will "offer a variety of services including incubation for early-stage startups, co-working facilities, innovation services for corporate clients, blockchain and entrepreneurship training, education, events, mentoring and funding."[62] Meanwhile, the Financial Services Regulatory Authority of the Abu Dhabi Global Market has published regulations and guidance on accepted crypto assets, ICOs, and crypto asset businesses.

MAURITIUS

The Island of Mauritius took steps to proactively construct a regulatory environment aimed at encouraging innovation and development on the island. The adoption of the Economic Development Board Act in the National Assembly on July 19, 2017 formalized a "regulatory sandbox," a legal framework specifically designed for licensing activities that are not yet regulated.

Mauritius issued an open call to innovators to take advantage of its new Regulatory Sandbox License. Applicants must demonstrate that their project is innovative, beneficial to the Mauritian economy, and cannot be accommodated in the innovator's home jurisdiction due to legal or regulatory gaps. In particular, the Government of Mauritius is seeking to attract fintech start-ups.

Specific conditions are attached to the granting of a license under the sandbox regime. *The Economic Development Board Act* lists four conditions that could lead to the suspension of a license under this regime. This suspension may occur, for example, if the project is viewed as a threat to the reputation of the island.

As part of its plan to create a fintech hub "in and for" Africa, Mauritius has become "the first jurisdiction in the world to offer a regulated environment for digital asset custody," according to the Mauritius Financial Services Commission. On March 1, 2019 a regulation came into force that requires any person carrying out custody services for digital assets to apply for a custodian services license. To receive a license, applicants must meet certain governance, minimum capital, cybersecurity, and AML requirements.

KAZAKHSTAN

As part of the Kazakh government's new policy on digitizing the economy, the country established the Astana International Financial Center (AIFC).

AIFC is like a country within a country; modeled on Singapore and Dubai business centers that have English as the main language, AIFC operates under U.K. securities and corporate law, offers visa and tax waivers for global financial players to set up shop, and promotes experiments with blockchain and digital assets. AIFC aims to attract investment in the economy by building a favorable environment for investments in financial services, developing regional capital markets, asset management, fintech, and Islamic finance.

AIFC is trying to create supportive conditions for the development of blockchain technologies without sacrificing necessary consumer protections. Concrete steps that have already been taken include AIFC's formal classification of digital assets, smart contracts, wallets, and other applications common to the digital currency market. Kazakhstan's open policy towards digital assets, coupled with low electricity costs, have made it an attractive location for Bitcoin mining operations. In 2019, government digital currency mining projects committed the equivalent of $20 million USD. In June 2020, the Central Bank of Kazakhstan announced its intention to make the country a central market for digital assets by doubling investments in Bitcoin mining.

SECTION V

OBSERVATIONS AND NEXT STEPS

Blockchain technology and digital assets have grown and evolved across geographies and industries, often organically and through grassroot initiatives. For the technology to reach its full potential, we must scale. Before we can do that, the industry must coordinate, collaborate, and harmonize regulations and standards. The following topics are proposed workstreams around which the broader blockchain community should coalesce to further progress in this industry:

Education

Education is crucial to ensure regulators and other stakeholders grasp the value of blockchain technology. However, as is the case with any new tool, the potential of blockchain, as well as its benefits and risks, cannot be completely or correctly understood or anticipated at this early stage. Creating platform-agnostic regulatory frameworks, which focus on uses instead of the underlying technology, will enable regulators to build better, more sustainable models that remain relevant even as technology continues to evolve. Many jurisdictions have embraced the idea of regulating uses of the technology while refraining from regulating the technology itself. But in order to build on this trend, decision makers must be educated with thoughtful, accurate, digestible information.

Taxonomies

Regulators are rarely technologists, which makes building functional regulatory frameworks for new technologies a challenge; something as seemingly straightforward as defining the technology becomes complex. Over the years, numerous blockchain taxonomies have emerged, but so far none have been universally accepted or adopted, making consistent regulations across (or within) jurisdictions difficult. While writing this report, we were challenged to clearly differentiate digital assets from crypto assets from cryptocurrencies from virtual currencies. Taxonomies are beginning to move towards a set of common definitions thanks to industry bodies. However, confused language remains a pain point. The broader community must prioritize finding greater consensus on common definitions and taxonomy.

Fragmentation and Information Silos

The fragmentation of approaches, both worldwide and within certain jurisdictions, is both indisputable and unsurprising. Existing efforts to coordinate across jurisdictions have been piecemeal at best and chaotic at worst. Much existing fragmentation adds unnecessary confusion and complexity. Breaking through traditionally siloed bodies of information, industries, and geographic barriers will facilitate more functional frameworks. Blockchain is already a tool which facilitates myriad solutions and new uses are consistently being uncovered.

Use cases and applications of the technology should be the primary focus of regulators seeking to provide clarity for innovators and comfort to consumers. Cross-industry partners must come together to inform the path forward.

Collaboration on Standards

As global actors construct new solutions to address society's toughest challenges, shared standards are needed to facilitate responsible innovation. There are both gaps and overlaps in the current landscape of blockchain and DLT-related standards. This may be alleviated through increased cross-entity collaborations. On the other hand, there may be aspects of DLT that are not yet mature enough for standardization. Moving towards standardization too early may stifle innovation or lead to skewed or adverse incentives. As such, the time frame in which standards are developed is critical. These aspects must be carefully scoped to identify a projected timeline for revisiting the topics.

Organizational Strategies and Planning

Organizations should proactively scope their strategies for their involvement in standards creation, whether through ecosystem collaboration or independently, and how they will be implemented.

Dynamic Guidance

Much existing regulation and standardization focuses specifically on digital assets, as opposed to blockchain or DLT technology more broadly. As new uses for the technology continue to emerge, dynamic or principles-based guidance will be better suited to adapt. Regulators should take advantage of regulatory sandboxes and innovation hubs to create more effective regulations.

Blockchain's potential is significant, but its realization is not guaranteed. As actors across the world attempt to construct societies' next great edifices, effective access to substantive information across countries and continents will be key to facilitating impactful and responsible innovation for all. These reports are intended to serve as a resource for the blockchain community and beyond, assessing the current landscape and evaluating where there may be gaps, overlaps, inconsistencies, and conflicts.

The scope and urgency of these efforts will intensify in the months and years ahead. We invite all interested organizations to reach out to us as we embark upon Version 2.0. We look forward to collaborating with you and to delivering a decade of transformational breakthroughs. We welcome feedback, additional contribution, support, and partnership as we continue to build and expand upon the reports and update the datasets. This is just the beginning. Join us.

GBBC Global Blockchain Business Council

SECTION VI: APPENDIX A

GSMI INDUSTRY BODIES AND ASSOCIATIONS OVERVIEW

CONTENTS

INTRODUCTION TO INDUSTRY BODIES AND ASSOCIATIONS

Myriad blockchain-related industry associations and consortia of varying sizes, memberships, and goals have been created — most in just the past 5 years. What may surprise readers is exactly how many.

A subteam of GSMI members, including the Global Blockchain Business Council (GBBC), Global Digital Finance (GDF), Accenture, and ESG Intelligence, collaborated on the following body of work. It demonstrates the breadth of activity in this realm and includes nearly 400 entities.

Despite the size of the list, it is not a comprehensive accounting of every organization representing the digital assets and blockchain technology community.

INITIAL ANALYSIS AND FINDINGS

The GSMI subteam focused on a subset of 50 active industry consortia and supranational organizations with the following highlights:

OVERVIEW

GSMI performed initial research on 21 supranational organizations and 29 industry consortia, both with a local jurisdictional focus and cross jurisdictional focus. Factors such as region and country of origin, standards, codes of conduct, working groups, publications and focus areas were considered.

The focus of these organizations spans from technical working groups, to the creation of industry standards, to the facilitation of regulatory consultation responses, to the publication of thought leadership and education materials, and the collaboration of industry networks.

KEY CHALLENGES

Aligning standards and codes of conduct across jurisdictions and industries

Ensuring that stakeholders of all sizes have a voice

KEY OPPORTUNITIES

51%

percent of industry and supranational organizations reviewed are actively exploring crypto assets, indicating promising future developments

15%

percent of industry and supranational organizations are focusing on centralized digital currencies, presenting an opportunity for further exploration in this space

COMMON GOALS

Among groups studied, the goals can be classified into three main categories:

1. Increase communication and collaboration with regulators and policy makers
2. Provide a forum for networking and cooperation between industry players
3. Encourage development of the blockchain and crypto industry through best practices, standards, and technical frameworks

RECOMMENDATIONS

Continue to enhance collaboration between organizations to better align standards and best practices

Increase promotion of centralized digital currency efforts among supranational organizations, especially outside Europe

Further research and analysis of industry organizations and their respective missions

Create a list of relevant foundations including blockchain networks (both public and private)

21 SUPRANATIONAL ORGANIZATIONS

BANK OF INTERNATIONAL SETTLEMENTS, COMMITTEE FOR MARKETS AND PAYMENTS INFRASTRUCTURE

COUNCIL FOR THE EUROPEAN UNION

EUROJUST

EUROPEAN BANKING AUTHORITY

EUROPEAN CENTRAL BANK

EUROPEAN COMMISSION

EUROPEAN PARLIAMENT

EUROPEAN SECURITIES AND MARKETS AUTHORITY

EUROPEAN UNION BLOCKCHAIN OBSERVATORY AND FORUM

EUROPEAN UNION INTELLECTUAL PROPERTY OFFICE

EUROPOL

FINANCIAL ACTION TASK FORCE

FINANCIAL STABILITY BOARD

G20

INTERNATIONAL MONETARY FUND

INTERNATIONAL ORGANISATION OF SECURITIES COMMISSIONS

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

WORLD ECONOMIC FORUM

WORLD FEDERATION OF EXCHANGES

WORLD BANK

29 INDUSTRY CONSORTIA REVIEWED INCLUDE

ACCESS

ADAN

ASSOCIATION OF FINANCIAL MARKETS IN EUROPE

BLOCKCHAIN ASSOCIATION

BLOCKCHAIN AUSTRALIA

BLOCKCHAIN4EUROPE

CHAMBER OF DIGITAL COMMERCE

COINSCRUM

CRYPTO ASSET LAB

CRYPTO UK

CRYPTO VALLEY ASSOCIATION

CRYPTOVALUES

ELECTRONIC MONEY ASSOCIATION

ENTERPRISE ETHEREUM ALLIANCE (EEA)

FINANCIAL MARKETS LAW COMMITTEE

FIX TRADING

FRENCH DIGITAL ASSET ASSOCIATION

GLOBAL BLOCKCHAIN BUSINESS COUNCIL (GBBC)

GLOBAL DIGITAL FINANCE (GDF)

HONG KONG FINTECH

HYPERLEDGER, THE LINUX FOUNDATION

IDAXA

INATBA

INTERWORK ALLIANCE (IWA)

ISDA

JAPAN VIRTUAL CURRENCY EXCHANGE ASSOCIATION

SINGAPORE FINTECH

KOREA BLOCKCHAIN ASSOCIATION

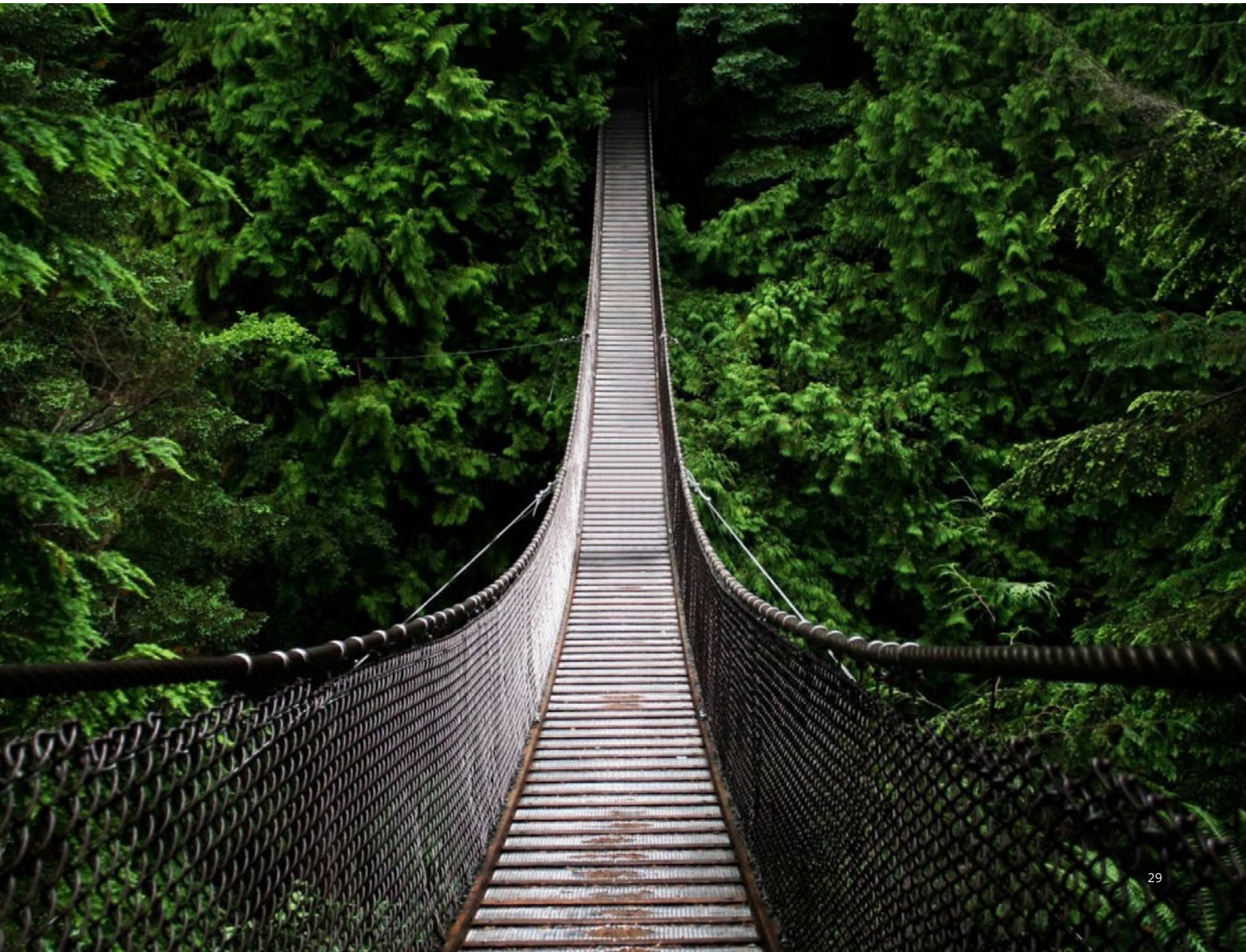
VIRTUAL COMMODITIES ASSOCIATION

NEXT STEPS

There are many groups around the world working to bring together various parts of the blockchain technology and digital assets community. The proliferation of groups is a testament to the importance of collaboration and the multi-stakeholder approach is necessary to success in this field.

Some of the prevailing questions about these groups include: What are the commonalities? Where are the overlaps? Do we need greater collaboration and potentially consolidation of efforts to create an impactful, global voice?

We have just scratched the surface of this additional seminal work and ask members of the global community to take part and support with future work streams to gain a better picture of what each catalogued group's mission is compared to the needs of the industry. Only then will be able to fill the gaps and realize blockchain's full potential.



INDUSTRY CONSORTIA LIST

We are grateful to our research partners for this portion of the report, who include Accenture, ESG Intelligence, and GDF.

+CityxChange Consortium

AB InBev, Accenture, APL, Kuehne + Nagel and a European customs organization consortium

ABCCD Consortium

Abu Dhabi Global Market Consortium (AGDM)

Acala Network

ACCESS, the Singapore Cryptocurrency and Blockchain Industry Association

Accord Project

Addenda Insurance Blockchain

AdLedger

Adschain Consortium

Advertising ID Consortium

Africa Blockchain Alliance

AI4VBH Consortium

Alastria Blockchain Consortium

Alberta Blockchain Consortium

Aliança Portuguesa de Blockchain

Alliance for Prosperity (Celo Alliance)

AMIS Blockchain Consortium*

Ampersand Consortium

Anti-Human Trafficking Intelligence Initiative

APAC Provenance Council

ArabianChain Technology

Arianee Consortium

Artemis Transaction Engine

Asia Blockchain Promotion Global Consortium

Asia Pacific Provenance Council

Asosiasi Blockchain Indonesia

Aston Alliance*

Aura Consortium

Australian National Blockchain Consortium

Automated Vehicle Safety Consortium (AVSC)

Automotive Solution Center for Simulation of Electronic Vehicles

B3i

Bankchain Consortium*

Bay Area Trade Finance Blockchain Platform

B-DER Project

Belt and Road Consortium*

B-hub Blockchain for Europe

BLOC Bunker Consortium
BLOC Maritime Blockchain Labs Dangerous Goods Misdeclaration Consortium

BLOC Maritime Blockchain Labs Marine Fuel Assurance Consortium

BLOC Maritime Blockchain Labs Seafarer Certification Consortium

Block4Coop

Blockchain Australia

Blockchain Bundesverband - The German Blockchain Association

Blockchain Collaborative Consortium (BCCC)

Blockchain Connect Association/Czech Alliance

Blockchain Consortium for Science – Bloxberg

Blockchain Education Alliance

Blockchain for Clinical Supply Chain

Blockchain for Europe

Blockchain for Social Impact Coalition

Blockchain Game Alliance Consortium

Blockchain Global Entertainment Alliance (BGEA)

Blockchain Hub Spain

Blockchain in Transport Alliance (BiTA)

Blockchain Innovation Alliance

Blockchain Insurance Industry Initiative (B3i)

Blockchain Interoperability Alliance

Blockchain project of The Pistoia Alliance

Blockchain Research Insitute

Blockchain Robotics Engineering Consortium (BREC)

Blockchain Service Network

Blockchain for Aviation (BC4A)*

Bloomen Consortium

Bloxberg

BRICS Bank consortium*

Busan Medical Data Trading Consortium

CableLabs - Cable Industry Technology Consortium

Canadian Blockchain Consortium (Formerly Alberta Blockchain Consortium)

CargoX

Carrier Blockchain Study Group (CBSG)

Centre Consortium

Certified Origins

ChainZy Cov-ID Project

Chamber of Digital Commerce ChinaLedger Consortium*

Chinese Telecom Blockchain Consortium

Chinese Banks Consortium*

CHIP initiative

Chongqing Blockchain Application Innovation Industry Alliance

Ci5 Consortium

Circularise Plastics

Clipeum project

CLSNet Consortium

Coadjute Consortium

Coalesce Health Alliance

Collateral Protection Insurance Consortium (CPIC)*

Commercio Consortium

Communications Blockchain Network (CBN)

Confidential Computing Consortium

Consortium Chain Settlement Systems

Consortium for ad-buying blockchain

Consortium of Indian Banks

Consortium Chain Settlement System*

Consortium of Indian Life Insurers*

Construction Blockchain Consortium (CBC)

Contour (Formerly Voltron)

Convergence Alliance

Covantis

Covid19 Alert! Initiative

COVID-19 Credentials Initiative (CCI)

COVID-19 health passport consortium

Credit Card Industry Consortium

CULedger Consortium

Cyprus Blockchain Consortium

Cyprus Blockchain Technologies

DCARPE Alliance

DECENTER Project

Decentralised technologies for orchestrated Cloud-to-Edge intelligence (DECENTER) project

Decentralized AI Alliance (DAIA)

Decentralized Identity Foundation (DIF)

DGLD network

Diamante Blockchain Consortium

DID Alliance

DID Working Group - W3C

Dig_IT Project

Digital Asset Alliance (DAA)

Digital Credentials Consortium

Digital Currency Governance Consortium

Digital Dollar Project

Digital Yen Consortium

Distributed Identity Alliance (DIDA)

Distributed Technologies Research

Dubai Economic Department and banks consortium

Dubai International Financial Centre (DIFC) and Mashreq consortium

Dutch Blockchain Coalition

Dutch Companies Consortium*

E4NET Consortium

Electron Consortium

Embleema Health Blockchain Consortium

Energy Blockchain Consortium

Energy Web Foundation (EWF)

Energy-Blockchain Enterprise Coalition

Ensuresec Consortium

Enterprise Ethereum Alliance (EEA)

E-port area blockchain alliance

Equigy

eTradeConnect - Hong Kong Trade Finance Platform (HKTFP)

European Blockchain Partnership

European Telecommunications Standards Institute Consortium - Permissioned Distributed Ledger Group

Execution Intelligence Group (E24P)

EY Blockchain Logistics Consortium in Austria

FIDEIUSSIONI DIGITALI (Digital Guarantees)

Finacle Trade Connect

Financial Innovation Roundtable

Financial Blockchain Shenzhen Consortium*

Finastra Fusion LenderComm Consortium

Finnish Companies Consortium

FinTech Association

Fitting Hub Platform Consortium

Fnality International Consortium

Food Industry Blockchain Consortium

Food Safety Alliance*

Food Trust Framework Consortium*

Foodlogiq Blockchain Consortium

Forcefield Consortium

Foundation for Interwallet

Operability (FIO) Consortium

FundChain Consortium*

Fusion LenderComm

Gasnet

Genomic Blockchain Consortium*

Global Blockchain Business Council (GBBC)

Global Blockchain Protocol Consortium

Global Consortium for Digital Currency Governance

Global Digital Bank Consortium Blockchain Investment Fund

Global Financial Innovation Network (GFIN)

Global Legal Blockchain Consortium (GLBC)

Global Shipping Business Network (GSBN) Consortium

Global Blockchain Protocol Consortium*

GMeRitS — Generalised Merits for Respect and Social Equality

GS1 Consortium - France

Hashed Health Consortium

Health Utility Network Consortium

Hedera Consortium

Hyperledger, The Linux Foundation

Hyundai-AutoEver Consortium

IBM Food Trust

ID2020 Alliance

I-DELTA

India Trade Connect

Initial DID Association

Innovative Medicines Initiative (IMI)

Blockchain Enabled Healthcare program

Integrated Engineering Blockchain Consortium (IEBC)

Interbank Information Network

International Association for Trusted Blockchain Applications (INATBA)

International Chamber of Commerce (ICC) Consortium

International Decentralized Association of Cryptocurrency and Blockchain (IDACB)

InterWork Alliance (IWA)

ISITC Europe Blockchain Working Group*

ISO/TC 307

Israeli Blockchain Association

Italian Wonders

IZNES

Japan Contents Blockchain Initiative

Japan Exchange Group (JPX)

Japan Payment Card Consortium

Japanese Electricity Trading Consortium

Japanese Home Leasing Consortium

JICWEBS DLT Industry Consortium

JP Morgan Consortium /Interbank Information Network

KFB Consortium

Kinakuta*

Klaytn Governance Council

Know your Customer (KYC) blockchain consortium

KOFIA Consortium blockchain project

Komgo Consortium

Korea Financial Investment Association (KOFIA) - managed blockchain consortium

Korean Real Estate Consortium chain

Kuknos Consortium

Kyobo Life Insurance Consortium

LACChain Alliance

Latin American Technology Consortium

Learning Credential Network

Libra Association

Liquid Network

Lygon Consortium

M.Video Russian Banks Consortium

Marco Polo Consortium

Maritime Blockchain Labs Consortium*

MBL Dangerous Goods Misdeclaration

Consortium*

Medical Tourism Consortium

MediLedger

MELLODY Consortium

Metal Repo Financing Consortium

MF Technologies JV*

Midwest Blockchain Consortium

Mil.k Alliance

MineHub Technologies Consortium

Minerac Consortium*

Mining and Metals Blockchain initiative

MiPasa

Mobility Open Blockchain Initiative (MOBI)

MRO Blockchain Alliance

Multichain Asset Management Association (MAMA)*

Multiparty Computation Alliance

Muzika Blockchain Consortium

Mvideo Russian Banks Consortium*

My Health My Data (MHMD) Consortium

MyID Alliance

National Blockchain and Distributed Accounting Technology Standardization Technical Committee

NatWest blockchain consortium

Natwest Consortium

NEAR Foundation

Niuron

Nomura Institute of Capital Markets Research Consortium

Nordic Blockchain Association

NPCI Consortium

Ocean Shipping Logistics Blockchain Consortium*

Olefang Global Consortium

Ondiflo Consortium

OOC Blockchain Consortium

Open Geospatial Consortium (OGC) - Blockchain and Distributed Ledger Technologies DWG

Orange-Safe.press Consortium

PanaBIOS

Partchain Project

PetroBLOQ Global Blockchain Industry Consortium*

Petroleum Trade Consortium

Pharmaceutical Utility Network (PhUN)

Pharmaledger

PhUSE - Blockchain Technology Working Group
PhUSE Consortium

Pistoia Alliance

Polymath and KABN consortium

Portuguese Blockchain Alliance (ALL2BC)

Preservation / Claims Alliance Chain

PRIVILEDGE Consortium

ProCredEx and Hashed Health Consortium

Project DECODE

Project Jasper

Project Kitchain

Project Plasma

Project Proton

Project Trado

Project Ubin

PTDL Group (Post-Trade Distributed Ledger Group)

Public Health Blockchain Consortium

PUBLISHalliance

R3 Consortium

RAG Wangiri Blockchain Consortium

Rapid Supplier Connect

Real Estate Consortium chain

reciChain

Redesigning Trust: Blockchain for Supply Chains

Regen Network

RemediChain Consortium

Ren Alliance

Responsible Minerals Initiative (RMI)

Responsible Sourcing Blockchain Network

Retail Blockchain Consortium (RBC)

Reynen Court Consortium

RomanAgora - an Identity Verification Consortium

ROUGE project

Ruschlikon Initiative

Russian Association of Cryptoindustry and Blockchain

Rymedi DSCSA Project

Safe.press

SAP Consumer Goods, Retail and Agribusiness Industry Consortium

SAP High Tech Industry Blockchain Consortium

SAP Life Science & Pharmaceutical Industry Consortium

SAP Consumer Goods, Retail and Agribusiness Industry Consortium*

SBI Ripple Asia

SBI Ripple Japanese Bank Consortium

Scalable Protocol Alliance

Seam's Blockchain Consortium

Secure Additive Manufacturing Platform (SAMPL Consortium)

Security Token Ecosystem

Shipping Industry Consortium*

SIAE Consortium

Smart Contracts Alliance

South African Financial Blockchain Consortium (SAFBC)

South African National Blockchain Alliance (SANBA)

Sovrin Foundation

ST Research Consortium

Steel Industry Chain Blockchain Alliance

STONledger Consortium

StopCOVID Project

Suning's Blacklist Sharing Consortium*

Swiss Blockchain Consortium

Swiss Industry Blockchain Consortium*

Swiss-German Venture

Synaptic Health Alliance

Taiwan Banks Consortium*

TBSx3 Consortium*

Tech Against Corona

Thailand Blockchain Community Initiative

The Blockchain Alliance

The Blockchain Association

The Blockchain Industry Group (BIG)

The Blockchain Turkey Platform

The British Blockchain Association

The Central Bank of Argentina (BCRA) blockchain-powered clearing system

The Food and Drug Administration (FDA) Consortium

The Government Blockchain Association (GBA)

The HANSEBLOC consortium

The Hong Kong Blockchain Society

The Industrial Internet Consortium

The Institutes RiskStream Collaborative

The Investing and Saving Alliance (TISA)

The Kyobo Life Consortium

The Millbrook Accord Consortium

The MiSE Project

The Netherlands-based Public Health Blockchain Consortium (PHBC)

The Open Impact Foundation

The Polish Accelerator of Blockchain Technology

The Proof of Stake Alliance (POSA)

The Spunta Project

The Swiss-Polish Blockchain Association (SPBA)

TKI Dinalog Blockchain Consortium

Tmall – Rice Tracking Consortium*

ToIP Foundation

TOKEN Project

Token Taxonomy Initiative

Toyota Blockchain Lab

TRACE-RICE

TradeLens Consortium

TradeTrust Consortium

Tradewaltz

TRUEngine Consortium

Trust over IP (ToIP)

Trust Your Supplier

TrustChain Initiative*

Trusted Blockchain Telecom Application Group

Trusted IoT Alliance

Trustworthy Accountability Group

UAE Trade Connect

Unit-e Project

Universal Protocol Alliance

University Consortium Malaysia

Vakt Global

Velocity Network Foundation

Verification for Autonomous Driving

Verified.Me Network

Vinturas Consortium

Wall Street Blockchain Alliance (WSBA)

we.trade Consortium

WEF Project for Supply Chain

World Blockchain Trade Consortium

World Energy Consortium

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