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BANKING BLUEPRINT FOR THE CRYPTO WORLD

(Adoption of crypto assets by the banks)

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ABSTRACT:

Due to the rapid development of entropy and connectedness technologies, numerous activities in our daily brio someone been merged online and they beautify solon stretched and statesman good. A Brobdingnagian growing in signal of online users has activated realistic language concepts and created a new acting phenomenon which is cryptocurrency to assist the business activities much as purchasing, marketing and trading. The use of realistic acceptance has transform distributed in many incompatible systems in recent age. Realistic money is not full limited and regulated hence most of the countries eff not admitted this nowness in their scheme activities. This report investigates virtually cryptocurrency mouth legality as shaft as tally responded in cost of regulations & legislations towards crypto currencies to instruct a unclouded ikon of its combat on different laws in India in position to adjust it.

The cryptocurrency activity has been described as radical due to the unceasing bailiwick phylogenesis and conception that the blockchain bailiwick provides. Guiding some to anticipate that this could be the incoming tread for the nominal taxon, right similar how fiat acceptance replaced gold. Cryptocurrencies were originally created to be a represent of savings or income for the unbanked, concentrate costs and force activity, for a effectuation of accumulation clearness and to remove financial intermediaries. It is undeniable that the cryptocurrency activity has created a change of opinions, as any appear to explore the marketplace advance time others judge the intellection of adopting this innovation bailiwick completely. This meditate focuses on the representation and intention to use cryptocurrencies. Swimming into previous

poverty to be explored advance. A valued way was victimized to stitchery accumulation from 102 participants. The findings indicated that action and try prospect as the most authoritative variables for cryptocurrency acceptance, as people assay tendency as what benefits cryptocurrencies can furnish for them when they reason unable of using the innovative engineering. Phytologist may be shy of cryptocurrencies as they consider that trading these assets increases essay and requires lengthy and dear due industriousness. Withal, digital currencies can give umpteen benefits to business institutions and their customers.

Introduction

The fast development of the crypto ecosystem presents new opportunities. Subject conception is ushering in a new era that makes payments and different financial services cheaper, faster, more reachable, and allows them to flow across borders swiftly. Crypto asset technologies acquire potency as a agency for faster and cheaper cross-border payments. Ridge deposits can be transformed to constant coins that let fast hit to a vast regalia of financial products from digital platforms and tolerate instant presenters rebirth. Suburbanised management could get a level for author original, inclusive, and transparent financial services. Despite voltage gains, the rapid maturation and maximising adoption12 of crypto assets also constitute financial changelessness challenges. This chapter discusses the implications of the discussion of the crypto ecosystem and provides an categorization of their associated financial stability risks. For emerging mart and nonindustrial economies, greater use of crypto assets presents few benefits, but also macro-financial risks, especially

Crypto Assets Continue to Grow through Ups and Downs

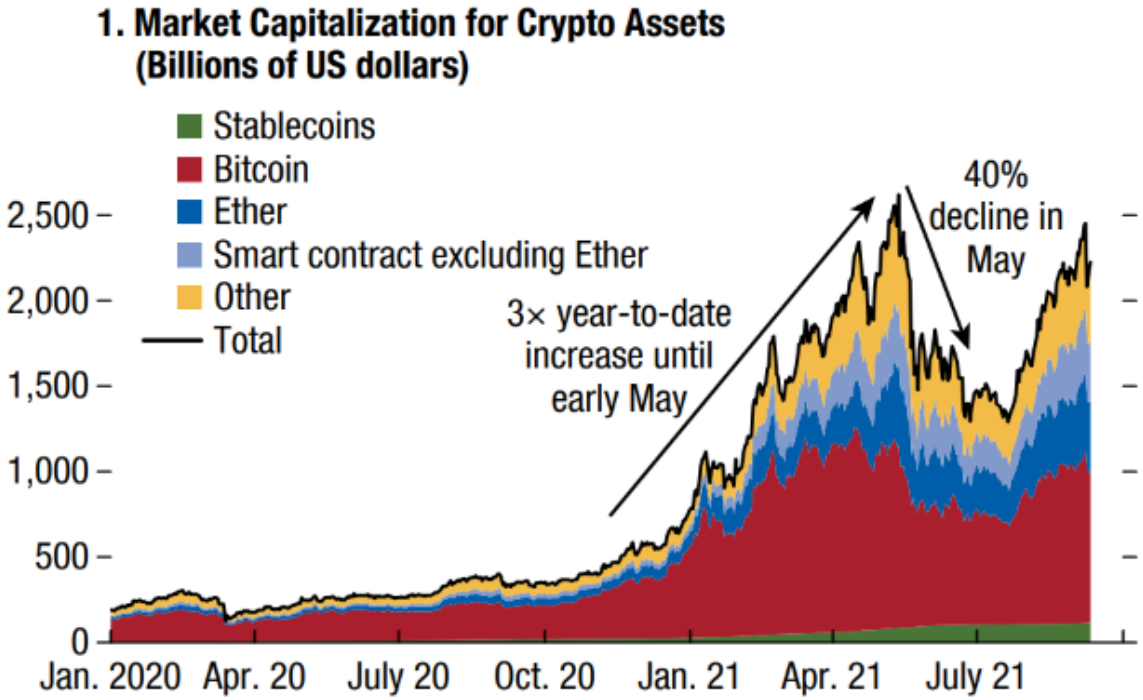
The market capitalization of crypto assets has grown significantly amid galactic bouts of value volatility. Finished young May, the market exploitation nigh tripled in 2021 to an all-time last of $2.5 cardinal (Illustration 2.1, commission 1). This was followed by a 40 pct break in May as concerns from institutional holders near the environmental result of crypto assets grew and global regulatory investigation of the crypto ecosystem escalated. The penetrative declines during May were possible exacerbated by continuance of crypto assets has raised again to author than $2 trillion-a 170 proportionality increase period to escort at the instant of writing. Despite probative cost perceptiveness, the returns of non-stable coin crypto assets are lower imposing when adjusted for irresoluteness.

A key component of the seem in marketplace writing is exploding investor touch in stablecoins; newer technologies, such as Ethereum; different "hurting bidding" blockchains; and decentralised management.

- ✓ Stablecoins
- ✓ Ethereum and other “smart contract
- ✓ Decentralized finance (DeFi)

Crypto Ecosystem Market Developments

The market value of the ecosystem increased dramatically in 2021 and expanded beyond Bitcoin.



The Financial Stability Implications of Crypto Assets

In Oct 2018 the Financial Stability Live ended those crypto assets did not acquit a substance try to international financial firmness (FSB 2018) but identified various transmittal channels that could happening its assessment. These channels permit risks from the size of market estimate, investor sureness personality, risks arising from move and circuitous exposures of financial institutions, and risks from the use of crypto assets for payments and settlements.

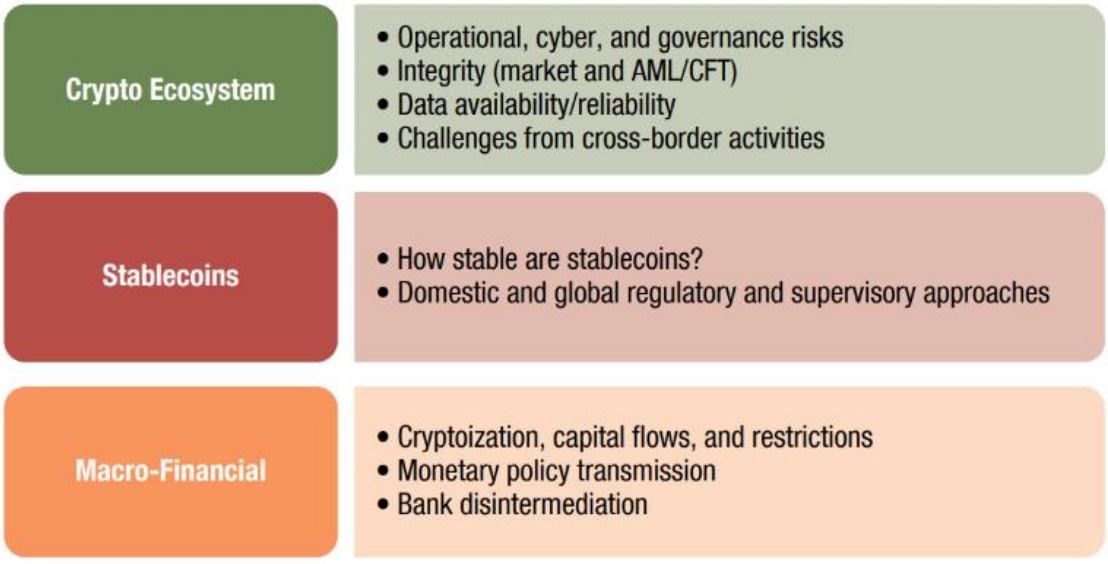
Since then, both of these channels make grown notably, and new sources of danger love emerged.

- **Market capitalization has grown** by a cipher of 10 and is now parallel to whatsoever habitual asset classes (for monition US high-yield bonds). It is allay pocketable, still, compared with regime hamper and repute markets in great modern economies.
- **Episodes of loss of confidence in crypto assets** so far feature had limited spill overs to broader markets

despite gigantic fluctuations in crypto asset valuations. Authority personality from failures of crypto asset providers bang also been small so far. Nonetheless, their importance is ascension as trading volumes in few countries' exchanges someone enlarged dramatically and, in any cases, are comparable to the volumes of their several housewifely grow exchanges.

- **Exposures to crypto assets** in the banking grouping are ontogeny, albeit from a low substructure. Exposures appear to be ontogeny faster among whatever nonbank institutions, most notably hedgerow funds,78 which can graphite to augmented tortuous exposures of the banking grouping.
- **The use of crypto assets for payments and settlements** is comfort controlled, with some exceptions (see the "Cryptoization" separate). This point can accelerate rapidly, precondition that several round defrayals companies' jazz only new started to integrate with the crypto ecosystem, in primary with stablecoins.
- Finally, **new sources of risk are emerging**, specified as stablecoins and DeFi, which did not survive on a biggish flake in 2018. In the time, a widely utilized constant coin or DeFi delivery with a hit and use crosswise treble jurisdictions could hit up speedily and prettify systemically important.

Financial Stability Challenges



The Bitcoin Origin Story

In late 2008, around the hour of the monetary emergency, a notable post showed up on a mostly secret web gathering entitled Bitcoin: A shared electronic money framework. It was composed by a strange individual called Satoshi Nakamoto, a pen name to mask the creator's actual personality.

Satoshi felt that the banks and legislatures had an excessive force that they utilized in the matters. Satoshi imagined another sort of cash called Bitcoin that could change that: cryptographic money that wasn't controlled or run by national banks or state-run administrations, that you could send anyplace all over the planet for nothing, with no individual or foundation in control.

At first, no person paid interest in Satoshi's wild ideas – however slowly increasingly humans commenced shopping for and the usage of Bitcoin. Many believed it changed into the destiny of money, and the more severe the massive banks behaved the greater famous it became. Since it changed into formulated and released in 2009, Bitcoin has grown to a community of around 10,000 "nodes" or member which use the Proof of Work device to validate transactions and mine bitcoin.

This democracy prevailed till the improvement of precise mining computer systems referred to as ASICs which overtook different much fewer effective machines, and groups started to benefit from accumulating miners and mining technology. It remains feasible for a person to participate in the Bitcoin process; however, it's far highly priced for installation. The go back on funding fluctuates with the fantastically risky cost of bitcoin itself.

Today, large mining swimming pools are owned or managed via way of means of huge corporations, and strength is centralizing again. This evolution has extremely undermined Satoshi's authentic imaginative and prescient for blockchain wherein the "strength" of individuals become designed to be flippantly distributed – however, is now focused withinside the palms of 1/2 of a dozen mining conglomerate.

Challenges Posed by the Crypto Ecosystem

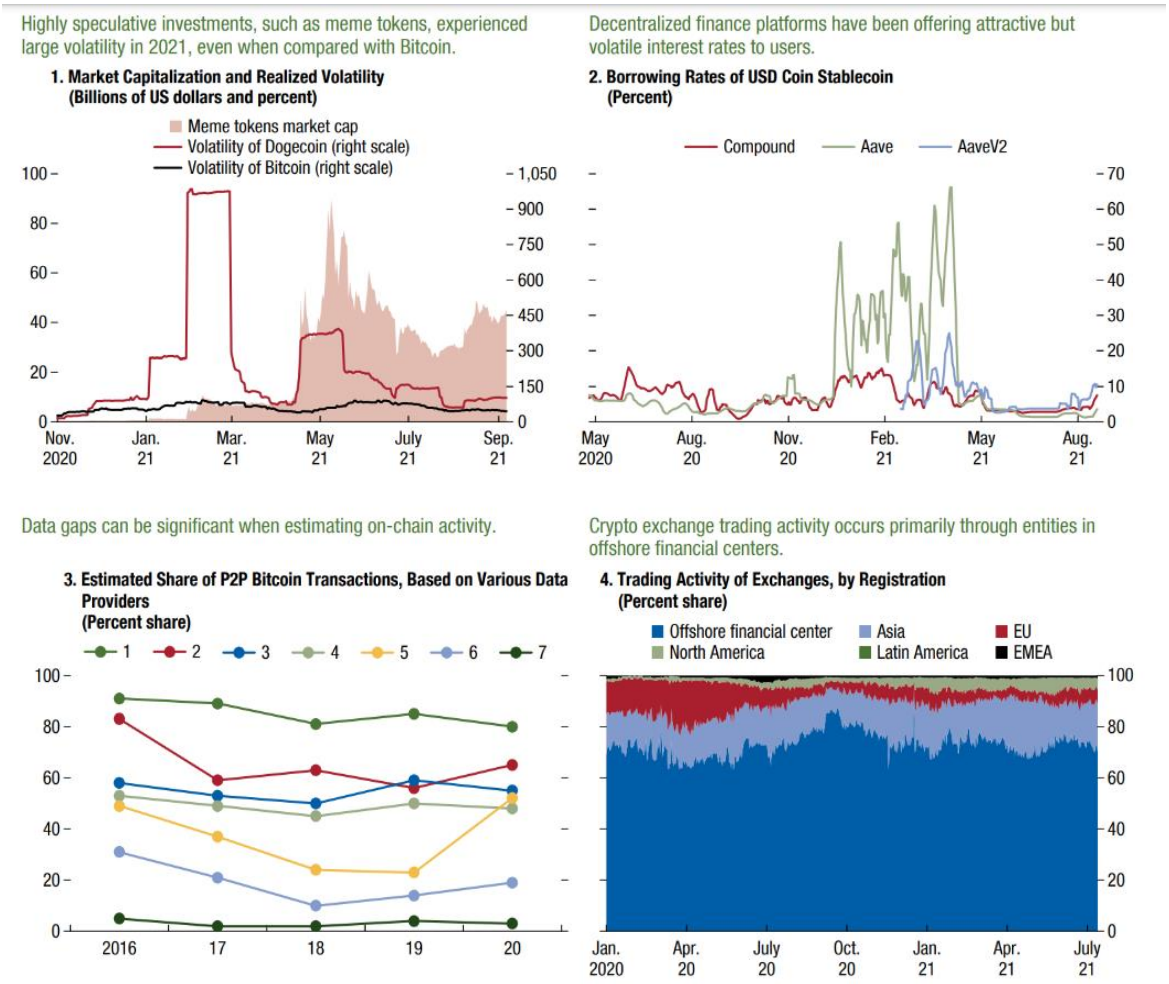
The rapid development of the ecosystem has been accompanied by the entering of new entities, whatever of which eff indigent fighting, cyber risk management, and brass frameworks.

- **Operational risks** can result in portentous downtime when failures and disruptions foreclose the use of services and even prove in larger losses of client finances. Such risks bang coincided with periods of flooding dealing state and can outcome from poorly fashioned systems and controls. For representative, on May 19, when liquidations of leveraged positions peaked, prima exchanges according outages, citing "network crowding."
- **Cyber risks** let high-profile cases of hacking-related thefts of client funds. Much attacks direct approximate on centralised elements of the ecosystem (for lesson, wallets and exchanges) but can also

resist on the consensus algorithms that underpin the noesis of blockchains.

- **Governance risks** regard the want of icon around issuance and spacing of crypto assets and score resulted in investor losses.

Crypto Ecosystem Challenges



Literature Review

This chapter will explore current literature and provide an overview of theoretical research to evaluate the aim of this study and establish fundamental background knowledge to compose research objectives. The researcher will delve into literature based on the **An Adoption of crypto assets by the banks**, more specifically cryptocurrencies.

1. **Radical Innovation:**

In the modern world, technological changes can be seen as the most powerful component of growth.

2. **Adoption and Attitude:**

Over time there have been various conceptual models for understanding consumer acceptance or adoption of new technology and radical change. Traditionally, models that looked at the acceptance of technology focused on attitudes and usefulness.

3. **Financial knowledge:**

Cryptocurrencies are wise as a financial product. Financial Knowledge has been circumscribed as the extent of noesis a somebody holds virtually financial concepts and the capacity in which they can cover their noesis for financial judgement making. There has been a appreciable total of research that illustrates business noesis existence a prophetic compute for financial conduct.

Business literacy is famous for beingness cogent in the financial firmness making transmute, this is because group with low levels of business literacy are considerably little liable to enthrone in stocks and shares. This was also demonstrated in Lusardi and Astronomer's (2014) literature recall, that the greater the financial noesis the greater the probability is to equip in business and fund markets. Higher levels of business noesis are not always discovered by the state of breeding, whether that is uninteresting or unforced, it can be seen as the knowledge to drop money, act in any programme that can goodness financially, and the action of financial products, as wellspring as the statesman unsettled an organism is with their everyday payment (Stolper & Conductor, 2017). Explore has also shown the nonstop Periodical 2, 2021, pp.109-144 114 services specified as accomplishment cards, mortgages, finance and retirement savings organization suchlike.

4. **Social aspects effects on gender acceptance:**

There are studies regarding the difference between genders in technological acceptance, overall, it is seen that males are more confident in their ability to use new technology compared to the female. This effects how females accept new technology, which results in women typically exhibiting lower levels of attitude towards technology. When looking specifically at gender differences with regards to cryptocurrency, it is easy to see that acceptance could differ due to a amount of exposure. While the men still make up of over 50% of cryptocurrency investors, for women an accumulate as roughly 40% is astonishing considering a nearly 2 out of 3 women feel they are limited to a cryptocurrency exposure, this exposure could include all channels of media and general conversation because of the assumption women are less interested in finance or technology.

5. **Socio-economic and demographic factors:**

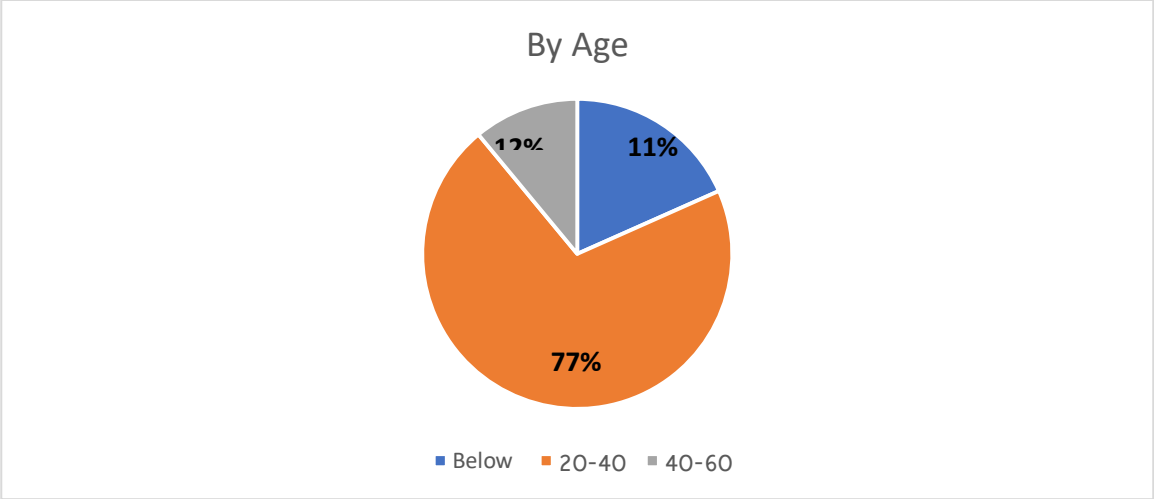
The survey shows the mass adoption and knowledge of cryptocurrency in India at present.

- **By Age**
- **By Geographic Region**
- **By Industry**
- **By Cryptocurrency**

- **By Age:**

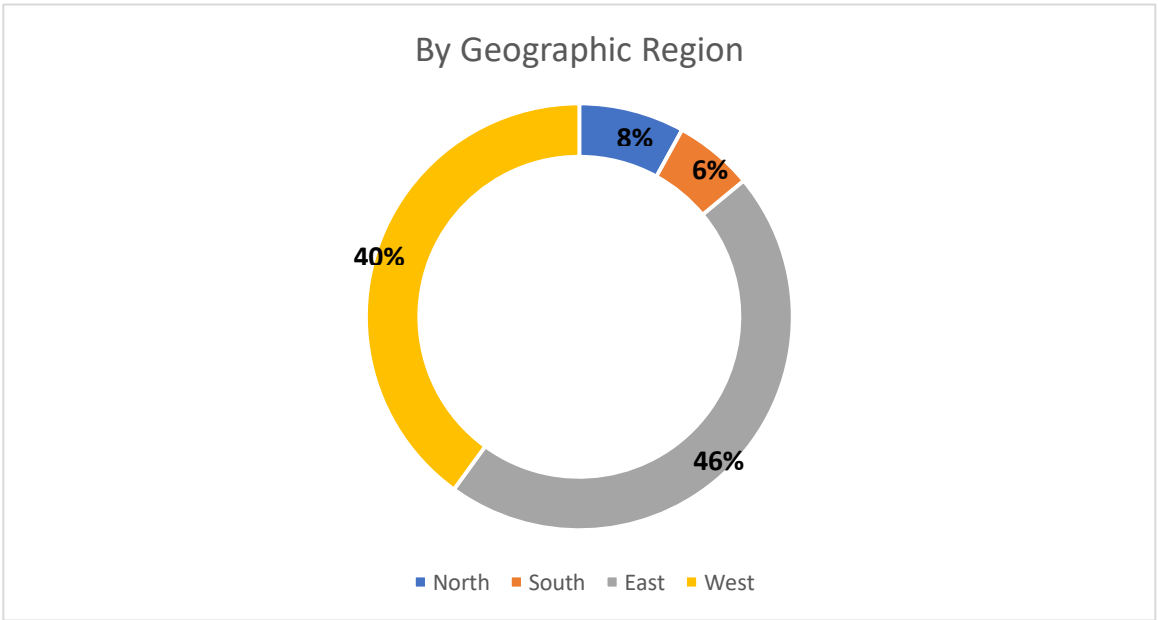
The Analytics Insight survey showed that Indians who prefer to buy cryptocurrencies or have an interest in the cryptocurrency market are mostly in the age range of 20-40, the tech-savvy generation. Since there is a legal issue with transactions through cryptocurrencies from the Government of India, almost all age groups of Indians have started taking initiatives to have a strong understanding of the cryptocurrency market and its benefits.

As per the survey, out of 281 respondents, 77.0% of the respondents were in the age group between 20 years to 40 years old who were highly interested in the cryptocurrency market. 12.0% belonged to the age group 40-60 years old while only 11.0% comprised the age group below 20 years.



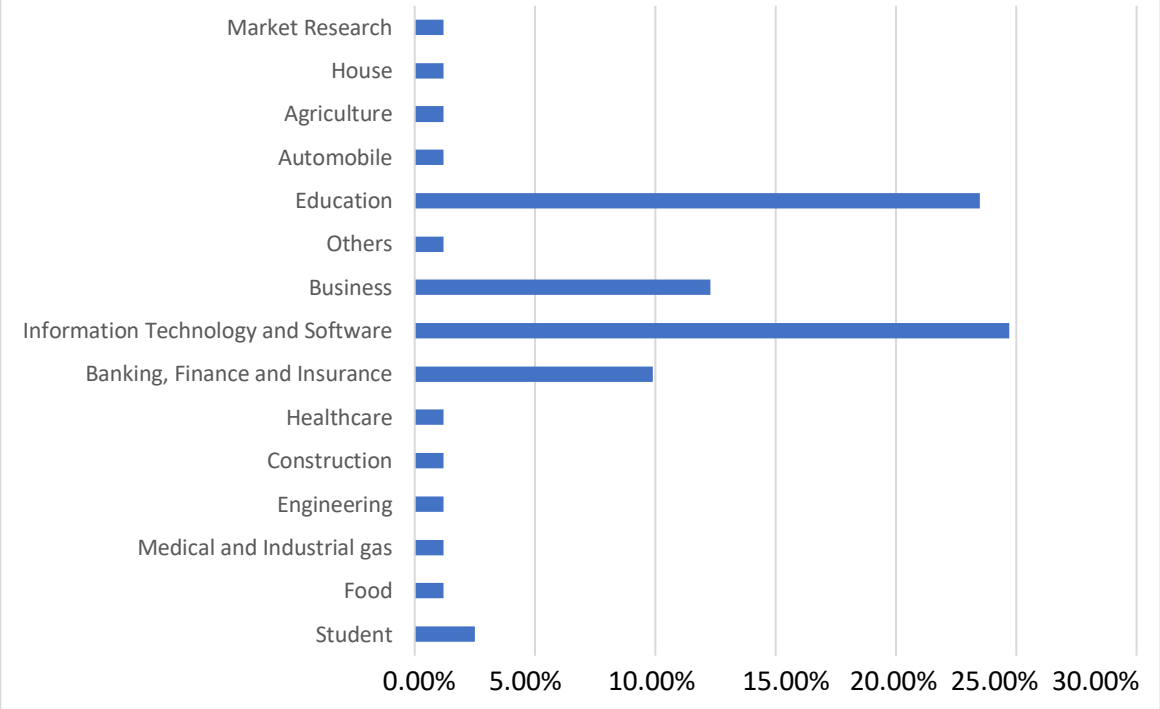
❖ **By Geographic Region**

Cryptocurrencies are thriving in every strain of the mankind despite exploit illegal from a few countries. The cryptocurrency activity can cover pain decision-making processes to present alternative fast defrayment options according to the geographical locations. The findings in the Analytics Intuition examine revealed that the feature realm of Bharat including Mumbai, Pune, etc. has the maximal signal of investors for fashionable cryptocurrencies. On the fundament of geographical part, out of 281 respondents, 40.0% belonged to the Westernmost of Bharat patch the Northern part was in the endorse attitude with 8.0%. Tagging in the gear function was the East of Bharat with 46.0% whereas it could be seen that the South-westerly Amerindian location had shown only 6.0% interest in cryptocurrency in India with 46.0% whereas it could be seen that the South Indian region had shown only 6.0% interest in cryptocurrency in India.



❖ **By Industry**

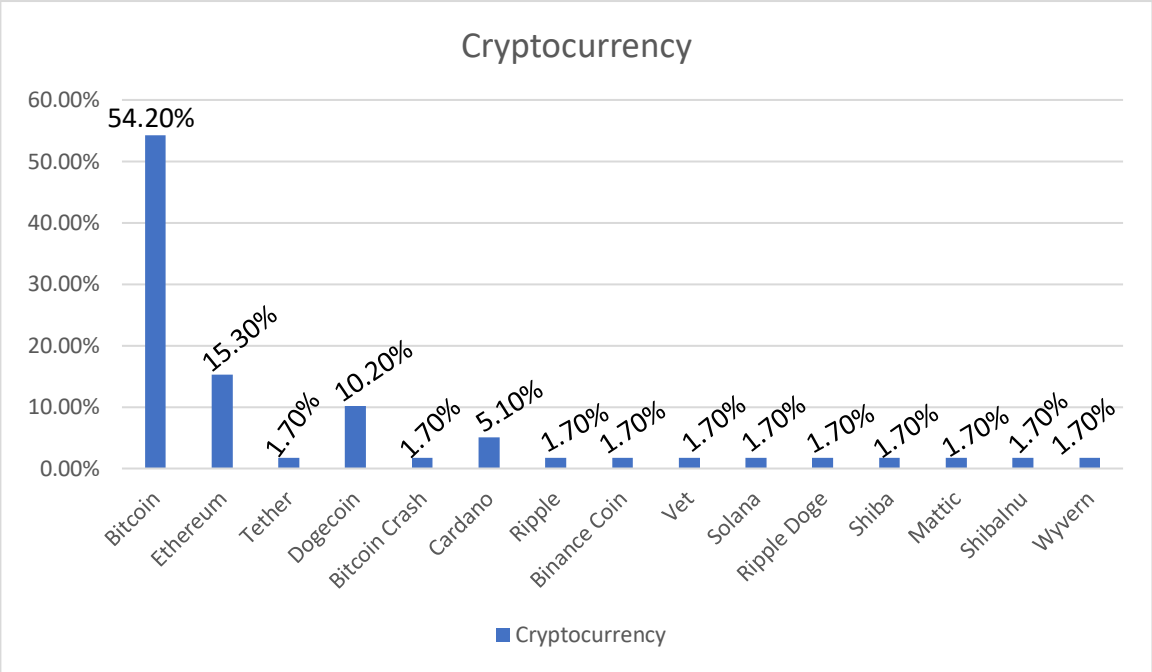
It is estimated that the cryptocurrency-tech marketplace in India can add an scheme appraise of US$184 cardinal in 2030. Thus, double Amerindian industries love started investment blockchain engineering for seamless commercialism processes with cryptocurrencies. 281 respondents apply in diametrical industries and this looking showed that grouping from virtually all kinds of industries are highly interested in cryptocurrencies. According to the analyze of Analytics Perceptivity with 281 respondents, the highest confine of respondents belonged to the aggregation technology and software manufacture with 24.7% spell the 2nd business was the education business at 23.5%, followed by the job sphere with 12.3%. The banking and financial manufacture as source as the media and diversion business consisted of 9.9% of the respondents. It is followed by 1% of the



❖ **By Cryptocurrency**

he rising demand for multiple cryptocurrencies such as Bitcoin, Dogecoin, Ethereum, and hundreds of others has created a major impact on the economy of any country. Being a developing country, India is now focused on the cryptocurrency market and multiple investors, business people, companies, banks, and other financial institutions have started taking a huge interest in popular cryptocurrencies. Thus, this survey showed that the maximum respondents are interested in Bitcoin to yield profit in the nearby future.

The survey showed that 54.2% of the 281 respondents were highly interested in Bitcoin while Ethereum had 15.3% interest. Dogecoin is favorable to 10.2% of the respondents followed by Cardano with 5.1%. A survey further revealed that other cryptocurrencies such a Tether, Bitcoin Cash, Ripple, Binance Coin, Shiba, Ripple, Solana, and many more are favorable to 1% of the respondents each.



Cryptoization

Crypto adoption in some emerging market and developing economies has outpaced that of advanced economies. According to a recent survey, the top five countries using or owning crypto assets in 2020 were emerging market and developing economies, whereas the lowest adopters were generally advanced economies (Statista 2021). Another recent survey (Finder 2021), with a more limited set of countries, also reaches similar conclusions, placing emerging market economies in Asia among the top and advanced economies, such as the United Kingdom and the United States, among the bottom. Some emerging market country-specific surveys also show a large jump in adoption over the past year.1920 Beyond surveys, tracking country-specific adoption can be challenging. So far, there is no reliable way to estimate the stock or flow of crypto assets based on country residency. A commonly used proxy is residency estimates based on internet visits to websites of crypto asset providers. These confirm the survey data to show the popularity of several global crypto exchanges among emerging market and developing economies, but they cannot measure the actual use of crypto assets.

Cryptoization Risks

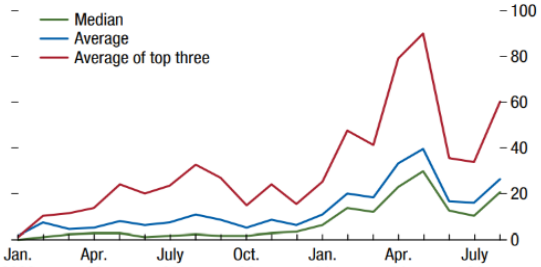
EMDE residents are among the top visitors of major crypto exchange websites.

1. Geographic Breakdown of Internet Visitors (Unique visitors, October 2020–June 2021)

Economies	BINANCE	HUOBI	COINBASE	KRAKEN	FTX	BITHUMB	BITFINEX
Top economy 1	Turkey	China	United States	United States	Turkey	Korea	Russia
Top economy 2	Russia	Ukraine	United Kingdom	Germany	Korea	Russia	Taiwan Province of China
Top economy 3	United Kingdom	Vietnam	Spain	France	China	Turkey	Germany
Top economy 4	Brazil	United States	Germany	United Kingdom	Taiwan Province of China	United States	Ukraine
Top economy 5	Argentina	Russia	France	The Netherlands	Hong Kong SAR	Poland	Brazil

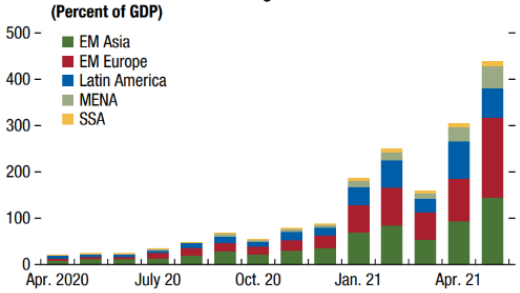
Volumes in local exchanges have grown rapidly and are comparable to some equity markets.

2. Volumes of EMDE Registered Crypto Exchanges (Percent share of local equity exchange volumes)



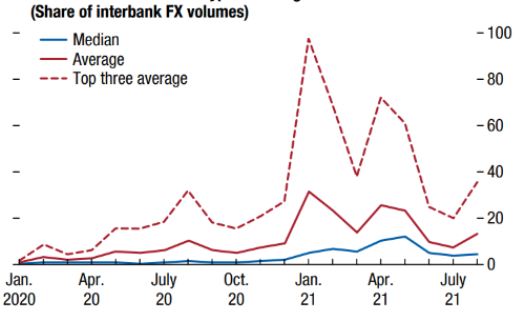
The amount of value received on-chain has grown rapidly by some estimates.

3. Value Received On-Chain among 50 EMDEs (Percent of GDP)



Off-chain trading volumes against some EMDE FX pairs have shown large volatility in 2021.

4. Volumes of EMDE FX on Crypto Exchanges (Share of interbank FX volumes)

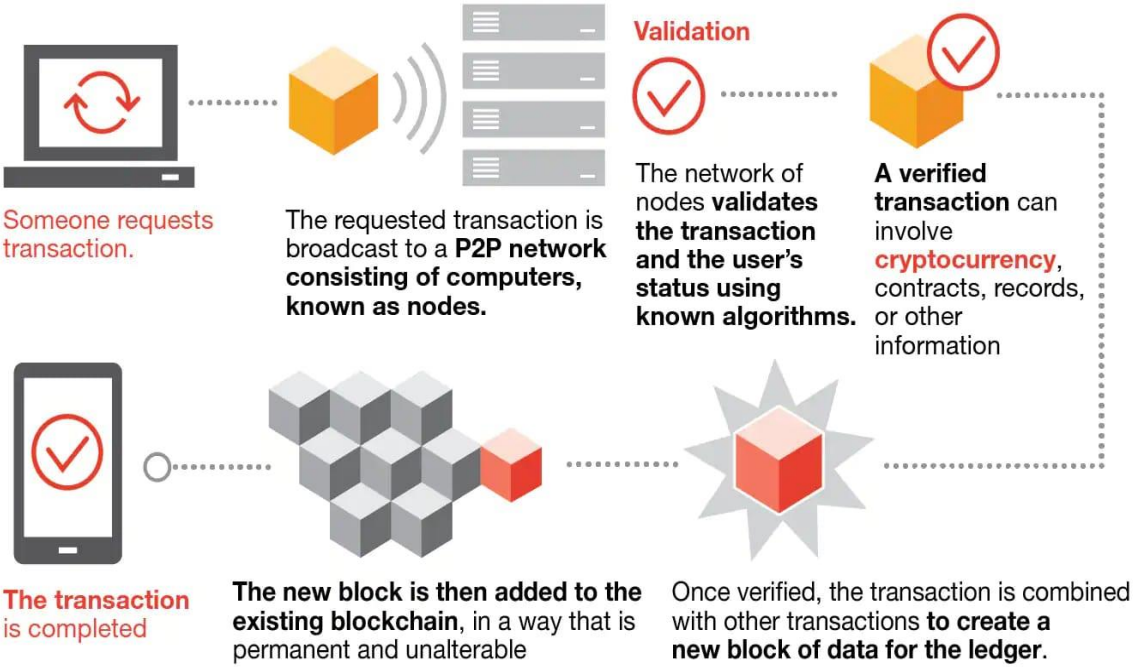


How is blockchain used in cryptocurrency?

Blockchain is the technology that enables the existence of cryptocurrencies (among other things). Bitcoin is the name of the most famous cryptocurrency, which is the invented blockchain technology. Cryptocurrency is a medium of exchange, as the US dollar, but it is digital and uses cryptographic techniques to control the generation of currencies and verify transfers.

A blockchain is a **decentralized** ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without a need for a central clearing authority. Potential applications can include fund transfers, settling trades, voting, and many other issues.

Blockchain's benefits and unknows:



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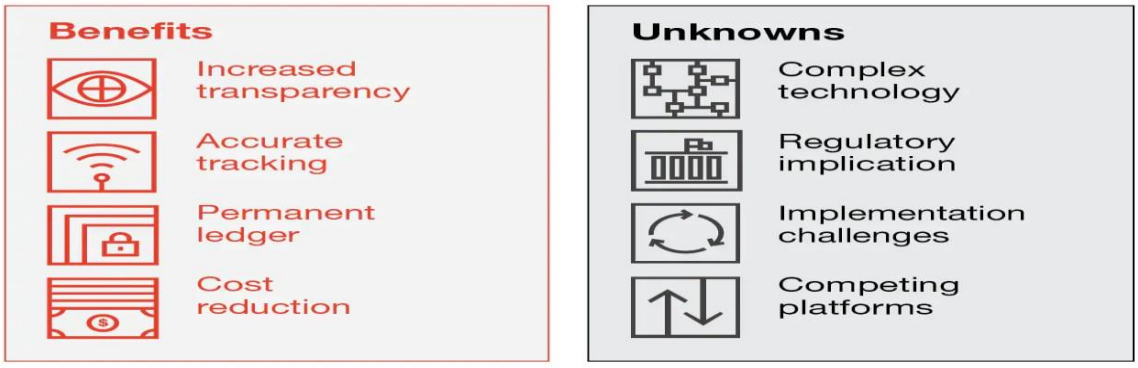


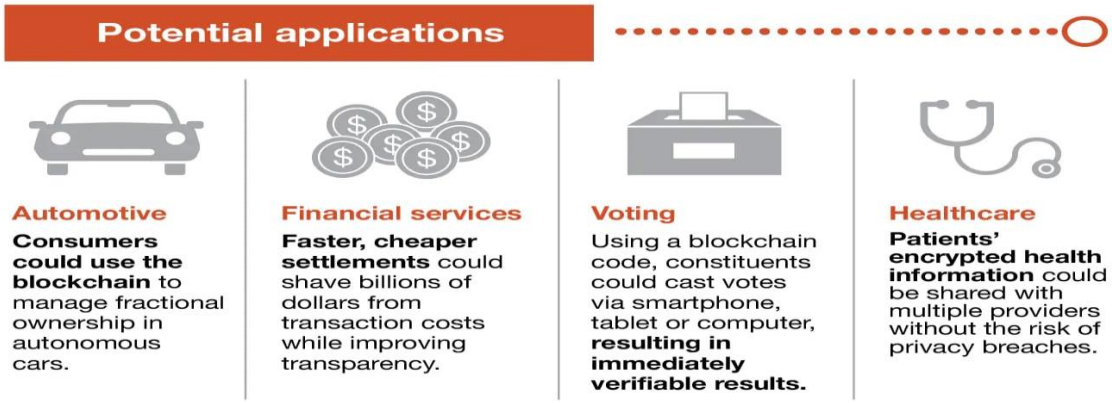
The purpose of blockchain is to allow digital information to be recorded and distributed, but not edited. In this way, the blockchain is the basis of an immutable ledger or record of transactions that cannot be modified, deleted, or destroyed. This is why blockchain is also known as Distributed Ledger Technology (DLT).

The **concept** of blockchain was first proposed as a research project in 1991 and before the first widespread application, Bitcoin in 2009. Since then, the use of blockchain has exploded with the creation of various cryptocurrencies, demand for ng for centralized finance (DeFi) applications. Non-fungible tokens (NFTs) and smart contracts.

Blockchain Decentralization : Imagine that an organization owns a server farm with 10,000 computer systems used to hold a database keeping all of its client's account statistics. This organization owns a warehouse construction that consists of all of those computer systems below one roof and has complete manipulation of every of those computer systems and all the statistics contained inside them. This, however, offers a single factor of failure. What takes place if the power in that region is going out? What if its Internet connection is severed? What if it burns to the ground? What if a terrible actor erases the entirety with an Annmarie keystroke? In any case, the information is misplaced or corrupted. A blockchain permits the information held in that data set to be fanned out among a few organization hubs in different areas. This makes overt repetitiveness as well as keeps up with the constancy of the information put away in that assuming someone attempts to modify a record at one occurrence of the data set, different hubs wouldn't be adjusted and subsequently would keep an agitator from doing as such. Assuming one client alters Bitcoin's record of exchanges, any remaining hubs would cross-reference one another and effectively pinpoint the hub with the wrong data. This framework assists with laying out a careful and straightforward request of occasions. Along these lines, no single hub inside the organization can modify data held inside it.

Along these lines, the data and history, (for example, of exchanges of a digital currency) are irreversible. Such a record could be a rundown of exchanges, (for example, with cryptographic money), yet it additionally is workable for a blockchain to hold an assortment of other data like legitimate agreements, state IDs, or an organization's item stock.

Blockchain's potential applications



Blockchain vs. Banks

Blockchains have been proclaimed just like a troublesome power to the money area, particularly with the elements of installments and banking. Be that as it may, banks and decentralized blockchains are boundlessly unique.

To perceive how a bank varies from a blockchain, we should contrast the financial framework with Bitcoin's execution of blockchain.

FEATURE	BANKS	BITCOIN
SECURITY	Assuming the client practices solid internet security measures like using secure passwords and two-factor authentication, a bank account's information is only as secure as the bank's server that contains client account information.	The larger the Bitcoin network grows the more secure it gets. The level of security a Bitcoin holder has with their own Bitcoin is entirely up to them. For this reason, it is recommended that people use cold storage for larger quantities of Bitcoin or any amount that is intended to be held for a long period of time.
APPROVED TRANSACTIONS	Banks reserve the right to deny transactions for a variety of reasons. Banks also reserve the right to freeze accounts. If your bank notices purchase in unusual locations or for unusual items they can be denied.	The Bitcoin network itself does not dictate how Bitcoin is used in any shape or form. Users can transact Bitcoin how they see fit but should also adhere to the guidelines of their country or region.
HOURS OPEN	Typical brick-and-mortar banks are open from 9:00 am to 5:00 pm on weekdays. Some banks are open on weekends but with limited hours. All banks are closed on banking holidays.	No set hours; open 24/7, 365 days a year.
ACCOUNT SEIZURES	Due to KYC laws, governments can easily track people's bank accounts and seize the assets within them for a variety of reasons.	If Bitcoin is used anonymously governments would have a hard time tracking it down to seize it.
TRANSACTION SPEED	Card payments: 24-48 hours •Checks: 24-72 hours to clear •ACH: 24-48 hours •Wire: Within 24 hours unless international *Bank transfers are typically not processed on weekends or bank holidays	Bitcoin transactions can take as little as 15 minutes and as much as over an hour depending on network congestion.

TRANSACTION FEES	Card payments: This fee varies based on the card and is not paid by the user directly. Fees are paid to the payment processors by stores and are usually charged per transaction. The effect of this fee can sometimes make the cost of goods and services rise. •Checks: can cost between $1 and $30 depending on your bank. •ACH: ACH transfers can cost up to $3 when sent to external accounts. •Wire: Outgoing domestic wire transfers can cost as much as $25. Outgoing international wire transfers can cost as much as $45.	Bitcoin has variable transaction fees determined by miners and users. This fee can range between $0 and $50 but users can determine how much of a fee they are willing to pay. This creates an open marketplace where if the user sets their fee too low their transaction may not be processed.
PRIVACY	Bank account information is stored on the bank's private servers and held by the client. Bank account privacy is limited to how secure the bank's servers are and how well the individual user secures their information. If the bank's servers were to be compromised then the individual's account would be as well.	Bitcoin can be as private as the user wishes. All Bitcoin is traceable but it is impossible to establish who has ownership of Bitcoin if it was purchased anonymously. If Bitcoin is purchased on a KYC exchange, then the Bitcoin is directly tied to the holder of the KYC exchange account.
KNOW YOUR CUSTOMER RULES	Bank accounts and other banking products require "Know Your Customer" (KYC) procedures. This means it is legally required for banks to record a customer's identification before opening an account.	Anyone or anything can participate in Bitcoin's network with no identification. In theory, even an entity equipped with artificial intelligence could participate.
EASE OF TRANSFERS	Government-issued identification, a bank account, and a mobile phone are the minimum requirements for digital transfers.	An internet connection and a mobile phone are the minimum requirements.

Pros and Cons of Blockchain

For the entirety of its intricacy, blockchain's true capacity as a decentralized type of record-keeping is nearly unbounded. From more noteworthy client protection and elevated security to bringing down handling charges afeweress mistakes, blockchain innovation might just see applications past those illustrated previously. However, there are likewise a few inconveniences.

Pros:

- ✓ Improved accuracy by removing human involvement in verification.
- ✓ Cost reductions by eliminating third-party verification.
- ✓ Decentralization makes it harder to tamper with.
- ✓ Transactions are secure, private, and efficient.
- ✓ Transparent technology.
- ✓ Provides a banking alternative and a way to secure personal information. for citizens of countries with unstable or underdeveloped governments.

Cons:

- ✓ Significant technology costs associated with mining bitcoin.
- ✓ Low transactions per second.
- ✓ History of use in illicit activities, such as on the dark web.
- ✓ Regulation varies by jurisdiction and remains uncertain.
- ✓ Data storage limitations.

The Adoption of Crypto Assets

Successful adoption of crypto assets hinges on network effects.

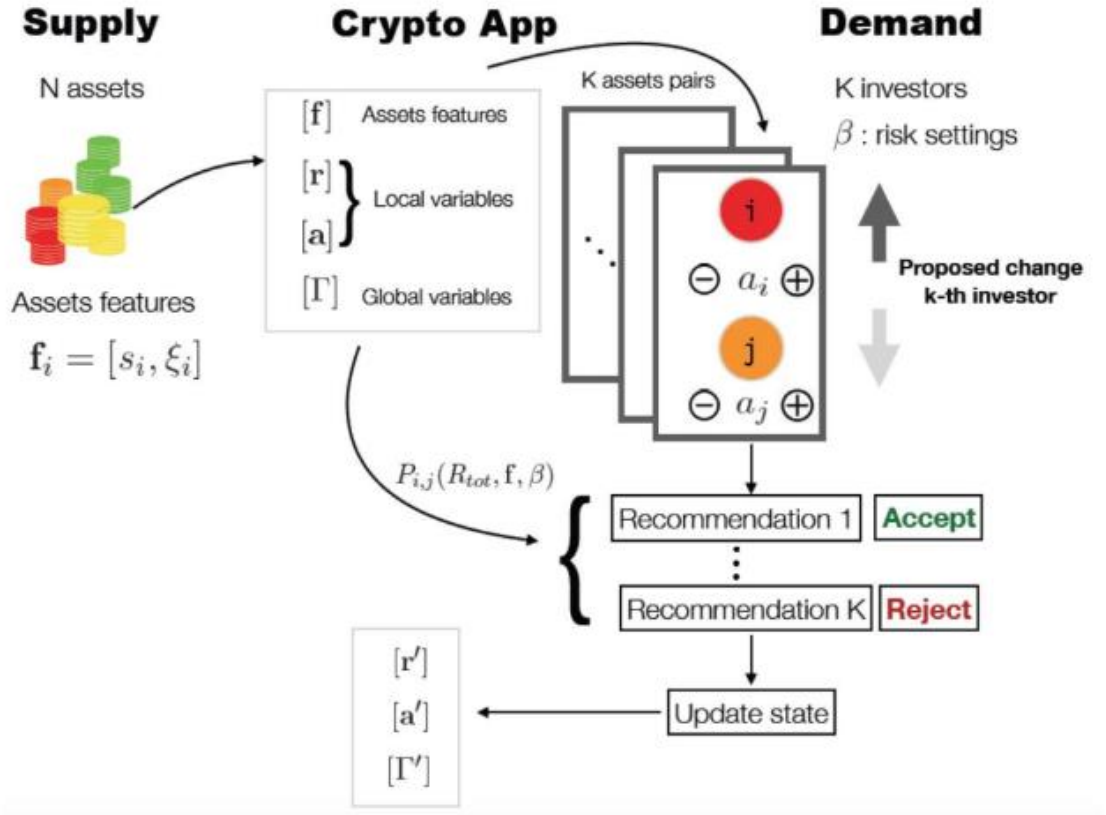
The concept is easy to describe: a good exhibits network effects if the value to a new user from adopting the good is increasing in the number of users who have already adopted it. This generates a positive feedback loop: the more users who adopt the good, the more valuable it becomes to potential adopters. This positive feedback loop also works in reverse: if adoption fails to reach a critical mass of users, the good or service may fall into a "death spiral" and ultimately disappear." Varian (2017) also points out that network effects are a demand-side rather than a supply-side, transactions costs or learning phenomenon: "Network effects are due

to value increasing with the number of units sold, while increasing returns to scale have to do with the cost declining or the quality improving with the number of units produced." The creator of Ethereum, Vitalik Buterin, outlined the following "[major] network effects at play in the crypto economic context8 :

1. **Security effect:** systems that are more widely adopted derive their consensus from larger consensus groups, making them more difficult to attack.
2. **Payment system network effect:** payment systems that are accepted by more merchants are more attractive to consumers, and payment systems used by more consumers are more attractive to merchants.
3. **Developer network effect:** there are more people interested in writing tools that work with platforms that are widely adopted, and the greater number of these tools will make the platform easier to use.
4. **Integration network effect:** third party platforms will be more willing to integrate with a platform that is widely adopted, and the greater number of these tools will make the platform easier to use.
5. **Size stability effect:** currencies with larger market cap tend to be more stable, and more established cryptocurrencies are seen as more likely (and therefore by self-fulfilling prophecy actually are more likely) to remain at nonzero value far into the future.
6. **Unit of account network effect**: currencies that are very prominent, and stable, are used as a unit of account for pricing goods and services, and it is cognitively easier to keep track of one's funds in the same unit that prices are measured in.
7. **Market depth effect:** larger currencies have higher market depth on exchanges, allowing users to convert larger quantities of funds in and out of that currency without taking a hit on the market price.
8. **Market spread effect:** larger currencies have higher liquidity (i.e. lower spread) on exchanges, allowing users to convert back and forth more efficiently.
9. **Intrapersonal single-currency preference effect:** users that already use a currency for one purpose prefer to use it for other purposes both due to lower cognitive costs and because they can maintain a lower total liquid balance among all cryptocurrencies without paying interchange fees.
10. **Interpersonal single-currency preference effect:** users prefer to use the same currency that others are using to avoid interchange fees when making ordinary transactions.
11. **Marketing network effect:** things that are used by more people are more prominent and thus more likely to be seen by new users. Additionally, users have more knowledge about more prominent systems and thus are less concerned that they might be exploited by unscrupulous parties selling them something harmful that they do not understand.

12. **Regulatory legitimacy network effect:** regulators are less likely to attack something if it is prominent because they will get more people angry by doing so".

Bartolucci-Kirilenko Optimal Crypto Assets Selection Model. Source: (Bartolucci and Kirilenko 2019).



The app presents each investor with a pair of crypto assets characterized by a certain security stability level; each investor compares the two assets and submits its preference for adopting one of the two to the app. The investor, then, receives a notification from the app on whether the proposed adoption is advisable given the assets' features, the choices of all other investors stored by the app, and the expected future economic benefits of adoption. Investors keeps on submitting their preferences over all pairs of crypto assets until their expected future economic benefits can no longer be improved upon. These steps are part of the optimal selection process. In the simulation of the optimal selection process, investors can choose within an ecosystem comprising four main types of crypto assets: high security/high stability, low security/high stability, high security/low stability, and low security/low stability. For expositional purposes, those assets can be assimilated with existing categories of crypto assets, namely central bank digital currencies (CBDCs), stablecoins (SC), crypto currencies (CC), and crypto tokens (CT). In Figure 2, we display the table with crypto assets categories organised according to their security and stability features taken from (Bartolucci and Kirilenko 2019).

Main Categories of Crypto Assets. Source: (Bartolucci and Kirilenko 2019).

Increasing Stability

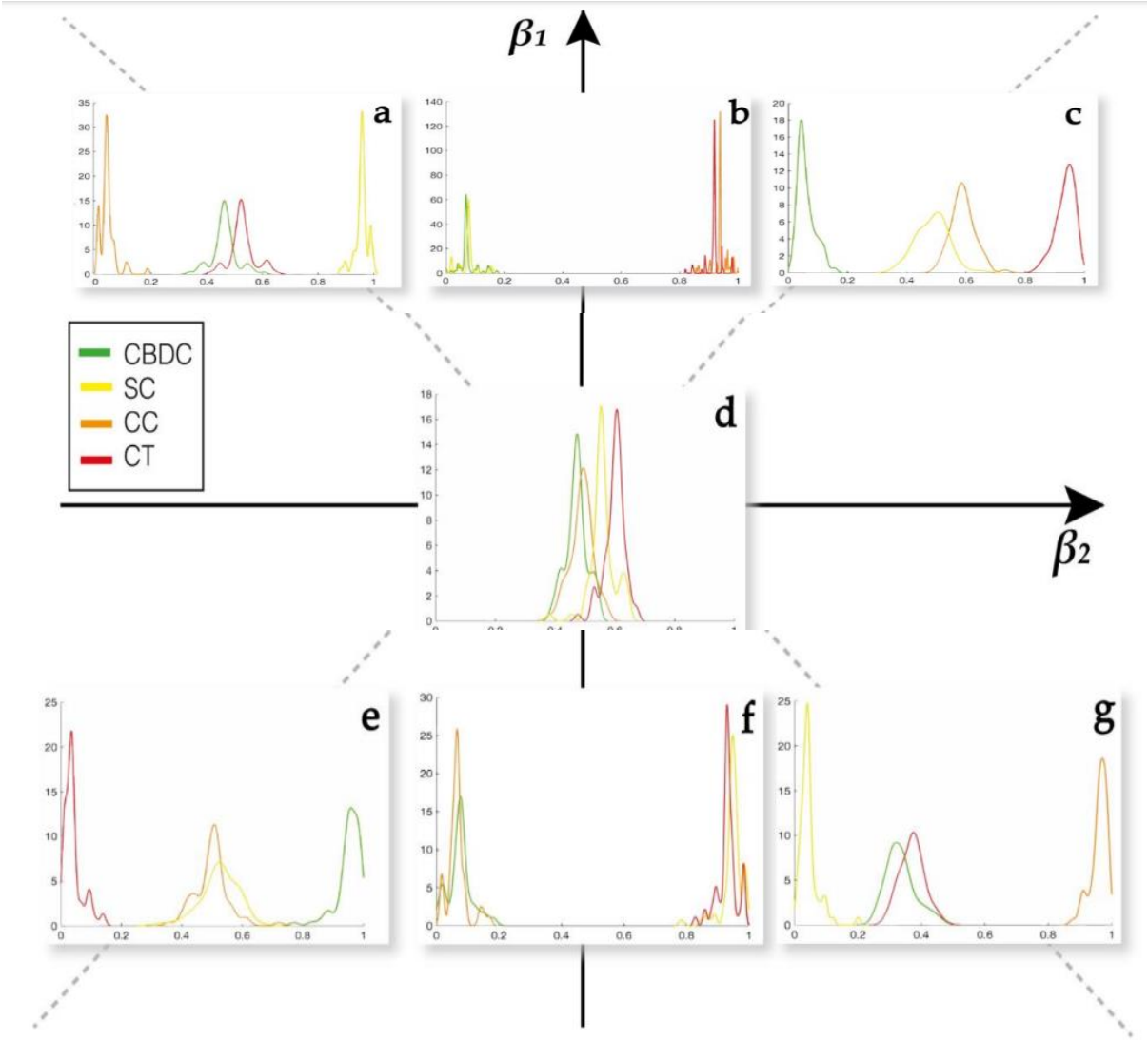
Security/ Stability	High Stability $\xi \geq 0.5$	Low Stability $\xi < 0.5$
High Security $s \geq 0.5$	Central Bank Digital Currencies	Cryptocurrencies
Low Security $s < 0.5$	Stablecoins	Crypto tokens

Increasing Security

A Central Bank Digital Currency (CBDC) “can be defined as either a digitally native form of fiat currency of a country or a balance held in a digital form in a reserve account at the country’s monetary authority”. Stablecoins (SC) “are crypto assets whose values are pegged to baskets of fiat currencies or cash equivalents, existing financial instruments, physical assets such as commodities, as well as baskets of other crypto assets”. Cryptocurrencies (CC) are “decentralized crypto assets relying on cryptography to secure the transfer of value between peers in the network”. This category, indeed, includes the first cryptocurrency–Bitcoin—and its successors (e.g. Ethereum, Monero, etc.). Crypto tokens (CT) are “tradable crypto assets and utilities built on

distributed ledger platforms". They correspond to utility tokens if their ownership also grants access to an existing or future product or service built on a blockchain.

Adoption of Crypto Assets



It is time for banks to engage with crypto assets customers

The adoption of crypto assets is moving from the financial periphery to the largest and most respected trading centers in the world. Banks cannot afford to miss the moment.

The crypto asset market is still small compared to traditional asset classes, but it's time to capitalize on the crypto phenomenon. The institutionalization of crypto assets, explored by various companies in their report continues to accelerate in today's turbulent economic environment. The mass adoption of these technologies is primarily:

(1) increased regulatory clarity;

(2) growing interest among investors;

(3) increasing acceptance of stable coins and central bank digital currencies (CBDCs);

(4) a robust ecosystem of commerce centered around crypto-assets (see Three promising areas of crypto innovation).

Regulatory clarity paves the way for mass adoption.

With increasing clarity from US regulators, more and more major banks are penetrating the crypto space by launching products, services, solutions, and operations designed to attract crypto-assist customers. At the same time, crypto companies are reinventing digital banking under state and federal banking charters and mimicking traditional banking by offering their core services. These two trends reflect the convergence of two previously distinct market segments.

The Office of the Comptroller of the Currency (OCC) recently provided greater regulatory certainty to national banks and federal savings associations, affecting hundreds of millions of Americans who trade billions of dollars a day in digital currencies. In July 2020, OCC issued an explanatory letter stating that banks in the national system have the right to provide cryptocurrency custody services to their customers.

In September 2020, the OCC announced that banks could hold a reserve for customers issuing stable coins, i.e., cryptocurrencies backed by fiat currencies such as the U.S. dollar. Finally, OCC announced on January 4, 2021 Work continued by issuing a dated explanatory letter. A statement that **national banks** and **federal savings institutions** can participate in the Independent Node Validation Network (INVN) and conduct payment transactions using stable coins.

The evolution of OCC has paved the way for many crypto companies. **Anchorage, Bit Pay, Paxos,** and **BitGo** have applied for national bank charters under the OCC regulatory framework, and on January 13, 2021,

Anchorage became the first national crypto bank to be approved5. The momentum of these applications in late 2020 and early 2021 will be a key indicator that cryptocurrency companies will continue to offer a wider range of products and services to the national customer base.

At the state level, Wyoming made history in the fall of 2020 by **offering** the first public special-purpose deposit institutions (SPDIs) to digital asset firms Kraken Financial and Avanti Bank & Trust.

The crypto advantage: -

While crypto assets have received mixed reactions from the press and are based on a notorious economy, proponents say the currency has the potential to solve some of the most challenging problems in the broader financial ecosystem and create new levels of openness, trust, and scale.

Accessibility: Crypto-assets help create a more open financial system, provide an alternative to traditional asset classes, and democratize financial access for more customers across the world. peer-to-peer exchange network.

Efficiency: Crypto-assets eliminate middlemen and fees. and other barriers to large transactions, creating a faster and cheaper global payment network. Open data on the blockchain enables an automated infrastructure and an always-open market.

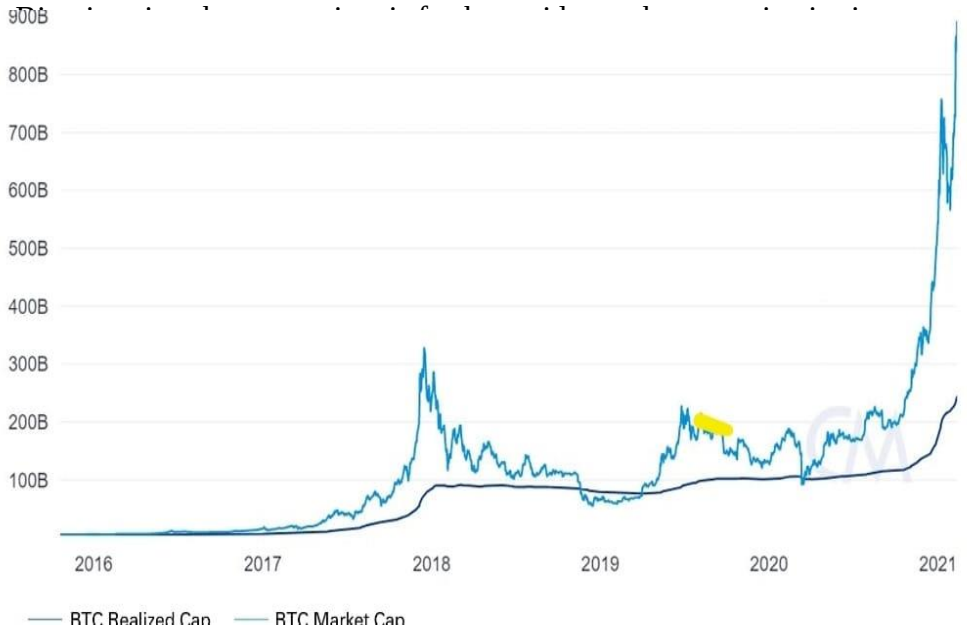
Transparency: As a native digital asset, crypto assets provide greater transparency throughout the life of the asset. A public blockchain ledger allows accounts and transactions to be independently verified and audited, providing real-time insight and greater certainty for custody and payments.

Growing investor and institutional interest

An increasing number of institutional investors are interested in cryptocurrencies, including well-known investment management leaders in the field. For example, BlackRock CEO Larry Fink has recently been relatively bullish on bitcoin, saying that it has the potential to develop into a global asset. His statement follows earlier announcements by billionaire investors **Paul Tudor Jones, Bill Miller,** and **Stanley Druckenmiller** that they own and recommend bitcoin. These recent positions can be seen as an institutional milestone for the cryptocurrency, serving to validate certain aspects of bitcoin with the mainstream investor community. Furthermore, activity in the institutional sector accelerated significantly in the second half of 2020, as more and more listed companies converted their fiat reserves into bitcoin.

Financial institutions have also expanded their participation. **Goldman Sachs** and **J.P. Morgan**. At the same time, major payment providers like PayPal are starting to allow customers to buy, hold and use certain digital currencies on their networks.

Tl crypto assets, especially in th JS market times compared to



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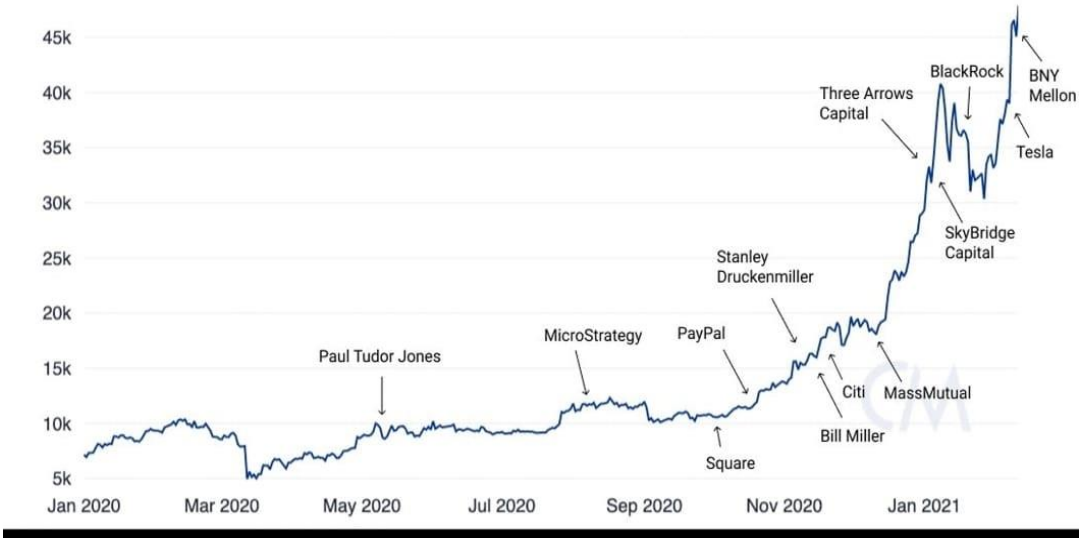


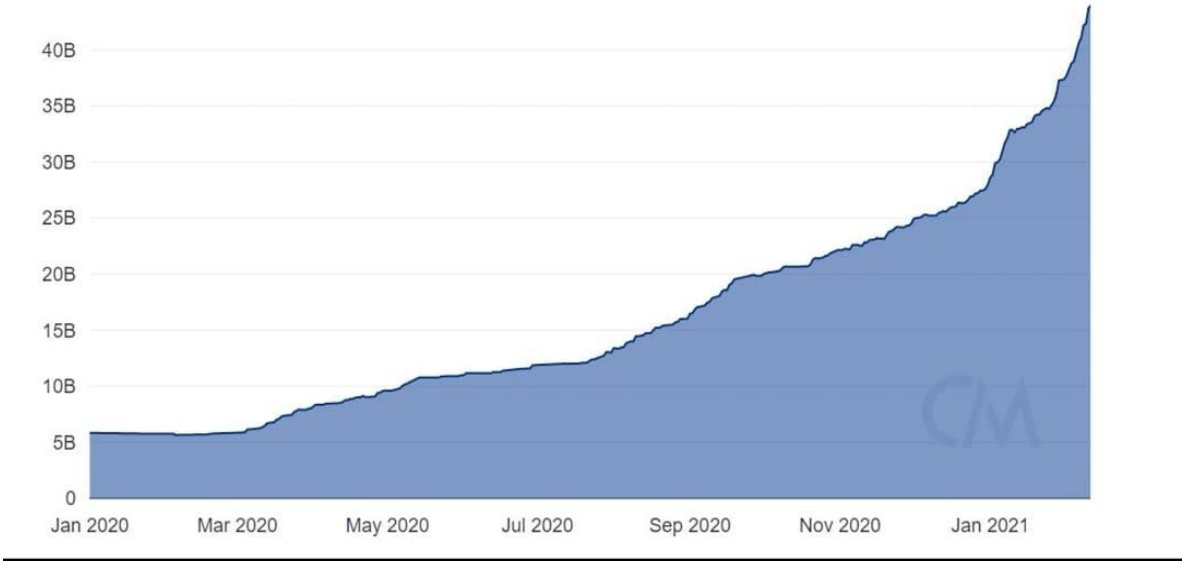
Increasing acceptance of stablecoins and central bank digital currencies (CBDCs)

Interest and use of stable coins and central bank digital currencies (CBDCs), often viewed as gateways to traditional financial institutions' crypto-asset markets, is growing exponentially, another sign of great opportunities for banks.

Stable coins are traditional assets with a stable value, most commonly digital assets pegged to a currency such as the US dollar. They are protected by collateral (assets and funds) held in traditional banks. Since its inception, stable coins have been widely used to limit traders' exposure to cryptocurrency price volatility, which was previously a major friction factor in the market.

Since March 2020, the adoption of stable coins has been parabolic. With more than $40 billion in unstable coin issuance the adjusted transfer costs for various stablecoinskyrocketck more and more customers are using them for payments, money transfers, s, and transactions.

- **Total Stable coin Supply (fig.03)**



Central Bank Digital Currencies (CBDCs) are tokenized digital versions of national or regional fiat currencies. CBDCs are officially created, issued, and regulated by central banks and federal regulators.

Several countries have been investigating CBDC proposals since 2017, and some are testing the technology. Now, interest is lightning-fast, driven by both geopolitical and political factors. At the beginning of 2020, only 2030 governments worldwide were serious about developing CBDCs. Today, more than 70 countries in

emerging and developed economies are participating in CBDC research projects or pilot programs that hope to help currencies boost economic power and expand financial inclusion.

As more countries consider the launch of CBDCS, banks are preparing to enter the crypto asset market. The banking industry is already moving towards supporting crypto-asset customers in payments and lending, but that change is gaining momentum. In particular, national acceptance by the US Federal Reserve and the European Central Bank could change the game for broader acceptance. If banks can prepare their infrastructure, CBDCS could eventually emerge as a plethora of profitable blockchain-based banking technology solutions for storage, remittance, wire transfer, and more.

Why Banks are Cautious of Cryptocurrencies

According to a study conducted by the Association of Certified Anti-money Laundering Professionals (ACAMS) and the Royal Institute of United Services in the UK, nearly 63% of bank respondents see cryptocurrency as a risk rather than an opportunity.

Decentralized Nature

Crypto assets are created as an alternative to traditional banking infrastructure that does not require intermediaries and is not tied to the functions of a central government, bank, or institution. Instead of relying on a centralized intermediary for these transactions, trust is given to the code of the blockchain and the decentralized nature of the blockchain.

Central bank-run cryptocurrencies make their assets less attractive in the first place, so some banks do not believe they can successfully enter this space. The decentralized nature of the currency is believed to undermine the credibility of central banks, leading some to believe that central banks will no longer be needed or will be unable to control the money supply.

AML/KYC Concerns

Cryptocurrencies allow peer-to-peer transactions without regulated intermediaries, allowing users to transfer funds quickly and easily without paying transaction fees. Rather than identifying a transaction with a separate

bank account through a financial institution, the transaction simply needs to be linked with a transaction ID on the blockchain.

This type of alias makes many banks concerned about the lack of anti-money laundering (AML) measures and knowing the customer (KYC) rules for trading digital currencies. Banks are often under the impression that crypto transactions cannot be tracked for AML and KYC reasons, which can lead to illicit activity and online fraud.

Volatility

The price of cryptocurrencies (especially Bitcoin) has generally fluctuated over short lifetimes. There are several reasons, including market size, liquidity, and several market participants. Banks view this as a risk because prices have not historically been stable and believe that the currency may not become a stable investment vehicle over time.

Three promising areas of crypto innovation

Cryptocurrency products and services have shown tremendous growth potential in the banking sector. There are many opportunities for traditional banks, fintech, and digital native banks to easily and securely provide solutions for storing, moving, and using crypto assets.

Banks that successfully serve crypto assets and investors will be competitive in the future. Three banking sectors: **first-class brokerage services; generating income through loans**, **borrowing, and interest rates**; And **the payout stands out for the potential profit.**

First-class brokerage services

The storage management of the assets and underlying cryptographic keys used by cryptographic asset holders to complete transactions is an important feature of crypto-economics. This will allow banks to interact with the crypto ecosystem and add related operations and services, including cash management, securities lending, leveraged transaction execution, and other back-and-forth support.

Resolving custody issues is a logical first step for banks looking to engage with cryptocurrency customers. Like all participants in the crypto market, a growing number of institutional clients are looking for ways to securely

store and use crypto assets. Traditional banks are in a strong position to meet their needs. They protect a wealth of currencies such as dollars and yen, investments such as stocks and stocks, esoteric derivatives such as options and non-deliverable futures, and even physical assets such as gold and art. I have a lot of experience.

The back-office infrastructure and processes for the storage of digital assets deviate from the typical bank storage model and pose new risks that need to be evaluated and managed.

Current cryptographic storage models take many forms. Recently licensed Wyoming SPDIs such as Avanti Financial and Kraken are authorized banks that have complete control over the custody services of institutions that own and trade crypto assets. Cryptocurrency exchanges such as Coinbase, Kraken, Gemini, and Binance offer digital wallets that enable private investors to hold, protect and trade crypto assets. Third-party custody providers such as BitGo and self-custody models such as Ledger and Casa are technology solutions for storing and protecting crypto assets.

Cryptocurrency custodian business opportunities are vast and evolving. But that's just the tip of the iceberg. Custody is the basis of a prestigious service package that covers everything from lending to lending for execution.

The difference between prime brokers in crypto markets and traditional financial markets is that investors integrate transaction clearing, settlement, order routing, exchanges, lending, leverage, cash management, portfolio management, financial reporting, tax reporting, and more. This is a way to enable you to manage your transactions through other services. The competition for prime brokerage accelerated in 2020, with significant acquisitions by existing players and the launch of related products and services. Institutional investors currently entering the market are benefiting from a wide range of trading options and a safer and more flexible post-transaction settlement process.

“There is a competition to provide services like prime brokers in then crypto space. Banks may have advent Prime services could be the first entry into the crypto ecosystem for many banks. There is. The ownership of crypto assets is still dominated by private investors, but Inst clients such as the wealthy are participating in Greater Numbers. They already have a relationship to store and protect crypto assets. We are looking for a bank to be in, and we also bundle white services to facilitate trading and other large investor activities.

For example, BitGo, a digital asset financial services company that provides custody and other world-class services to crypto investors, shows how banks can develop world-class service models for crypto customers.

BitGo has developed a system that allows crypto-asset owners to sell their assets and settle transactions internally without having to move them from their storage wallets. This is representative of a risk mitigation approach that allows crypto-asset owners to enter the market without exposing their assets to settlement risk on the chain.

Yield generation: Crypto borrowing, lending, and staking

The growth of crypto prime brokerage shows a strong interest in the organization. However, the demand cycle for crypto borrowing and lending has increased dramatically across the spectrum of crypto market participants. This demand cycle is reflected in the dramatic growth in user recruitment of centralized lending platform organizations such as BlockFi20 and Celsius and the explosive growth of decentralized finance (DeFi) by early 2021 and "locks" to DeFil. The total value of the assets created is over $ 25 billion.

In both centralized and decentralized crypto lending and lending models, crypto users can generate income by depositing crypto assets. Profitability has proven to be an important level of value-added service for participants with long-term investment positions. Centralized organizations developing lending and lending solutions are poised for significant growth as institutional adoption continues and more individual investors seek revenue opportunities.

Devi's growth has been driven by technological advances that enable more efficient decentralized governance. To date, the best-known DeFi applications focus on decentralized peer-to-peer exchanges and crypto-asset lending. In this context, pioneers including Uniswap, MakerDAO, and Compound experienced dramatic growth and user adoption in 2020. The dynamics of DeFi regulation remain uncertain, but the transformative potential of this new sector is only just beginning to materialize.

In parallel with generating income through borrowing and lending, the growth of the Proof of Stake (POS) network has created new opportunities for generating income through "staking". Staking is the process by which users of a PoS network "stake" their assets to participate in consensus and eventually earn revenue from block rewards issued by that blockchain. Pos yield generation is another value-added service provided by exchanges and custodians to customers. As with DeFi, there are many key regulatory and tax-related staking questions that still need to be answered to clarify adoption by regulated financial services firms.

Staking is a process by which users on Pos networks "stake" their assets to participate in consensus, ultimately generating yield through block rewards issued by a given blockchain.

Payments

B2B and B2C digital payments are developing rapidly worldwide. The model emphasized cross-border payments to improve the cost and payment efficiency of stable coins. Mobile payment apps like Square Cash App and PayPal Venmo have surged in popularity, especially after COVID-19 social distancing limits the use of physical cash to some extent.

The increasing integration of crypto assets into existing fintech payment platforms has spawned new methods of adopting cryptocurrencies and new payment methods that use cryptocurrencies for network transactions. It is a new low-friction mechanism to transfer value beyond traditional payment systems using public blockchains for cross-border payments and settlements, especially with stable coins.

Banks and payment systems are rapidly entering the growing field of digital payments. In November 2020, PayPal launched a service that allows customers to buy, sell and store crypto assets, including Bitcoin, Bitcoin Cash, Litecoin, and Ethereum. PayPal's move was followed by another major payment provider that added a Stable coin infrastructure company to the network.

Wider implementation in banking is the subsequent step, and it seems it's going to quickly be underway. Amex, Mastercard, PayPal, and Bank of America are a number of the monetary companies which have filed loads of patents related to the usage of blockchain generation for fast price rails, inner payments, and different sorts of payments.

Considerations for bank infrastructure transformation

If crypto markets keep conforming to the tempo and scale presently underway, the latest conventional banking infrastructure may also have a restricted shelf life. Growing participation withinside the crypto financial system is making new crypto abilities vital foundations for the financial institution of the future.

How can banks get started engineering a business transformation of such magnitude and position themselves for success in the emerging digital economy?

Here we outline key actions to help banks accelerate their strategic roadmaps and develop core business and technology capabilities to serve crypto market customers.

Determine where to play.

A vital early stage in every corporate transformation initiative is to align goods and services with market opportunities. To determine present and future consumer demand for crypto assets products, a bank can start by following growth patterns. Then they should analyze how the bank's wider customer focus aligns with the demands of target customers, as well as the impact of planned goods and services on revenue per customer, client acquisition, and customer attrition. It's also crucial to list the bank's current product and service offerings. Custody skills will undoubtedly be at the heart of a bank's overall crypto-asset strategy, but which other income streams to pursue will be determined by each bank's specific strengths in prime brokerage, lending, payments, and other related services.

Build or buy technology (or both).

The technology that underpins crypto asset products is complicated and new, with blockchain at its heart. Whether to develop blockchain systems in-house or buy technology from crypto native firms will be determined

by several criteria. The most crucial factor is talent: Is the bank's in-house personnel capable of designing and deploying cry crypto asset ducts, or are they only capable of operating the technology?

It will also be important where the bank operates geographically: Because authorities in some countries are cautious of homegrown solutions, banks in those areas may need to go above and beyond to demonstrate that they have a defensible infrastructure that puts regulators at ease. It's a toss-up whether to construct or purchase in the end: Understanding the degree of consumer demand in the market and how rivals are positioning themselves to satisfy it will be critical. A bank may frequently come to market faster if it purchases current technological capabilities rather than developing new ones from scratch.

Track and adjust to the regulatory climate.

The crypto-asset ecosystem's regulatory mechanisms are extremely complicated and constantly evolving. A bank establishing a crypto asset service will need to keep an eye on regulatory developments in both the nations where it already operates and those where it may want to expand in the future. To understand the practices of various governments, look at the G20 nations and rising economies. What rules does crypto market participants? What patterns can be inferred from major financial authorities, treasuries, and central banks' pronouncements and updates? The bank's regulatory compliance plan should be flexible enough to deal with several of scenarios that might arise in the next year, three years, or five years all over the world.

Stress scalability.

We've shown throughout this study that the crypto asset business is growing at a breakneck pace in terms of market size and product diversity. Massive change is coming to the financial industry, and rising wealth will be available for the taking if the current pace continues. Banks have previously experienced technological upheaval. The most forward-thinking companies will use lessons acquired over the last three decades to prepare for the next wave, ensuring that their infrastructure can handle all forms of digital assets, even some that do not yet exist.

Crypto Banks started offering loans on cryptocurrencies

Some 'crypto banks' have started offering credit lines to people who have digital currencies in their investment portfolios.

People owning cryptos such as Bitcoin, Ethereum or ripple can pledge their holdings with crypto banks to get loans up to 50-60% of the asset value.

These loans come with no specific tenure and can be repaid at any time.

Interest at 12-15% per annum is lower than 12-24% charged by the banks on personal loans, along with a processing fee in the range of 2-3%.

Which banks:

Crypto-focused institutions such as EasyFi Network, Vault, and Cashaa, among others, have started their lending operations in India.

"The loan is instant because it's collateralized and we don't check the creditworthiness of the borrower," says Darshan Bathija, CEO of Vauld, which has booked over $25 million worth of crypto loans over the past few months.

But why would anyone take a loan?

If any crypto-holder wants liquidity but doesn't want to sell off his holdings, he can just pledge it and get a loan. So, if you own bitcoin, currently valued at Rs 45 lakh, you can pledge it with a crypto bank and get a loan of up to Rs 30 lakh instantaneously.

How does work?

The loan is disbursed into your crypto account using 'stable coins' like USDT the value of which is pegged to the US dollar.

The borrower can then sell the stable coins on a crypto exchange to get fiat money (rupee, in this case) in his normal bank account.

But why this sudden rise in interest?

The Centre's decision to not outlaw cryptocurrency has emboldened various players such as exchanges, crypto banks, rating agencies, and protocol manufacturers to expand their business in India.

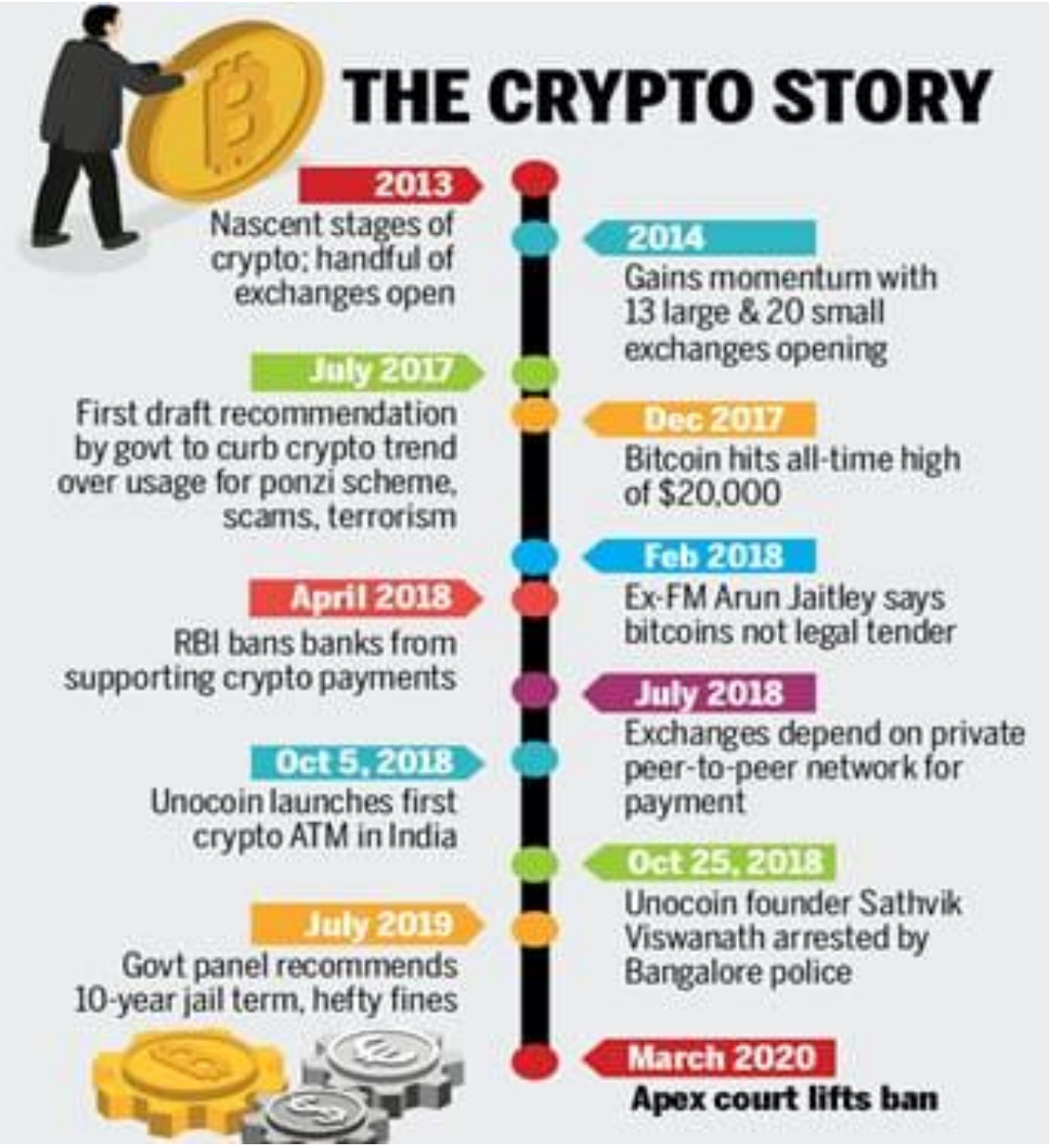
Cashaa has tied up with United, a Jaipur-based multistate cooperative society, to form a brick-and-mortar crypto bank called **Unicas.**

More about crypto banks:

The bank allows customers to deal in cryptocurrencies seamlessly, earn 9-10% interest on their crypto deposits and also get cash loans.

Its branches are operational in Rajasthan, Gujarat, and New Delhi.

Players like Cashaa and Vault also offer crypto deposits, which work like a normal savings account with a bank.



Crypto deposit accounts earn up to 4% interest for the account holder.

easy Network, for example, is planning to launch 'payday loans in India this quarter.

"This product will be for working professionals and salaried employees," says Anshul Dhir, cofounder, EasyFi Network.

Timelines:

FIG.4

Central banks are launching cryptocurrencies

The Cryptocurrency

and Regulation of Official Digital Currency Bill 2021, is likely to ban digital currencies - except the one being mooted by the Reserve Bank of India (RBI).

- ✓ Reports indicate that the bill is expected to provide an exit window (3 to 6 months) to the existing crypto holders of private entities.
- ✓ Indians are believed to hold around the US $ 1.5 billion (around €10,000 crore) in cryptocurrencies.

1694 - The Bank of England became the first Central Bank to regularly issue banknotes - as an alternative to coins, as a means of payment.

21st Century - The primary task of Central Banks across the world is- to maintain price stability (inflation and forex rates).

➤Today nearly 90% of Central Banks are exploring the idea of launching digital/cryptocurrencies - a form of money that you cannot see.

➤60% of Central Banks are already experimenting with it.

The idea of digital money is not new - we already use debit/credit cards or payment apps for transactions.

What makes Central Bank digital currencies different?

Over the last few years, the rise in popularity of cryptocurrencies (like Bitcoin).

➤Volatile in value.

➤Unlike traditional money, cryptocurrencies are not issued by a Central Bank.

Generated via a decentralized (no single government/authority/company/person) network of computers - most commonly by using blockchain technology.

- ✓ Since there is a theoretical limit on the number of Bitcoins that can ever be mined, cryptocurrency will become increasingly valuable (like gold).

2019- Facebook announced that it would develop its digital currency - Libra.

Now, it has been rebranded as Diem.

At this point, Central Banks started to realize that they were under some threat.

➤The question in Central Bank circles - if we cannot beat them, do we join them?

The need for Central Bank Digital Currencies (CBDC)

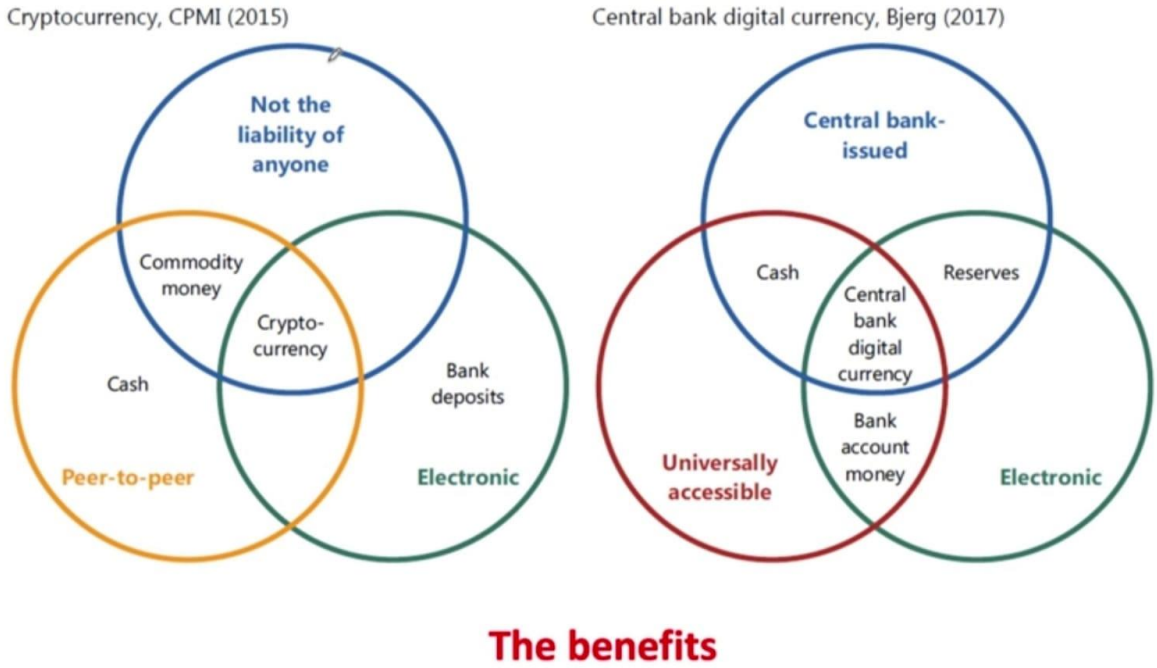
Currently, the major accepted means of the transaction -

1. Regular bank deposits
2. Cash
3. Cryptocurrencies issued by the private sector (like Diem and Bitcoin) - all have a few features, that make them useful.

Benefits of CBDCS

- ❖ Just like cash, everyone can have access to CBDCs.
- ❖ Therefore, more people can have access to electronic payments - making it easier for governments to deliver monetary benefits to citizens (even those without bank accounts).
- ❖ Will allow for immediate settlements and no processing delays, thereby making payments faster.
- ❖ Regular retail payments using credit/debit cards have an extra charge - CBDC will make retail digital payments cheaper.

FIG.05



Challenges

Critics are questioning whether issuing CBDCs will interfere with the effectiveness of the monetary policy.

Theoretically, if central banks wanted, they could pass negative interest rates on CBDCs

➤After any financial crisis, there is a possibility of people withdrawing their money from commercial banks and storing it as CBDCs instead.

Trouble - if CBDCs replace bank deposits in a large amount (banks will then have a shortage of funds).

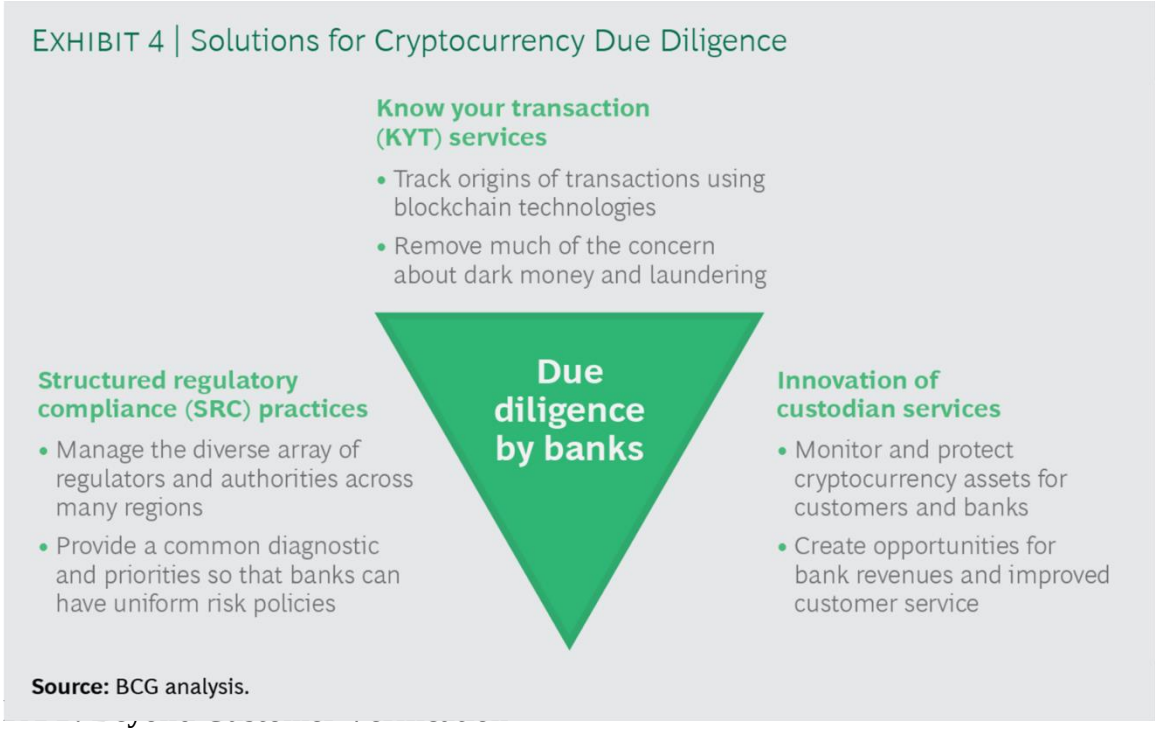
MITIGATING RISK

When offering products in this fast-developing sector, banks need to protect themselves and their customers against the risks that such new technology can bring.

In March 2019, the Basel Committee on Banking Supervision stated that crypto-related assets "do not reliably provide the standard functions of money and are unsafe to rely on as a medium of exchange or store of value." It suggested that four practices are essential with any offering: due diligence on each cryptocurrency offered to customers, an internal governance and risk management framework, disclosure of all related activities in financial statements, and an appropriate dialogue with regulatory supervisors.

All these practices are significant, and due diligence is particularly important. Some cryptocurrency offerings have been associated in the past with "dark money" transactions: illicit trade and criminal activities, including ransom and extortion payments. In a few publicly identified cases, terrorist groups financed themselves with cryptocurrency. Tax evasion also remains a concern, and classification is difficult in some jurisdictions where regulators have not determined consistently whether to treat cryptocurrencies as assets, currencies, securities, or commodities.

In practicing due diligence of this sort, banks can rely on three types of solutions: know your transaction (KYT), structured regulatory compliance (SRC), and custodian services. (See Exhibit 4.) These can be outsourced, but banks may benefit from bringing them in-house and making them substantial parts of the institution's own crypto service chain. Together, these three solutions can build trust and address most concerns. They do not always need to be handled separately by each bank. Ultimately, the financial services industry will probably establish practices and platforms that embed these safeguards into every credible cryptocurrency offering.

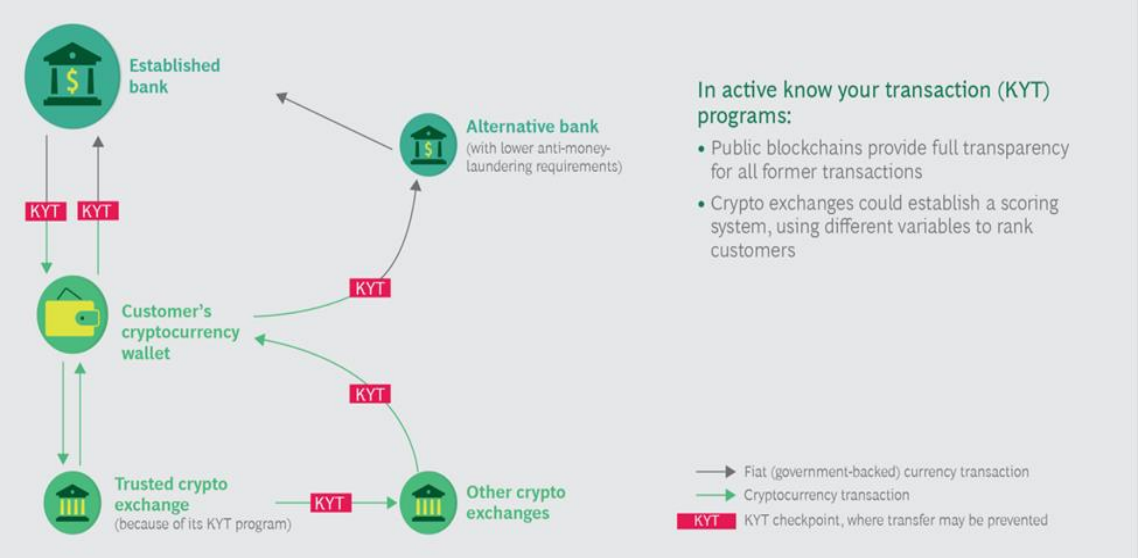


Verification has long been an issue for cryptocurrencies because of the standard way that banks establish trustworthiness. When they bring a new client onboard, they rely on know your customer (KYC) verification, which regulators have required for many larger exchanges for at least a year. This might involve government identification, proof of employment, reliable collateral, and credit references. But KYC is a check only on the customer and not on the transaction, so it may not detect all cases of counterfeiting and money laundering. Some smaller exchanges do not use KYC, and it generally applies just to retail customers. The task of tracing any transaction back to the original source is often too onerous and costly for banks, especially at scale. As a result, counterfeiting and money laundering frequently go undetected.

But the blockchain technology enables KYT, which can be used to easily track almost all transactions back to their sources. (See Exhibit 5.) The digital ledger automatically stores the complete history of currency exchanges and payments, in a distributed record that cannot be faked or tampered with in any way. Moreover, the KYT process can include analytics that recognize patterns of behavior associated in the past with criminal activity and set off alarm bells when those patterns occur.

To be sure, the technology will not solve all verification problems or address the risks associated with cryptocurrencies, but as Bank for International Settlements (BIS) economist Raphael Auer notes, “It might open up new ways of supervising these risks.” In a 2019 BIS working paper, Auer proposed a concept called “em-

bedded supervision," in which digital ledgers are continually monitored for transgressions. In other words, rather than fitting new crypto offerings into established regulatory-compliance practices, technologies are put in place to track and reveal problems as they occur.



KYT does not replace KYC; they complement one another. Exchanges and banks can use them together in order to establish a scoring system, ranking potential customers according to (for example) the reputation of transaction partners or the timing as well as the geographic location of particular transactions. In this way, KYT could enable banks to meet their anti-money-laundering and financial-crime compliance obligations while increasing customer trust. Strong KYT programs might also make banks more willing to process transactions that would otherwise be prohibited by their internal policies. That would encourage customers to keep their business with the bank, rather than taking it to competitors.

In addition, banks often need to conduct further rigorous analysis of the sources of transaction records, a process called know your data (KYD).

Together, KYT, KYC, and KYD can be used in several ways:

- To verify transactions on exchanges or broker platforms, which do not write every transaction directly to the blockchain network

- To trace transactions from services with non-blockchain-based origins (for example, with fiat currencies)
- To track transactions where part of the sale occurs offline, as in a face-to-face handoff
- To validate data from experimental cryptocurrencies where, by design, some transactions are not automatically traced

For the KYT approach to work, banks need to raise their internal capabilities. On the purely technological side, the required functions include connectivity and analytics; it is essential to gather and analyze a vast amount of transaction data on an ongoing basis. Then, in real time, several managerial skills are needed. These include the ability to identify illicit transactions, recognize and counter attempts to disguise transaction origins, link accounts to their sectors and countries, manage and update lists of questionable actors, build and maintain relationships with regulators in this new context, and fit the technology into an established compliance system without compromising it. As is often the case with new technologies, the greatest challenges are less a matter of digital implementation than of embedding the right attitudes and habitual behaviours throughout the bank's workforce and in its organizational culture.

Structured Regulatory Compliance

Cryptocurrencies and related blockchain technologies are regulated by a wide variety of government organizations around the world, each of which has introduced its own laws and guidelines. Countries hold a broad spectrum of views. Some are highly restrictive, banning or severely regulating both cryptocurrency exchanges and ICOs. Others are mostly hands-off. Still other regulators have yet to indicate that they will take any action at all.

Innovation of Custodian Services

Cryptocurrencies are often targets of fraud or cyber intrusion. Banks thus have an increasing need for custodian services: the storage, maintenance, and protection of cryptocurrency assets. Entering the crypto custody market can be a lucrative business for suppliers that offer value-added services. Banks are ideally placed to provide this solution: a digital equivalent to the old-fashioned safe-deposit box, taking advantage of the high levels of cyber protection that are already used to safeguard financial holdings and records. In July 2020, the US Treasury's Office of the Comptroller of the Currency published an interpretive letter clarifying that national banks and

federal savings associations have the authority to start offering these services—as a modern version of traditional banking activities.

Conclusion

Guidance and regulation surrounding digital assets is sparse, leaving many financial institutions wary of adoption. Concerns surrounding the security and stability of cryptocurrency also hold banks back from entering this space—but instead of fearing the risks of this technology, banks should be looking ahead to its potential benefits.

"Like other technology developments in the past, there was the potential for criminal activity," said Brian Brooks, acting Comptroller of the Currency in a statement. "There's also an enormous potential for economic growth. So, we don't want to throw out those advantages because there's a chance for criminal activity. Instead, we want to give compliance guidance to help banks innovate."

Financial institutions should also shift from thinking of crypto as a competitor to that of a partner. Banks can actually play a significant role in the crypto industry, adding some much-needed assurance and security to the largely unregulated environment. Adopting cryptocurrencies and blockchain technology overall can streamline processes and take banking into the next generation of efficiency and innovation.

Financial organizations should also see crypto as a collaborator rather than a competition. Banks may play an important role in the cryptocurrency business, providing much-needed confidence and security in an otherwise uncontrolled environment. Adoption of cryptocurrencies and blockchain technology, in general, may speed up procedures and propel banks into the next era of efficiency and creativity.

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