FUNDAMENTAL AND GUIDING PRINCIPLES OF THE VDA INDUSTRY

NAMASTE WEB 3
Making India Web3 Ready

CONTENTS

A.

Basic concepts

> **Key themes covered**
>
> This section introduces basic concepts relating to blockchain technology, consensus mechanisms, VDAs and the relationship they have with each other. It provides a background into how users are incentivised to build, interact and generate value over distributed databases.

1. What is Blockchain:

Blockchain is a distributed ledger that records transactions in a secure and tamper-proof manner. One can think of it as a network of participants who transact with one another in the 'native token' of the network and all of their transactions are recorded on a distributed database by each node in the network

Blockchain stores data in groups / blocks. Then every time a new block is created, a block is inter-linked to the old block. Each Block has a certain storage limit set. Since the data stored in blocks is linked together, the database is called a blockchain . This distributed database is openly accessible to all participants for adding and viewing the recorded data at any time. The same is secured using a scientific technique called cryptography. While all the VDAs are built on blockchain technology, not all of them are the same.

Blocks are self-correcting in nature. For example, if one user tampers with Bitcoin's record of transactions, all other nodes would cross-reference each other and easily pinpoint the node with the incorrect information. This system helps to establish an exact and transparent order of events. For Bitcoin, this information is a list of transactions, but it also is possible for a blockchain to hold a variety of information like legal contracts, state identifications, or a company's product inventory

2. Blockchains enable direct peer-to-peer interactions

Public blockchains enable a system where A and B can interact directly with one another, without the involvement of any intermediary. One can think of such blockchains as digital ledgers, similar to online spreadsheets, shared across a network of participants who can view the stored data at any time. It enables participants to transact with one another on the network without the involvement of a central server and all these transactions are recorded on the database in a distributed manner by multiple network computers. These computers are called nodes. They

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can initiate transactions on the request of network participants, and verify transactions initi-ated by other nodes. Transactions get added to the blockchain in the form of blocks, once the participating nodes consent to its authenticity. Public blockchains are append-only, time-stamped databases and subsequent changes can only be made after achieving nodes' consensus, which offers immutability. Anyone with the right infrastructure can become a node on a public blockchain, rendering such blockchains permissionless. These nodes do not know one another, which makes it difficult for them to collude rendering such blockchains truly decentralised. The Bitcoin blockchain for instance is reported to have over forty thousand nodes across nearly hundred countries. [1]

Public blockchains' decentralised nature eliminates users' vulnerability to targeted cyber-attacks as the data is duplicated and stored with a large number of nodes. Given that there is no single person or entity behind blockchains – just pre-written, open-source technology – they create a level playing field for all participants and allow equal opportunity encouraging innovation and competition. It also excludes the need for users to trust any third party intermediaries with data or be subjected to algorithms and codes developed by said third party, that may be arbitrarily altered. Users and third party compliments are now no longer competing for with centralised platforms for profits, so the system is also more economically efficient. The immutability and transparency of blockchains also allows strangers to interact directly without the need for any trust, or intermediary. This is a significant feat which was previously considered to be impossible in the digital space.

3. How do VDAs come into the picture

The sanctity of a blockchain depends heavily on the nodes or the connected computers participating in the network. As noted, they have the power to initiate and validate transactions, enabling direct peer-to-peer interactions. Virtual digital Assets ('VDA') play a fundamental role in incentivising participants to honestly engage with the network.

VDAs are a medium of exchange or a store of value that secure, validate, and record transac-tions made on a public blockchains, serving a critical function that enables the whole system to function in the absence of a third-party service. In absence of VDAs, blockchains are essentially shared platforms for storage. VDAs are rewards offered to miners who validate transactions.

For instance, nodes are awarded with tokens for recording and validating transactions correct-ly on the blockchain. In Bitcoin's case, miners who write a new block have permission to give themselves a reward of new bitcoins. That reward started at 50 bitcoins (today nearly INR 8 cr) per block and every four years the protocol is adjusted, reducing the reward by half. To discour-age malpractices, blockchain networks leverage mechanisms such as "proof of stake". Nodes who validate a transaction need to "stake" their VDAs and risk losing some or all of them if they conduct fraud. Many blockchains actually destroy one's stake as a penalty for some provable attempt at corrupting consensus data.

Given these incentives and disincentives, blockchain networks achieve a game-theoretical equilibrium where rational participants will always choose honest participation rather than fraud, in order to receive rewards and avoid penalties.

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[1] https://bitnodes.io/nodes/all/

4. How VDAs and blockchain are inter-linked:

Blockchain innovation is almost entirely fueled by VDAs which form the incentive for miners and nodes to participate and perform validation tasks in the network.

For example, imagine a blockchain network that interconnects un-utilized data storage space from all our phones and aggregates them for sale on a token-based blockchain network. Any consumer who wants to host an online business or service can purchase tokens of this network and use them against storage space requirements. The incentive for network participants — in this case, all those who are sharing their storage space — is that they can now earn in the form of tokens from the network. Each sale is established via smart contract interactions in the native token and all earnings are cryptographically verified and credited to participants in the form of tokens automatically without the need for a third party.

These earnings and token holdings form a core part of the blockchain as it incentivizes participants to join the network. The more developed the use-cases and network effects of a particular blockchain, the higher the resulting earnings from the token. Such a system ensures that both businesses that power the network and users benefit from it. If participants do not see any value, there is no reason for them to be part of the blockchain and this network could cease to exist.

While a centralized system running such a network is also possible, the difference is that unlike a decentralized network where all participants accrue value over time as the network grows, in a centrally driven network all the value and resulting wealth only accrue to a central entity/owner.

5. What would a blockchain without VDAs look like?

A decentralised (public) blockchain cannot function without VDAs. As noted previously, the primary value proposition of such blockchains, over any other ordinary database, is the elimination of the challenges associated with trusting a centralised intermediary. This is only possible when a wide variety of participants including nodes choose to engage with the network. VDAs effectively align incentives of all parties involved to build a truly decentralised, transparent, and robust blockchain. For instance, the grant of valuable VDAs as rewards (and their destruction as penalties) brings onboard a wide variety of unrelated participants to engage honestly on the network. These features of public blockchains are in turn fundamental to addressing the concerns stemming from the current reliance on "trusted" intermediaries.

In theory, a centralised agency like a company may designate nodes and incentivise them through more traditional mechanisms like salary, providing infrastructure to run the node etc. In doing so, they may even dilute the system enough to avoid a single point of failure. There may even be specific use cases for such a permissioned blockchain (not permissionless as not anyone can become a node), but it will fail to address other challenges associated with centralisation. For instance, users will still be trusting a centralised agency with their data; they will still be subject to changes in their algorithm and codes. Moreover, such a system will be grossly inefficient from an economic standpoint. This centralised agency will spend substantial resources in the form of salary for the employees running nodes, infrastructure cost etc. while instead, they can leverage VDAs to provide an inbuilt incentive mechanism to draw participants to either an existing or a new blockchain

6. Consensus Mechanisms and why they are important

Consensus mechanisms are a key component of the effective operation of blockchains, as well as other decentralized systems. In a decentralized system where users have asymmetric information and trust about one another, some mechanism is needed to guarantee that a state, value, or piece of information is correct and agreed on by all participants validating the network. Different consensus mechanisms have vastly different requirements,deliver different outcomes, and may require different regulatory considerations. For example, some consensus mechanisms might prioritize speed and efficiency, while others might prioritize security. Quicker methods of forming consensus might be suited for situations where there are fewer participants or they can trust each other, i.e. CBDC, whereas a more decentralized, secure mechanism is more suited for cross border remittances, like Bitcoin

6.1. Typical Profile of Network Participant in Public Blockchains

Regardless of the platform, or the consensus mechanism, the participants in public VDAs can be broadly categorized up into asset holders – those who hold assets in a wallet, private or custodial –, nodes – participants maintaining the historical ledger and looking for fraudulent transactions based on the agreed upon state of the network at the time –, and miners, or validators – nodes or special participants that change the agreed upon state of the ledger.

6.2. Types of Consensus Mechanisms

Proof-of-Work (PoW), Proof-of-Stake (PoS), and Delegated PoS (DPoS) are some of the more popular consensus mechanisms in public blockchains like Bitcoin or Ethereum, while practical Byzantine Fault Tolerance (pBFT), Istanbul BFT (iBFT), and federated BFT (fBFT) are popular in private blockchains. Several larger technology entities are actively developing or have created consensus mechanisms that have the potential to be used in products and services that could become systemic quickly—for example, DiemBFT.

Proof-of-Work, or PoW was the consensus mechanism developed for Bitcoin, was the first broadly successful consensus mechanism for digital assets developed, that solves the consensus problem through an activity dubbed 'mining'. Transactions are organized into 'blocks' , with the entire history of transactions forming a 'blockchain'. Some network participants participate in a race to add new transactions to the Bitcoin ledger (i.e. a new 'block' of transactions) by solving a complicated mathematical problem. In the simplest terms, this math problem is finding a number associated with a new block based on all of the previous blocks – meaning that if fraud had to occur, a dishonest participant would have to rewrite the entire chain of transactions and add a new block before anyone else does (known as a 51% attack). PoW has proven incredibly robust and successful, but does have a few significant drawbacks – primarily its limited throughput and high sunk cost associated with mining operations.

6.3. Deep-dive into the Proof-of-Stake consensus mechanisms

In a PoS consensus mechanism, an algorithm randomly selects validators (analogous to miners for PoW) for block creation based on the amount that holders 'stake', or lock in the network, from their own assets. First a proposer is selected, then a proposed block, and then

validation of the proposed block. Individuals or entities with larger staked amounts of the native token have a greater chance of being selected. A commonly used analogy is to lotteries – even though everyone who buys a ticket has a chance of winning and selection is random, those with the most tickets have the greatest odds of winning (note, that this is only for which validator gets selected to validate a block).

PoS improves on some perceived weaknesses in PoW consensus mechanisms, such as low throughput and the need for increasingly intensive computation power, while preserving net work security. This relatively lower cost of maintaining the ledger (the equivalent of mining in Bitcoin) also means a lower need to issue many new coins to incentivize participation in validation of the network. It also limits the risks of a 51 percent attack (as described above, where an entirely new chain of transactions is created). Although it is prohibitively difficult and expensive for anyone to carry out a successful 51 percent attack in a large PoW-based platform like Bitcoin, it is even more expensive to do it in a large PoS-based one.

The superior throughput makes the PoS model much more useful in certain financial services contexts, like facilitating payments or running complex contracts as is the case on platforms like Ethereum or Solana. However, to increase the chances of being selected, validators might vote on multiple blocks — even those whose underlying information might be incorrect, creating risks around broader market integrity. While voting on multiple blocks maximizes the chances of nodes receiving a reward through transaction fees, it also increases the risks of multiple forks, which can create uncertainty with settlement finality; the infamous "Nothing at Stake" problem. Newer models of PoS seek to solve it by creating monetary penalties for the work validators do on blocks that do not get included in the chain – the latest version of Ethereum uses a mechanism called 'slashing' that is similar to this.

Because ownership has a direct correlation to the amount that can be staked and consequently receiving rewards for validating the network, PoS consensus mechanisms can theoretically create a community which continuously results in a concentration of wealth and governance. This scenario can lead to those participants with smaller holdings exiting the network if they aren't able to generate rewards. In effect, PoS consensus mechanisms could create conditions where the network isn't inclusive, as certain members (that is, those with larger holdings) are more likely to be favored over others, increasing the potential for centralization.

Even in larger PoS networks, the potential for validator cartels to form can lead to concerns around centralization, while exchanges and wallet providers could also theoretically exercise disproportionate control given their large holdings. PoS is also inefficient in its use of net work-native resources. Given that VDAs might be locked up for staking purposes, PoS removes the ability to transfer or spend a proportion of the total number of VDAs in circulation. A liquidity shortage could arise if token holders hoard their tokens to increase their chance of being selected as validators; this act would lower the speed of transaction rates, and the network could suffer from the lack of circulation.

B.

Introduction to the VDA Ecosystem

Key themes covered

This section examines some fundamental concepts relating to the larger VDA ecosystem. In particular, it discusses the importance of VDA trading in creating value and fostering the growth of blockchain projects.

1. The role of intermediaries in today's digital era

Today, nearly all digital transactions are conducted through intermediaries. For instance, if A wishes to relay a message to B, they may do so through email hosted by the likes of Gmail and Yahoo; or speak over the phone using platforms like Whatsapp and Facetime; or communicate over social media through platforms like Facebook or Twitter. The state of play leads users to place heavy reliance on the proprietary solutions offered by these mostly opaque, profit-driven intermediaries. This reliance raises several fundamental challenges. Users give up privacy and valuable data. These platforms that benefit from multi-sided network effects, also exercise a large degree of power over users and third-party complements like developers. They are involved in a zero-sum game. Since they leverage proprietary algorithms and codes, they create the rules and hold the power to change them. These changes may often be detrimental to users and third-parties, while benefiting the platform's own pursuit of profits. The existing degree of centralisation therefore is not only economically inefficient, but it also hampers innovation and competition.

2. Fundamentals of the VDA industry

Just the way public companies have tradable assets which are offered to retail investors in the form of equity in the company, which allows them to partake in the company's governance decisions, even public blockchains have tradable assets in the form of VDAs, which are at the core of every public blockchain ecosystem. Similar to public companies, public blockchain ecosystems too solve real world problems for users.

For example, the Ethereum blockchain enabled millions of participants access to collateralized lending in the form of Decentralized Finance (DeFi) by simply locking their ETH holdings in smart contracts. Once they provide their ETH as collateral, they receive liquidity in native tokens, which could be used in various dApps for gaming, trading, minting NFT's, etc. Just as stock market listed companies have underlying fundamentals, ETH too has fundamentals like daily transaction volumes, total value locked in DeFi, number of nodes running the network (which is a sign of its health), number of active wallets (transacting users) on the network, and so on.

Each of these fundamentals are verifiable on-chain records available publicly in real-time. As these fundamental indicators keep growing in strength, the price of the token also increases.

3. The importance of trading in the VDA economy

Let's first break down VDAs into broad categories that have been adopted by many financial regulators globally

NFT Tokens	Security tokens	Utility tokens	Unbacked Crypto Asset	Stablecoins	CBDC
• Usually centrally issued • Right to ownership of specific product • Collectible and non sbstitutable	• Centrally issued • Meets the definition of security in each respective jurisdiction • Within the the regulatory perimeter	• Centrally issued • Right to a product/ service • Accepted across multiple ecosystems • Transferable • Can be used as a means of exchange	• Usually decentralised • Designed to be used as a means to exchange • Limited rights for the token holder • No single issuer to enforce rights against • Transferable	• Designed to be value stable • Stability mechanism can be backing or collateralization with a commodity, fiat currency, multiple currencies, crypto assets or algorithms	• Centrally issued by a state or central bank • Designed to be value stable • Stability mechanism is usually sovereign fiat currency

The categories of such tokens can be distinguished are as follows:
- ▶ NFTs issued with utility and participating rights in the network
- ▶ Security tokens represent securities, as defined by the relevant jurisdiction (e.g. a share in a company).
- ▶ Utility tokens provide digital access to an application or a service (e.g. a software license or a voucher).
- ▶ Unbacked Crypto Asset like Bitcoin that is completely decentralised and works as an unbiased and trustless settlement mechanism and works as a payment token is a complementary currency for a specific service, for example a blockchain-based distributed network for computing power: The only way to access the network is by using the token.
- ▶ Stablecoins are VDAs backed 1:1 by sovereign currencies
- ▶ CBDC central bank digital currency issued by sovereign states

For the purpose of this paper, let's focus on the NFT and Utility token projects built on top of the likes of Ethereum or EOS, which represent blockchain infrastructure projects that can execute computer code in a decentralized manner. Using smart contracts, projects can create (mint) new tokens on top of the blockchain that enable on-top applications. The purpose of these tokens differs from project to project and various companies look to solve specific problem statements and issue tokens to incentivise employees and customers to rally them towards solving those real world use cases.

The most common use of issuing tokens for companies, is to do token sales as an alternative means to raise capital. This process is known as an initial coin offering (ICO) in the case of utility tokens. Similar to initial public offerings, token issuance theoretically offer a number of advantages:
▶ Tokens are immediately transferable and can be traded 24/7 on secondary markets.
▶ Clearing and settlement is a matter of a few minutes at most.
▶ Tokens can be held personally, i.e. brokers and custody accounts are no longer required.
▶ The underlying blockchain ensures the transparency of all transactions.

3.1. Case study 1: utility token called Pool from UK:

Pool Founded in 2021 and based in London is a web3 project built on top of the Ethereum blockchain as an ERC20 token. Pool is building technical infrastructure for data unions – organisations allowing groups of individuals to be directly compensated when data about them is used for digital advertising or other commercial purposes. To date, Pool has raised $3.7m to build its product through sales of Ethereum-based $POOL tokens.

According to Co-Founder & CEO Shiv Malik, there are several advantages to Pool being structured as a web3 project. Firstly, the amount payable to an individual when data about them is used is typically a small fraction of a penny. Tokenisation overcomes this operational problem by enabling micropayments to individual data union members.

Secondly, tokens can be used to democratise the governance of Pool's platform. Enabling token holders to vote on key decisions should mean that the interests of the platform's users (data unions and their members) are not secondary to the interests of the organisation's board and executive management – a common criticism of Web 2.0 platforms.

Thirdly, issuing tokens rather than equity makes the process of raising startup capital easier, as investors benefit from greater liquidity – they are able to sell their tokens in the secondary market more or less immediately, rather than having to wait for a subsequent investment round or IPO. Malik adds: "Issuing tokens also allows for the equity in the company to remain protected. This is important to our current and future stakeholders because we need to protect the ownership of the IP we are creating to stop any potential buyout by big tech now and in the future. It's like Ulysses tying himself to the mast. At the same time, those tokens allow stakeholders to benefit in the increased value they are helping to generate."

3.2. Case study 2: Example of an NFT project

NFT case study: Les Éléfants Terribles Les Éléfants Terribles is a digital art collection co-created by the London-based artist and illustrator Guillaume Cornet. It consists of 2,754 images of elephants, programmatically generated from 373 hand drawings of references to

"enfant terribles" from the worlds of literature, art, fashion, and music. The images were minted as NFTs on the Tezos blockchain, which is seen by many digital artists as an energy-efficient alternative to Ethereum because of its proof-of-stake consensus mechanism (see Blockchain Primer). In common with many NFT projects, Les Éléfants Terribles conceives of its owners as a community and offers them additional benefits. There is a dedicated Discord server, and rewards (in the form of new limited-edition artworks) are randomly distributed to owners through regular air drops. Cornet previously sold work through commercial galleries, but he sees much greater earning potential in minting art-works as NFTs – not least because they can easily be sold without the need to pay the high commission rates galleries typically charge.

In the secondary market, the floor price for an Éléfant Terrible is currently 22 XTZ (~$85). There are, however, significant barriers created by current UK taxation rules and UK banks' interpretation of anti-money laundering regulations. According to Cornet, the proceeds of his NFT sales are treated as ordinary income, giving rise to an immediate tax liability in GBP, calculated using the XTZ:GBP exchange rate at the time of the transaction. At the same time, banks will not accept payments into business accounts from VDA exchanges. He is therefore more exposed to exchange rate volatility, and less able to manage his business's tax position and cashflow than with conventional sales in fiat currencies. In addition to the financial costs, Cornet says this is a major cause of occupational stress among digital artists.

Both the above projects gain end users only if there is sufficient distribution and activity in liquid and efficient secondary markets. Without trading activity and effects of the secondary markets on prices the upside for project creators and early supporters gets severely restrict-ed. Similar to speculation in existing capital markets, secondary markets in VDAs too are fueled by speculation, however, contrary to popular belief there are several key factors that drive prices of these tokens in the secondary prices and not just plain speculation. Many of these factors are rooted in intrinsic value and can be studied by looking at on-chain and off-chain metrics of the VDA project in detail.

Some of the key parameters that drive prices of tokens in secondary markets are:
▶ No of unique wallets
▶ DAUs, MAUs and other active user metrics
▶ Network effects in the form of growth in wallet addresses
▶ Market Cap of the token
▶ Tokenomics or token distribution mechanics (how many will be reserved for founders, marketing, airdrops, etc)
▶ Tech and product roadmap
▶ Partnerships with other ecosystem players that adds value to the network i.e. Partnership with a wallet product that makes token usage easier and can further increase mass adoption
▶ Early team credentials

In the absence of exchanges and marketplaces that build and drive the secondary markets, some of the mechanisms token issuers use to distribute tokens are airdrops or the free distribution of tokens among users. There are more like promotional events that seek to incentivise the early supporters of token projects.

Outside of exchanges and marketplaces, these secondary markets primarily exist within OTC trading systems. Such systems allow for P2P trading of assets using DEXs or Decentralised Exchanges - the shortcomings of which are outlined in our other paper.

Furthermore, nation states are racing to become the most sought after destinations for Web3 projects - as is demonstrated by the US, UAE, Australia, and the UK. Post the debacle of ICOs or Initial Coin Offerings in 2017, which offered new issuance of tokens directly to end users, a new paradigm that sought support from CEXs or Centralised Exchanges emerged, whereby new tokens would only get launched on exchanges - with this format, exchanges would whet the tokens being issued and would co-assume the responsibility of launching quality projects only.

Notable developments in regulation are observed in the case of UK's FCA, where they look at web3 as opportunities. The Bennett Institute has discussed the possibility of looking at token sales as adapted versions of the Seed Enterprise Investment Scheme (SEIS), Enterprise Investment Scheme (EIS), and Enterprise Management Incentives scheme (EMI) which can in turn serve as a means of increasing the supply of capital and talent available to early-stage web3 ventures. Furthermore, FCA encourages DeFi projects to apply for the FCA's Regulatory Sandbox to help the UK consolidate its position as a global fintech centre. Meanwhile artists, musicians, and video content creators would benefit from clearer guidance on and revisions to the tax treatment of NFTs.

With this format, many successful token projects have been listed as IEOs or Initial Exchange Offerings on exchanges - without exchanges these projects would not exist or proliferate to achieve the network effects and distribution needed for adoption of their tokens/projects. Some key India led projects that have raised funds via IEOs and then gone on the create waves across the globe are as follows:

▶ Polygon (Previously Matic): One of the top 10 projects globally with a market cap of ~$7 Billion, Polygon was founded by Indian founders and was launched on a centralised exchange launchpad for its initial funding requirements.

▶ Stader is another project built by an Indian team. Stader is a smart contract platform that was started in Apr'21 and is created to help delegators conveniently discover staking solutions and get access to the best yields based on their risk preference.

▶ Biconomy is yet another India origin project. Biconomy provides the multi-chain transaction infrastructure for making Web 3.0 frictionless and mainstream. Through Biconomy's plug & play APIs, decentralized apps (dApps) become accessible to anyone regardless of their knowledge and experience. Biconomy helps remove blockchain headaches through features such as gas-less transactions, instant cross-chain transfers and flexible gas payment options.

Therefore, it is clear that in the absence of a highly liquid and efficient secondary market for tokens, most token projects will fail to sustain growth after raising funds from investors. Furthermore, the early investors who took high risks to back the project will not be incentivised to take risks to drive the use cases driven by these token projects and the flywheel of innovation from Web3 that looks to solve complex challenges will lose momentum and in turn accelerate the P2P economy driven by decentralised exchanges for achieving the same purpose. It is legitimate businesses, regulators

and law enforcement agencies that will lose out on the critical pieces of information, which are enabled by Centralised Exchanges (CEXs), that can help build a win-win situation for all.

C.

Market players in the VDA Ecosystem

Key themes covered

This section takes a deep dive into the market players within the VDA ecosystem. In particular, it examines the anatomy of VDA exchanges and discusses how they enable VDA trades. It goes on to examine the market players who perform custodial functions in the VDA ecosystem by discussing the different kinds of wallet service providers.

1. Exchanges and trading venues

1.1. Background

In any VDA ecosystem there are multiple participants that perform different functions. For instance in the Bitcoin network the participants are:

Developers: a collective of open source contributors who write, audit and evolve the source code for how the network operates and engages with the backbone of the network being the Blockchain Ledger - the core encrypted database that stores all the transactions taking place within the network in a time-ordered manner since day zero till date.

Nodes: a collection of network enthusiasts who secure the network by running machines connected to the network at all times with the primary task of maintaining one copy of the updated ledger each

Miners: a set of incentive driven individuals who invest in ASIC machines to perform the PoW algorithm that forms the final leg of processing a Bitcoin transaction on the Bitcoin network and thereby receiving freshly minted Bitcoin as reward from the network

End Users: Represented by wallet addresses on the Bitcoin network, these users hold the private keys to their public wallet addresses and can use them to sign and broadcast trans-

actions they want, to the blockchain network onto the ledger. In the case of the Bitcoin network the native token for all transactions is Bitcoin (BTC) - End users send and receive BTC, and Miners get incentivised by freshly minted BTC upon successfully validating, processing and appending a legitimate transaction onto the Bitcoin blockchain ledger.

Once the VDA network is set into motion by generating the first set of tokens the system runs as follows:

▶ End User A, signs his wallet with his private key and makes a SEND transaction to End User B's wallet

▶ Miners pick up these transactions and start validating them for their own incentive (newly issued Bitcoin tokens)

▶ Once the transaction is successfully validated all the nodes update their copies of the ledger reflecting the new finality within the system post settlement

Which means that users can pseudonomously transact with each other using VDAs, simply by participating in the above network as an End User (wallet address holder). All users require are an internet connection and a mobile device. No user authentication, no KYC, no identity information is required. Now, basis the above explanation, Virtual Digital Assets were designed to disintermediate financial services, however participating in these networks also turns out to be fairly complex for the masses.

1.2. The role of exchanges

The inherent complexity in dealing directly with VDA networks, made it imminent that new types of centralized entities, such as exchanges (CEXs) and wallet providers would have to emerge in order to abstract out these complexities. Such entities, on one end would themselves plug into the VDA networks as Nodes, and/or End Users and on the other end facilitate users to create user accounts with them. Within these accounts the CEXs would plug into the VDA network on behalf of their users - create, manage and maintain the wallets required for holding and transacting various VDAs, allow the users on their platforms to transact with each other off-chain and then eventually settle the transaction on-chain. They became hugely successful across the globe as they were a sort of aggregator of hundreds of VDA blockchain networks which allowed end users a simple and familiar onboarding inter face of creating an online user account.

In the absence of a CEX, the user could directly engage with the VDA network and even find means to exchange one VDA to another without creating an account, thereby making absolutely untraceable P2P transactions.

By creating user accounts, the CEX ensures that when they plug a user into the VDA network, they also have his/her identity related information attached to the end user. Thus, if the user were now to perform any kind of illicit transaction on a VDA network in a P2P manner, the VDA network can be analysed to create a linkage between wallet addresses indulging in illicit transactions and the identity information collected by CEXs. In this manner any movement from the FIAT economy to the VDA economy or back can be trace all the way down to each and every single interaction.

This was corroborated by the August 2016, <u>Bitfinex VDA exchange</u> hack. It announced it had suffered a security breach in 2016 and forensic investigations were initiated. In 2017 small amounts of money began to move out of the single wallet in early 2017 through darknet marketplaces. Finally in February 2022, a New York couple, Ilya Lichtenstein (age 34) and his wife Heather R. Morgan (age 31), were traced using VDA transactions and linkages with centralised exchanges (CEXs) where the missing piece of their identities were facilitated. Both were charged by US federal authorities with conspiring to launder the bitcoin, which was by then worth US$3.6 billion.
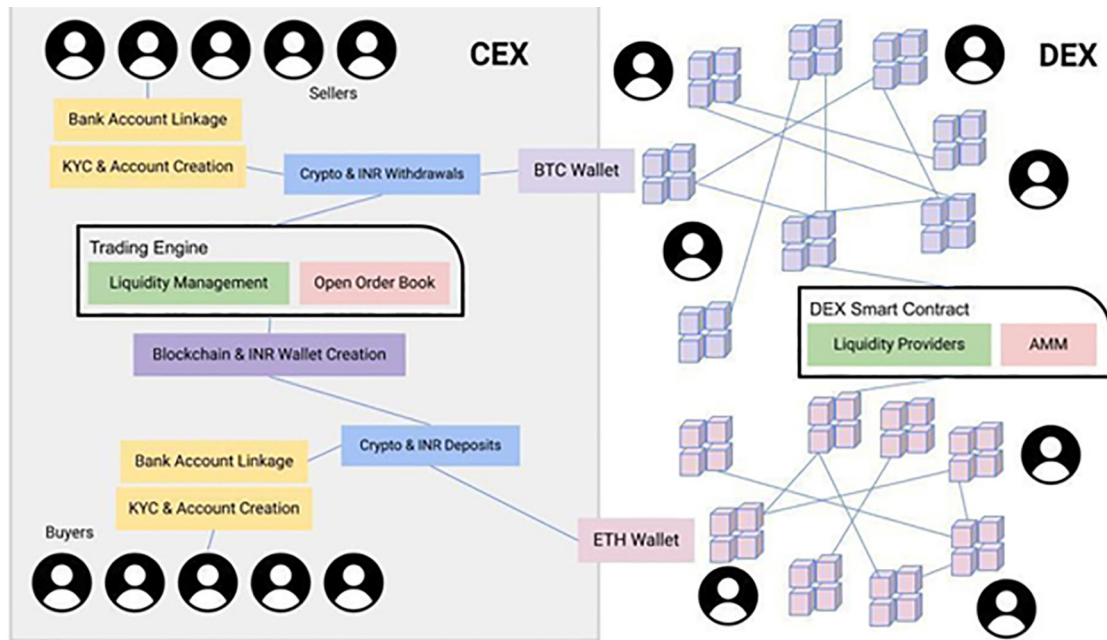
This system of CEX for identity management and on-chain transactions for end-to-end surveillance has ensured that across the world, illicit usage of VDAs continues to reduce, even as the overall volume of VDA usage increases over time. On the basis of forensic analysis and blockchain surveillance tools, Chainalysis in their Crypto Crime Report 2022 revealed that this was indeed a fact and the share of illicit transactions in the overall volume of VDA transactions had reduced from 0.62% in 2020 to 0.15% in 2022.

Illicit share of all cryptocurrency transaction volume | 2017–2021
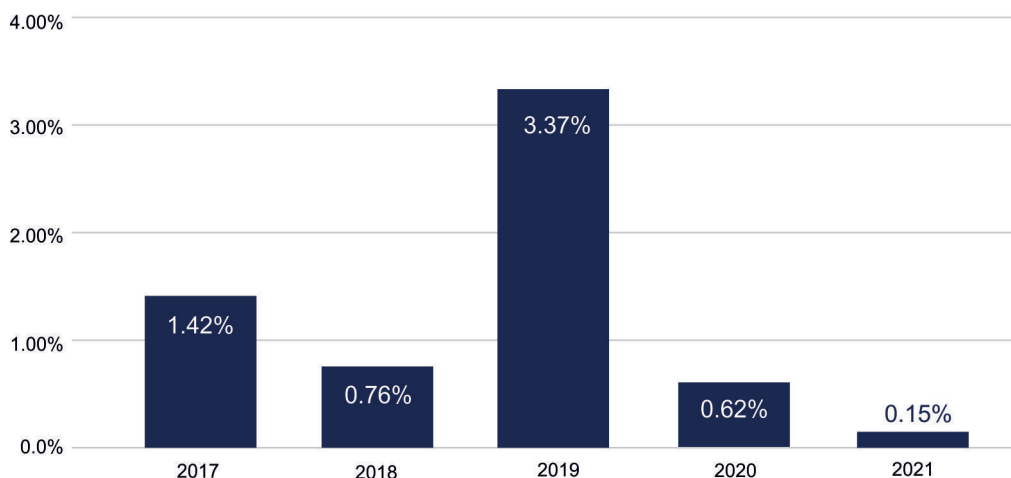
Even the FATF explicitly defines exchanges as VASPs, as exchanges are the only source of user KYC data within the VDA ecosystem.

In particular, in October 2018, the FATF adopted two new Glossary definitions—"virtual asset" (VA) and "virtual asset service provider" (VASP)—and updated Recommendation 15 (R. 15)(see Annex A). The objectives of those changes were to further clarify the application of the FATF Standards to VA activities and VASPs in order to ensure a level regulatory playing field for VASPs globally and to assist jurisdictions in mitigating the ML/TF risks associated with VA activities and in protecting the integrity of the global financial system. The FATF also clarified that the Standards apply to both virtual-to-virtual and virtual-to-fiat transactions and interactions involving VAs.

Therefore, globally it is understood that only exchanges can help in achieving the objective of KYT or Know Your Transaction across cross-border transactions

With leaps in technology VASPs can ensure KYT by complying with the Travel Rule with the following objectives:
▶ Identify counterparty VASPs
▶ Get accurate originator & beneficiary data with consent
▶ Ensure this is done with minimal cost and high efficiency using technology
▶ Perform these in a fully secured, transparent and auditable manner

* OFF-CHAIN : register, update and remove customer identity information only in the same jurisdiction
* ON-CHAIN : share customer identity information with virtual asset service providers in all countries
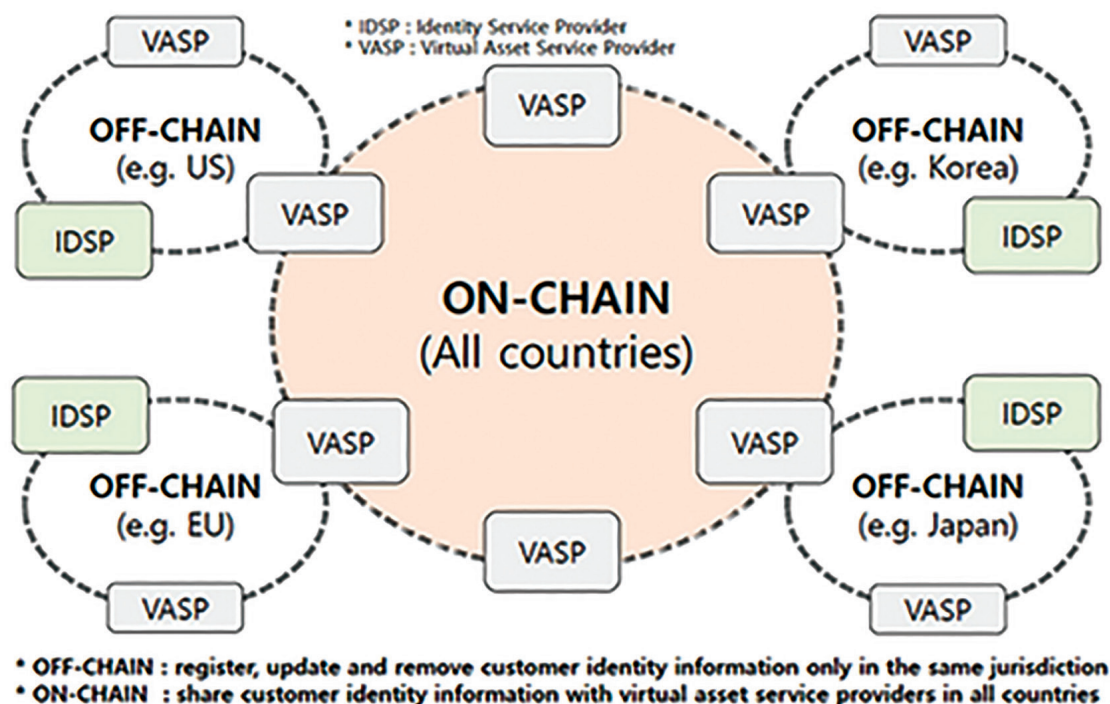
For a truly successful globally co-operative model, the VASPs in multiple countries will be required to share their massive customer identity information including personal data before cross-border VA transfers. In addition, it is very important for them to prevent tampering with customer identity information, along with ensuring transmission of data in real-time to enable interventions.
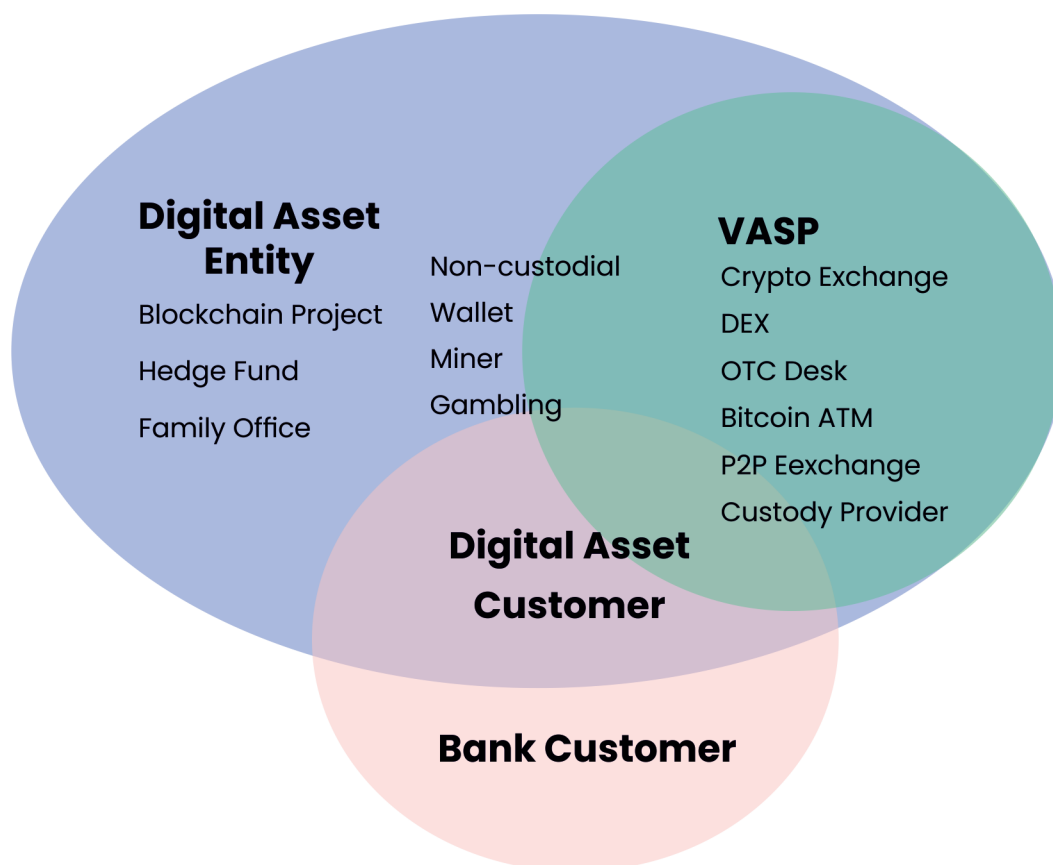
On a closing note, within the entire universe of VDAs it is evident that any systems of regulating and surveilling are made possible by building a global collaborative framwork between CEXs, the Digital Asset Customer and the Bank Customer. The intersection of these three represent a safe and compliance movement of funds into and out of the traditional economy and the VDA economy. A couple of exchanges in India like CoinDCX have already piloted parts of the Travel Rule requirements that enable such movements successfully. However there needs to be deliberation on data sharing, disclosures and transaction rules to enable enforceability and to build frameworks with dos & donts for cross-border VDA transactions.

1.3. How exchanges maintain liquidity

One of the key concerns for a capital control economy like India is the movement and transfer of VDA outside of the country, VDA exchanges and broker platforms in India have pioneered and implemented a two pronged approach, whereby they have, curtailed withdrawals for retail users and at the same time enabled monitored withdrawals for market making purposes. While retail users on these platforms cannot withdraw VDAs, high frequency traders or market makers are required to furnish a declaration of their source of funds, purpose of transaction and enhanced KYC along with strict limits, AML checks and monitoring of each withdrawal.

2. Wallet service providers

The importance of self-custody wallets has grown tremendously as users explore ways to safeguard their digital assets. The recent fallout of FTX, the world's second-largest VDA exchange has made self-custody wallets more relevant than ever before. In the case of FTX or any centralized exchange, the private keys of the users are held by centralized entities and as a result, the users risk losing their funds in the case of hacks and bankruptcy threats.

Understanding the difference between custodial (centralized) and non-custodial (decentralized) wallets is crucial as it defines who controls the private keys or passwords to your wallet. To understand private keys, we must first understand what public keys are: Think of a public key as an email address that you give to send and receive emails. The private key is like a password to your email address that is needed to verify the transfer of your digital assets. There is a unique private key associated with every public key also known as the wallet address. The public key and the private key are both required in unison to conduct transactions on the blockchain. One must never share their private keys with others as anyone with a private key can have full control of the funds associated with the public key.

2.1. Custodial wallets

Custodial wallets are run by a centralized organization, such as a VDA exchange. These have some advantages, such as less user responsibility for managing your private keys. However, when a user outsources wallet custody to a centralized company, they are essentially handing over their private keys to that company.

The individual user is not responsible for safeguarding the private key to the wallet and thus relies on the centralized entity to keep the private key secure.

If a user wants to transfer VDA from a custodial wallet, they simply log in with a username and password, enter the public key of the location to which they want to send VDA, and the centralized company enters the private key to complete the transaction.

This results in a very simple solution for the user to perform VDA transactions, but it also introduces an additional layer of risk to user funds as the company has complete control over user assets. Many exchanges have been hacked in the past, including Mt. Gox, Bitstamp, QuadrigaCX, and BTC-e.

3. Non-custodial wallets

Non-custodial or self-custody wallets are the ones where the user maintains full control of their assets. As a user, you control the private keys to your wallet and retain complete ownership at all times. You do not require any permission to send, store and receive your VDA as no central entity can prevent you from conducting transactions using self-custody wallets.

With non-custodial wallets, no central party can prevent you from undertaking a transaction. The user controls the private key, and hence these transactions are essentially censorship-resistant. Some central entities in custodial wallets can freeze your VDA holdings, set limits on the amount you can transact and even use your assets for their personal gain as was witnessed in the recent FTX case. FTX owners used the users' assets to fund its subsidiary companies without the user's consent. Approximately $1 billion of customer funds have been lost from the FTX exchange.

Security is another important aspect one should consider. With self-custody, there is no single point of failure, and thus provides multiple layers of security to your funds. Self-custody not only provides users with ownership rights but also protects powerful actors from corrupting the network and its participants.

On the contrary, custodial wallets store a user's keys in centralized servers and are more vulnerable to malicious actor attacks and hacks. For example, the $90 million Liquid exchange hack demonstrated the vulnerability of exchange-hosted custodial wallets.

As non-custodial wallet users store their keys in a decentralised way, hackers find it more difficult to steal their funds. Non-custodial VDA wallets are thus paving the future for a safe and secure VDA ecosystem.

D.

VDA market risks and Industry safeguards

Key themes covered

Having discussed the fundamentals of the VDA ecosystem, and introduced the market players therein, this section looks at the ecosystem more holistically and identifies the key risks and vulnerabilities therein. It also discusses industry best practices to address risks, and regulatory directives in the form of the FATF travel rule. Lastly, it views the ecosystem from an Indian perspective and discusses the threat of dollarisation, particularly in the trade of digital goods and services.

1. Overview of VDA functioning and vulnerabilities

Public, (such as Bitcoin, Ethereum etc.), as well as private (Corda, Hyperledger Fabric) blockchains have no specific norm, but are thus far largely a variant of the 'initial' blockchain system developed for Bitcoin. Although consensus mechanisms have begun to diverge between platforms (Proof of Work vs. Proof of Stake), by and large VDAs rely on Public Key Cryptography used widely across internet and digital applications. A 'public key' can be thought of as an address of ID that allows users to receive tokens. Each public key is associated with a private key – and in conjunction the two allow a user to send funds by broadcasting a transaction along with a digital signature derived from both keys and the transaction details.

The most common attack vector in data breaches has always been via users of a system, rather than the system itself – attackers have found it easier to leverage human error and poor judgment rather than bringing down systems themselves, although this can still happen. In this context it is easy to see the vulnerability that is intrinsic to funds and data stored in VDAs, users themselves must be incredibly careful to not accidentally expose their private key online, as well as to keep it in a safe and accessible place so that it may be used for a long period of time. A natural consequence of this is the emergence of 3rd party VDA custodians, including 'hot' or online wallet providers, exchanges and other financial platforms, and pure custodians. This however, creates a counterparty risk – if the 3rd party is hacked, all users could lose funds even if they did nothing wrong. It also means that users would have to trust 3rd party providers to not misappropriate their funds, something that has occurred repeatedly in the space.

Quick facts (as of 2022)

▶ More than 25% of all bitcoin are lost (private keys not available), with a market value in USD hundreds of billions.

▶ There have been multiple hacks in centralized exchanges, such as the 119,756 BTC that was stolen from Bitfinex in 2016.

▶ Exchanges have misappropriated funds themselves, such as the current FTX fiasco where over USD 1 billion was 'stolen' and USD 10 billion was lost due to malpractice.

From a regulatory visibility perspective, a key vulnerability is posed by offshore exchanges. Given that regulations over the VDA ecosystem exist in silos, and that consensus over appropriate regulatory frameworks is still growing – offshore VDA exchanges can leverage opportunities for regulatory arbitrage. This is exemplified by entities like FTX and Binance. A detailed case study on Binance is provided in **Annexure 1.**

2. Attack Vectors for VDAs

This section gives a brief overview of the types of attack vectors that exist for VDAs – identifying them now before illustrating how they will be tackled by the custody solution presented in this note.

2.1. Systemic Risk vs Storage Risk

Systemic Risk refers to the risk that the system itself will be hacked, i.e. a 51% attack on the Bitcoin Protocol. Storage Risk refers to loss due to negligence like losing private keys or an individual being compromised.

2.2. Storage Risk: Key Focus

Systemic Risk has proven low for large-cap VDAs; storage risk is the risk that is being mitigated through a custodial solution like the one presented here.

▶ Storage Risk: Mishandling Risk by Individuals: Users can store their own private keys with out the need for third-party storage systems, but will thus be responsible for their own security. Users can be compromised in multiple ways, i.e. through phishing, creating several attack vectors that can exploit this kind of risk

▶ Storage Risk: Counterparty Risk: Where a trusted 3rd party may misappropriate funds by colluding with an outside attacker, defaulting (like FTX), and incompetence resulting in the loss of private keys

▶ Storage Risk: Hacking Risk via Technical Weakness: Methods used to steal digitally-stored private keys and/or the decryption keys to access the data, such as open ports, uncompli-cated passwords, unpatched operating systems, and bad encryption.

▶ Storage Risk: Hacking Risk via Impersonating a Customer: Should a hacker obtain control of a customer's e-mail account, it is possible to effectively impersonate the customer Further more, e-mails are frequently used to reset login passwords or validate requests, often giving email intruders access to somebody's VDAs by extension

▶ Storage Risk: Hacking Risk via Impersonating a Counterparty: Should an attacker succeed in hacking the website of the counterparty, they might be able to change the bank account or address where funds are to be transmitted. In this case, a customer would unknowingly send funds to the attacker instead of the intended counterparty.

▶ Storage Risk: Hacking Risk via Intercepting Communications: Also called a man-in-the-middle attack (MITM), if an attacker can intercept and change the address to which bitcoins are to be transferred due to an insecure transmission medium, this would be an easy manner to steal bitcoins.

2.3. Storage Risk: Private Key Loss Risk

If stored online private keys may accidentally be deleted, while there is a risk of physical loss of private key medium (piece of paper, USB drive, etc.) or physical degradation of said medium.

2.4. Addressing Storage Risks -- CoinDCX's Solution

Our custody solution revolves around a simple principle of 'Defence in Depth'. We use a multi-layered, robust approach combining global best practices for storing VDAs online, offline, multiple levels of redundancy (in case of force majeure) and stringent protocols for how agents who interact with the system should behave. Additional layers of security, ro bustness, and cutting edge technology will be added in future iterations. Specifically, our solution offering provides users:

▶ **Security:** Our solution provides the highest level of security available to VDA and digital asset clients in India – leveraging the use of multiple offline locations, independent teams, and highly secure hardware and software to ensure all the risks of the previous section are mitigated

▶ **Governance:** The system is designed such that CoinDCX has no ability to transfer or use funds in any way without the explicit permission of the customer in question.

▶ **Reliability:** There are multiple layers of redundancy to ensure that risks derived from private key loss or hardware damage are minimized, and mechanisms to return funds in the event of force majeure on either the customer or service end.

▶ **Transparency:** In line with other VDA projects, full transparency of user funds that can be verified in-real time by users trustlessly and independently.

▶ **Ease of use:** Being a hybrid custody solution allows a greater level of customer support and ease of use – in particular for when it is deployed by institutional clients who will have dedicated support at all times

The CoinDCX custody solution is based around key design principles to mitigate the risks presented in the previous section. Storage systems face contrasting requirements and therefore require a design compromise between convenience, security, and robustness (i.e. systems ability to continue running uninterrupted. For example, an online wallet solution may be convenient and reliable, but not secure. While we endeavor to maximize all three to the greatest extent possible, our storage standard favors security and reliability over convenience.

2.4.1. Use cases

The primary use case is to create an Indian custody solution where the HSMs are held in India will be increasingly important going forward for anything related directly, or indirectly to VDAs. This is analogous to how data centers for a cloud service provider like Amazon have a dedicated center in India. As of now, the domestic VDA industry, for both public and private blockchains, are either reliant on foreign custodians like BitGo, leverage foreign exchanges for custody, or have made ad hoc solutions for their own platforms internally.

A secure, reliable, local solution for custody of VDAs is essential for the development of both the private VDA industry in India, as well as any alternative blockchain use cases for government or other industries. It is unlikely that institutional investors will engage in the market, or local market makers and liquidity providers without a local custody solution, and is thus an essential component on reducing reliance on foreign platforms.

We envision this project to evolve into a central vault for private VDAs, e-INR (CBDC), as well as any other tokenized assets, contracts, or information (i.e. documents relating to land ownership, or educational certificates) through an appropriate partnership with government agencies. Additionally, a reliable cold custody solution will provide lawmakers an avenue to segregate VDA platforms into those that match user orders/settle trades and custodians – as is the case in securities and equities markets.

3. Industry Best practices to Place to Arrest - Money Laundering, Terror funding and Tax evasion

3.1. KYC is a must for VDA investors

All renowned VDA exchange and broking platforms in India have KYC requirements in place. While most platforms have automated & manual processes for verification of user documents, some have also incorporated direct verification via government databases i.e. PAN verification via NSDL and Aadhaar verification via Digilocker. This ensures verified identity of all users on the platforms and prevents cases of spoofing.

3.2. VDA exchanges and brokers have compliance processes –

Once a user's identity has been verified and recorded, VDA platforms also perform additional due diligences like bank account verification checks involving 'penny testing' methods, uniqueness checks across user details to prevent duplicate accounts and alerts for suspicious transactions to ensure multiple layers of checks and balances.

3.3. Closed Fund Flows –

Once a user deposits funds (INR) into his/her VDA exchange account, there is no way for the user to transfer his INR other than back into his/her own bank account. Further, when the users buy or sell VDAs, they place their trades on open order books and a high performance matching engine, matches their orders with other KYC verified users on the platform.

3.4. Regtech and Suptech Integrations –

Most Indian VDA exchanges and brokers have implemented regulatory technology integrations (regtech) for ensuring AML compliance with global standards. These regtech solutions help create and maintain an index of malicious VDA wallets and alerts for platforms in the event that any transaction from or to the platform comes in contact with such tainted wallet addresses. These solutions help Indian platforms steer clear of sanctioned lists, dark net addresses, terrorism funding and known addresses with hacked or stolen funds, thereby keeping platform user funds secure with real-time risk alerts of bad actors through their interoperable AML/CFT system. Further, some exchange platforms have also implemented financial supervision technology (Suptech) to ensure there is no instance of market manipulation or money laundering across all transactions taking place within the platform. These measures ensure reduced counterparty risk, investor protection, safe and transparent trading environment.

3.5. VDA exchanges and brokers help with tax compliance –

All the major Indian VDA exchanges and broking platforms have built TDS compliances and assist the ex-chequer by aggregating TDS collections on behalf of their platform users and posting them against each PAN in a systematic manner. In fact, Indian exchange platforms also worked closely with CBDT to build frameworks for complex transactions like VDA to VDA transactions and defined the process of TDS collection, conversion to fiat and consequent submission to the government. While international exchange and broking platforms continue to provide their services to Indian residents, they do not have any tax compliance processes in place. On the contrary they encourage tax avoidance across TDS as well as income tax by not providing transaction details of users. Many Indian exchanges have also tied up with technology firms that help their users compute their tax liabilities in a few clicks. All these measures ensure both the platform as well as their users are tax compliant.

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4. Travel Rule for Virtual Asset Service Providers

4.1. Background

VDAs are more vulnerable to criminal activity and money laundering since the public keys engaging in a transaction cannot be directly linked to an individual.

The Financial Action Task Force (FATF) is an independent inter-governmental body that develops and promotes policies to protect the global financial system against money laundering, terrorist financing and the financing of proliferation of weapons of mass destruction.

FATF Recommendations are recognised as the global anti-money laundering (AML) and counter-terrorist financing (CFT) standard. FATF's 'Travel Rule' requires financial institutions to pass along information to one another for certain electronically-facilitated transfers. The info 'travels' along with the pertinent transactions from bank to bank until the funds reach their end destination. The intent behind the Travel Rule is that sharing information* will allow participants to: (1) Block terrorist financing (2) Stop payments to sanctioned individuals, entities, and countries (3) Enable law enforcement to subpoena transaction details (4) Support reporting of suspicious activities (5) Prevent money laundering of VDAs

The Travel Rule rule, formally known as FATF Recommendation #16, requires VASPs to communicate the information of the originators and beneficiaries of VDA transactions that exceed a certain threshold. More specifically, the regulations require VASPs to exchange information regarding the identities of the originator and beneficiary whenever the amount transacted is above $1,000.

Notably, FATF has defined a Virtual Asset Service Provider (VASP) as any person or entity who is not covered elsewhere under the Recommendations and, as a business, conducts one or more of the following activities or operations for or on behalf of another person:
(1) An exchange between VAs and fiat currencies
(2) An exchange between one or more forms of VAs
(3) A transfer of VAs (moves a VA from one VA address or account to another)
(4) The safekeeping or administration of VAs or instruments enabling control over VAs
(5) Participation in and provision of financial services related to an issuer's offer or sale of a VA

The Travel Rule mandates that organizations collect and exchange personal data from trans action parties. The Rule initially only applied to banks. The FATF, however, expanded this regulation to VDA firms in 2019. In addition, the G20 and several other jurisdictions began incorporating the Travel Rule into their local anti-money laundering laws in 2020.

4.2. Examining FATF Recommendation #16:

VDA exchanges, custodial wallet providers, and other virtual asset service providers (VASPs) must disclose personal client data accurately during transactions under this regulation. Information such as the sender's and recipient's names, geographic addresses, account numbers, and more must be collected and submitted to the appropriate authorities. Specifically, whenever the amount transacted exceeds $1,000, the regulations oblige VASPs to share information about the originator and beneficiary's identities.

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▶ In addition to the extra information required by individual regulators, FATF recommends the following data ought to be transmitted back and forth by VASPs: (a) The names of the sender and the recipient (b) The address of the sender (c) The account number of the sender and the recipient

▶ Many VASPs face a challenge when complying with the 'Travel Rule' and facilitating transactions across jurisdictions called the 'sunrise' challenge – or problem. This occurs when jurisdictions are at different stages of complying with or setting expectations for the travel rule. In jurisdictions where VASPs must adhere to the travel rule (aka the sun has risen), they could find it very difficult to transact and even maintain relationships with VASPs where travel rule compliance is not yet established or enforced (aka the sun is still down).

Data item and required action	Ordering VASP	Beneficiary VASP
Originator Information	Required, i.e. submitting the necessary data to a beneficiary VASP is mandatory. Accurate, i.e. the ordering VASP needs to verify the accuracy as part of its COD process.	Required, i.e. the beneficiary VASP needs to obtain the necessary data from ordering VASP. Data accuracy is not required. The beneficiary VASP may assume that the data has been verified by the ordering VASP.
Beneficiary Information	Required, i.e. submitting the necessary data to a beneficiary VASP is mandatory. Data accuracy is not required, but the ordering VASP must monitor to confirm no suspicions arise.	Required, i.e. the beneficiary VASP needs to obtain the necessary data from ordering VASP. Accurate, i.e. the beneficiary VASP must have verified the necessary data and needs to confirm if the received data is consistent.
Actions required	Obtain the necessary information from the originator and retain a record. Screen to confirm that the beneficiary is or a sanctioned name Monitor transactions and report when they raise a suspicion.	Obtain the necessary information from the ordering VASP and retain a record. Screen to confirm that the originator is not a sanctioned name. Moniitor transaction and report when when it raises a suspicion

▶ While many in the industry welcome regulatory oversight, as it provides clarity and certainty for both investors and operators, one piece of guidance — Recommendation 16 — has caused significant controversy. The so-called travel rule requires "obligations to obtain, hold, and transmit required originator and beneficiary information in order to identify and report suspicious transactions, monitor the availability of information, take freezing actions, and prohibit transactions with designated persons and entities."

5. Impact of 'dollarization' of international trade

The current spike in interest in dollarization stems from two sources; the first being the RBIs push to encourage the invoicing of EXIM payments in INR, and the second being its claim that VDA will encourage dollarization and consequent financial instability in India. Coincidentally, there are clear parallels that can be drawn between the two; The dollarization of the global & domestic VDA industries has followed a strikingly similar path to that of inter national trade

5.1. Dollarization of the Global VDA Industry

Like international trade, historical context is key in understanding why most VDAs are priced in dollars. It is important to point out that this was not always the case; between 2013-2017, most VDAs were priced in Bitcoin, with the Chinese Yuan being the most traded currency for fiat transactions. During this period, the Japanese Yen and Korean Won captured a significant share of overall volume, and continue to do so to this day, albeit with relatively smaller shares. At this juncture it is important to point out that in general there were (and still are, to a lesser extent), two types of VDA trading platforms – regulated exchanges that provide fiat on-ramps, (Coinbase, Bitstamp, Kraken) and VDA exchanges where most trading occurs (Binance, FTX, OKX) that provide lower fees, a larger variety of offerings, and more liquid markets.

The 'dollarization' of the market really started with the introduction of USDT (USD Tether), a USD backed token (with a troubled history) created by the trading platform Bitfinex in 2016. The promoters of Bitfinex created a separate entity, Tether Ltd. , that functioned in a fashion similar to the way a modern commercial bank works; while they claimed the token was backed 1-1 with dollars, in reality they likely operated it on a fractional reserve, and minted new tokens on demand for Bitfinex users, and other exchanges. Bitfinex clients, (individuals and entities), were allowed to redeem USDT tokens 1-1 for real dollars via Tether. This allowed VDA exchanges who were previously forced to price other assets in Bitcoin to price them in dollars. The circulating supply of tether grew to several billion dollars, and using USDT as the benchmark to price VDAs became the norm. Since VDA exchanges almost al ways operated from regulation-light jurisdictions, their volumes, and assets on hand quickly outpaced their fiat on-ramp competitors.

The second driver for the dollarization of the industry came from a unique derivatives product offered by a Seychelles based trading platform called BitMEX. BitMEX offered 'inverse perpetual swaps', essentially futures without an expiry that used Bitcoin as collateral but priced in dollars. The product gained immense traction after the market crash in 2018, as for the first time users had an avenue to make profits commensurate with that of a bull run during a market downturn. The perpetual swap is now the backbone of any VDA trading plat forms derivatives offering.

Today, there are several other stablecoin competitors to Tether, such as USDC, which operates in a similar manner to USDT, and algorithmic stablecoins like DAI. The parallels between international trade and the VDA industry now become clearer:

▶ There is an incomparable amount of liquidity in stablecoins (The combined market cap and volumes of USDT and USDC are USD 120 billion and USD 66 billion respectively as of today)

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▶ Low KYC offshore VDA exchanges like Binance and FTX dwarf fiat on ramps in terms of product offerings and liquidity (The combined spot and derivatives volume for Binance, FTX, and OKX are USD 90 billion plus daily)

▶ These exchanges provide a stamp of approval for the most promising and well-funded new projects, as well as exotic derivatives products like high leverage swaps and options

▶ Since China forced their exchanges to move abroad in 2018 (Binance, OKx, Huobi), Coinbase and Kraken have dominated the fiat-on ramp space, primarily offering conversion through USD & EUR

▶ This isn't the case for all currencies, with JPY, KRW, and EUR still maintaining strong trading volumes, although assets are still priced in dollars regardless of how they are bought.

It is important to note that this may not always be the case; as mentioned above USDT has a notoriously troubled past, and never seems to be in a comfortable position with regulators. While USDC does provide a alternative in that regard, it is important to note that USDC does less than 1/10th the volume USDT does, and is primarily used in North America and Europe, while USDT dominates Asia and the rest of the world.

5.2. Dollarization of the Indian VDA Industry

The VDA market in India is significantly, (but not completely) dollarized, with USDT/INR being by far the most traded INR pair. To put this in perspective, on CoinDCX in the week between May 9th and May 16th, the USDT/INR volume was close to 1000 cr., almost 3x that of the BTC/INR volume, and 10x the ETH/INR volume. As one would expect, the most common user behavior is converting INR to USDT, and then using USDT as a gateway to pur chase other assets. In fact, both CoinDCX and WazirX (Indias two largest exchanges), allow users to trade on Binance and other platforms directly through their own. This explicit 'piggybacking' on foreign exchanges is (to the best of my knowledge), unique to the Indian VDA ecosystem, and is one of the major areas of concern for the RBI and government. This is because to facilitate trading directly on foreign exchanges, foreign exchanges must have custody of funds.

However, while the government is right to harbor concerns about foreign entities holding the assets of Indian users, it is important to point out that this is a direct result of government policy; analogous to how draconian capital controls in countries like Nigeria have only led to a greater flight of funds to foreign markets. The 2018 RBI circular made it practically impossible for any local entity to carry out market making to provide liquidity depth in the Indian market – essentially forcing Indian trading platforms to piggyback on foreign exchanges. In fact, until the RBI circular was overturned by the Supreme Court in 2020, Indian traders had to largely rely on informal P2P or cash transactions to enter or exit, which led to the creation of a thriving black market for USDT and Bitcoin. Thus, the entire structure of the Indian VDA ecosystem that is perceived as problematic has been directly caused by a combination of an unofficial ban coupled with a complete absence of any sort of regulatory clarity. Now, according to senior executives at all Indian exchanges, the current tax regime will once again destroy the ability of individuals and entities to provide liquidity to the market, forcing investors to transact via P2P, in black, and to conduct their trading on

foreign exchanges.

It is important to note that the RBIs concern of VDAs themselves causing dollarization is somewhat misplaced. While some VDAs are certainly akin to securities issued by foreign entities, major assets like Bitcoin and Ethereum are much closer to commodities and are as such not 'issued' by any entity. The entire purpose of PoW systems that have thus far been employed by BTC and ETH are that new currency can only be created through work, i.e. the same way new gold can only be added to the market by mining. As long as these assets are held domestically, it is a stretch to claim that they cause currency substitution any more than gold or other precious metals do (although their price may be determined by external forces), as they are not legal tender, and do not currently compare to the convenience and safety of say, UPI.

Conceptual Overview of Dollarization

Dollarization is a colloquial term for Currency Substitution, where foreign currency is used as a substitute in lieu of a domestic one. According to the World Bank, "The term Dollarization has been used loosely in the literature in reference to the process in which foreign money replace domestic money in any of its functions"

The three main functions of money this definition refers to are:
1.) Unit of Account (pricing items in dollars),
2.) Means of Exchange (using dollars instead of local currency) and
3.) Store of Value (immediately converting local currency to dollars as savings or directly being paid and saving in dollars). While this definition has been used to specifically highlight dollars, or dollar denominated assets by the RBI recently, it would be prudent to broaden this classification to any foreign currency, or in this case, private currency replacing the rupee in any of its functions

Consequences of Dollarization

Although institutions like the World Bank or IMF purport that dollarization can be advantageous for developing countries under specific circumstances, the pros are largely irrelevant to the current discourse. The RBI has always maintained a hawkish stance on allowing any form of currency substitution, as even partial dollarization erodes a Central Banks ability to effectively influence the economy through monetary and exchange rate policy. For example, in the edge case of full dollarization, the Central Bank completely loses its ability to act as a lender of last resort in case of a banking crisis. Another important example (discussed in more detail later in the note), is the dollarization of a specific sector of the economy, (such as international trade), which significantly increases vulnerability to inflation and other financial contagions irrespective of domestic policies. The second, (and more immediately relevant) consequence of dollarization is the increased vulnerability to geopolitical shocks, which can severely disrupt bilateral trade between countries.

Real World Manifestations of Dollarization

While there have been examples of official organized (i.e. Panama) and disorganized (Zimbabwe 2009, in response to hyperinflation) attempts at dollarization, of primary concern is 'unofficial' dollarization – where individuals and entities begin to hold their financial wealth in foreign currency, even if it is not legal tender. This includes foreign bonds and other nonmonetary assets held abroad, foreign-currency deposits held abroad and domestically (if allowed), and foreign notes held physically; the threat of dollarization through VDA falls in this category.

Unofficial dollarization happens at varying degrees in most developing nations and is naturally very difficult to quantify due to a lack of verifiable information. As one

would expect, extensive unofficial (or in many cases official forced) dollarization occurs in countries experiencing hyperinflation or some other form of financial crisis (Zimbabwe, Bolivia) – and often has little to do with the severity of capital controls. For example, both Cambodia and Nigeria are significantly dollarized, although the Central Banks of both nations implement strict capital controls and strongly discourage currency substitution.

India is at minimal risk of dollarization affecting its means of exchange, suffering instead (to a limited extent) from dollarization of store of value and unit of account. While the RBI may claim there is a danger of domestic transactions being priced in foreign currency, there is little to no evidence to justify the same. On the other hand, a significant amount of wealth is siphoned out of the country to be held in foreign assets, and more than 95% of import/export transactions are invoiced in dollars.

A deeper look at Dollarization in International Trade

Although the push to encourage invoicing of EXIM payments in INR is almost certainly driven by the RBIs desire to insulate bilateral trade relationships from geopolitical shocks (i.e. Russia, Iran), it has rekindled the debate about why the vast majority of global trade is not only conducted, but priced in dollars.

International trade has been conducted in dollars for close to half a century, due to critical goods like oil being priced in dollars, proactive measures by the Fed to ensure deep dollar liquidity for international trade, institutions like the IMF & World Bank providing loans and financial aid in dollars, as well as innumerable historical factors like the Bretton Woods Agreement, and the US being a net creditor to almost every developed nation by the end of WWII etc. The historical context is key to understanding how the current system came to be.

The current discussion in the Indian media is derived from the work of Gita Gopinath, who found that the price of goods traded internationally are sticky in dollar terms, as opposed to the local country producing or importing a particular good. The conclusions drawn by their work upend conventional wisdom on export competitiveness and the effectiveness of domestic monetary policy; demonstrating that fluctuations in the value of the dollar and Fed monetary policy directly influences inflation and export competitiveness between any two nations, while severely dampening the effectiveness of domestic exchange rate and monetary policy on the same.

E.

Regulatory uncertainty and impact

> **Key themes covered**
>
> This section focuses squarely on the legal and regulatory framework governing the VDA ecosystem in India. In particular, it examines how the TDS measure directed at onshore VDA exchanges has had a crippling effect on their operations. Further, it looks at the impact of regulatory uncertainty in general in terms of banking-rail and frictions. Lastly, it discusses how FEMA application can serve as a regulatory starting point in the Indian context.

1. The 1% TDS on VDA trade

1.1. Summary

The Finance Act, 2022 introduced a tax deduction at source ('TDS') mandate on "transfer of virtual digital assets". In her speech, the Hon'ble Finance Minister shed light on the rationale behind this mandate, which was capturing details of VDA transactions. This article explores the efficacy of the TDS provision – whether it has served the intended purpose of capturing details of VDA transfers, or if it has inadvertently left Indians vulnerable to foreign exchanges that are not subject to Indian laws.

Industry reports suggest that the TDS mandate has, on the one hand, reduced Indian VDA exchanges' business by about 80-90%, but Indians' engagement with VDAs has remained largely unaffected. Instead, Indian users have migrated to foreign platforms like FTX and Binance that are not charging TDS. Industry estimates collected over the last four months suggest that trading volumes to the tune of INR 80,000 cr. have been conducted by Indians who have shifted to such foreign exchanges; which is likely only a fraction of the 'real' trading volume by Indians. To put things in perspective, the world's largest trading platform by volume – Binance – does USD 50 billion a day in volume, almost 20 times the aforementioned monthly estimate. Data analytics firm Chainalysis consistently ranks India in the top 5 countries for VDA value transacted, accordingly, the actual trading volume contributed by Indians could easily be multiples higher than INR 80,000 crores.

1.2. Background

▶ GoI introduced 1% TDS on the transfer of VDA (Virtual Digital Assets) effective 1st July 2022.

▶ As there is no clarity on the applicability of TDS to foreign entities, foreign exchanges operating out of India are not deducting tax at source and are onboarding Indian VDA users/investors.

▶ Further, the high rate of 1% is creating a liquidity crunch, causing a flight of market makers and liquidity providers from the Indian market. As a result, users of Indian platforms suffer poor execution prices.

▶ The legislature's purpose of introducing 1% TDS is to:

▶ Track all VDA transactions and sources of income made by Indian residents;

▶ Protect the users from volatility-driven challenges;

▶ Reducing liquidity and discouraging speculation and trading on VDAs;

▶ Build guard rails for financial stability concerns.

1.3. Deep dive into the TDS mandate

1.3.1. Does the TDS mandate apply to foreign exchanges?

The TDS mandate is imposed on "any person responsible for paying to any resident" for transfer of VDAs. It has further been clarified that exchanges should deduct TDS for transactions that are undertaken on their platforms. Notably, the provision is agnostic to the geographical location of the buyer of VDAs. The only qualifying factor is that the person receiving the sum for transfer of VDAs should be an Indian resident. Therefore, the intention of the legislature to impose TDS on any and all buyers dealing with Indian resident VDA sellers, regardless of such buyers' location, is clear and unequivocal. Foreign exchanges are thus clearly intended to be covered under the ambit of this provision.

There is however scope to argue, on interpretational grounds, that the provision does not apply to foreign exchanges. The extraterritorial applicability of the Income Tax Act has been discussed extensively in several landmark judgments, including the infamous Vodafone case. Judicial precedents, even in their most conservative application, dictate that the Parliament is empowered to bring foreign corporations under the fold of a statute so long as it satisfies the nexus text, which is to say that the cause has an impact on India's interest. Given that the TDS is applicable on transactions that involve transfer of VDAs by Indians, there is strong ground to argue that the Parliament is well within its powers to require foreign exchanges to comply. However, the absence of an explicit inclusion of such foreign exchanges in the language of the TDS provision leaves scope for uncertainty. It allows leeway for foreign exchanges to take a stand that they are not included under this levy.

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1.3.2 How has TDS encouraged Indians to use foreign platforms

The impact of this uneven playing field between Indian and foreign exchanges has had a catastrophic impact. The requirement to charge 1% TDS on each transaction has left a liquidity crunch in compliant Indian exchanges as there has been a flight of market makers and liquidity providers. As a result, users of Indian exchanges are suffering poor execution prices.

Further, the VDA ecosystem is uniquely borderless. Indian users can easily access foreign exchanges' apps and websites and legally use them to engage with VDAs. Since these exchanges are not paying 1% TDS and generally have a larger liquidity pool, the prices there are a lot more competitive as compared to compliant Indian exchanges. This absence of salience in transacting on foreign exchanges, coupled with the poor execution prices offered by Indian exchanges, has led to the massive exodus of Indian users to foreign platforms. For liquidity providers too, it is more profitable to operate on foreign exchanges.

1.3.3. Conclusion – Cramping domestic VDA industry

Most of these exchanges that are increasingly becoming Indian users' platform of choice, do not have any presence in India and are hence not answerable to Indian law enforcement authorities. Incidents such as the recent bankruptcy of the Bahamas-based VDA exchange, FTX are disastrous and leave VDA users in the lurch.

Governments across the globe are working to develop a regulatory framework to safeguard the interests of end users. The Indian income tax framework, specifically the TDS mandate has had the opposite impact. By incentivising Indians to use foreign platforms, the frame work has failed to accomplish the intended goal of monitoring VDA transactions. Further, by rendering the business of Indian exchanges as uncompetitive in the global market, it has jeopardised the interest of millions of legitimate Indian VDA users by encouraging them to rely on foreign platforms. Indian users have been consequently denied the accountability and familiarity offered by local Indian platforms, built and run by Indians, subject to Indian laws.

To rectify this situation, the Government must create a level playing field between Indian and foreign exchanges operating in India. Such foreign exchanges should be explicitly brought under the fold of the income tax framework. Further, the TDS rate must be reduced so as to allow Indians the option to engage on VDAs through an Indian platform, which is answerable to Indian authorities.

1.4. Deep dive into the implications of the TDS mandate

1.4.1. Key Highlights

▶ There was a shift of cumulative trade volume of around USD 3,852 million (~INR 32 thousand crores) from domestic centralised VDA exchanges to foreign ones, during Feb-Oct 2022.

▶ Additionally, according to a sample of 5436 peer to peer traders and industry estimates, the total trade volume contributed by Indians on foreign centralised VDA exchanges was to the tune of USD 9,670 million (INR 80 thousand crores) between Jul and Oct 2022.

▶ Indian VDA exchanges lost 97.1 percent of their volume in Oct 2022 when compared to the corresponding volumes in Jan 2022. In this period, foreign exchanges lost only 36.3 percent.

▶ There is robust evidence that many Indian investors switched (approximately 17 lakhs if share of Indian users on Indian exchange remain as before Feb 2022), as a result of the domestic VDA tax architecture.

▶ Using an alternate data on VDA adoption rate, proxied by number of app installs of domestic centralised VDA exchanges by Indians, we notice a month-on-month fall of 16 percent during Jul-Sep 2022, while downloads of foreign counterparts increased by a commensurate amount

▶ India currently ranks in the top #2-5 in terms of website traffic to Binance.com, and Metamask.io, uniswap.exchange, huobi.com, coinbase.com

▶ A reported INR 60 Cr. was collected in TDS since its introduction, indicating that the vast majority of compliant transactions are from compliant Indian exchanges

▶ India trades at a premium of ~5-7% on global crypto prices and has severely impacted the market participants[2], reflecting the low liquidity and inefficiency in the market.

Economic Loss:
▶ Since the introduction of the TDS, the exchequer has lost out on an estimated INR 800 Crores of TDS not collected.

▶ Industry estimates suggest that 270+ operators/startups have moved outside India due to regulatory frictions / uncertainty since April 2022.

▶ Estimated 50k jobs will be lost in India over the next 12-24 months due to an overtly hostile legal environment.

Defeating the purpose behind the TDS mandate:
▶ Indian users' migration to foreign exchanges that do not comply with the TDS mandate, prevents the government from accessing details of the trade. There is also a potential that these users might not pay 30% tax on their income. All of this defeats the primary objective of the provision to maintain robust records for all VDA transactions by Indian residents which address government concerns on FEMA & AML violations.

▶ The existing framework is incentivising Indian users to shift wealth to foreign exchanges.

▶ Indian exchanges that are contributing towards nation building in several ways including taxation, employment, wealth creation, and nurturing the Web3 ecosystem are the sole bearers of the brunt of the TDS mandate.

▶ In summary, there has been a significant decrease in trading, activity, and sign-ups for Indian exchanges, while their international counterparts have not seen the same.

1.4.2.Defeating the purpose behind the TDS mandate:

▶ Due to onerous regulation, law-abiding citizens are being incentivised to break the law.
Indian users' migration to foreign exchanges that do not comply with the TDS mandate, prevents the government from accessing details of the trade. There is also a potential that these users might not pay 30% tax on their income. All of this defeats the primary objective of the provision to maintain robust records for all VDA transactions by Indian residents which address government concerns on FEMA & AML violations.

▶ The existing framework is incentivising Indian users to shift wealth to foreign exchanges.

▶ The Web3 ecosystem is poised to be the next sunrise sector in India. Industry estimates suggest that it can contribute USD 1 trillion to India's GDP by 2032. There has been a nearly 138% rise in jobs offered by this space since 2018 and 11% of global Web3 talent is in India. As of the first half of 2022, there were 450+ Web3 startups in India and 75000+ tech talent in the industry. The Web3 space has attracted investments of over USD 1.3 bn since 2020.

▶ Indian exchanges that are contributing towards nation building in several ways including taxation, employment, wealth creation, and nurturing the Web3 ecosystem are the sole bearers of the brunt of the TDS mandate.

▶ In summary, there has been a significant decrease in trading, activity, and sign-ups for Indian exchanges, while their international counterparts have not seen the same. However, there has been a sharp rise in downloads for foreign VDA exchange apps in July by Indians.

Considering the above backdrop, the following next steps are suggested:

▶ Clarify the applicability of the TDS mandate on foreign exchanges and P2P deals.
Take enforcement action against the exchanges/ other buyers not complying with said provision

▶ Reduce the percentage of TDS from 1% to 0.01%. This will discourage Indian VDA sellers to switch to foreign exchanges

2. Impact of Banking Rail Frictions on Indian VDA industry

Frictions with Banking Rails has been a defining concern for Indian VDA exchanges for the last half decade, with issues beginning well before the RBI notification from April 2018 isolating individuals and firms dealing in VDAs; and is a trend that has continued till this day.

Despite the Supreme Court quashing the effective ban in March 2020[3], and acknowledged by the RBI in a 2021 circular[4], Indian VDA exchanges have continued to persistently face issues with banking rails, particularly since April 2022.

Just like any other business currently operating in India, continuous availability of UPI and other digital payment rails for VDA businesses is also critical for their development and success. However, VDA exchanges have been kept out of the UPI network. UPI was available for Indian VDA exchanges until the first week of April 2022, before being disabled by the vast majority, if not all, Indian VDA exchanges in India. Platforms have continued to face issues with maintaining relationships with banks, with accounts regularly being frozen. This is despite major Indian VDA exchanges[5] (accounting for the majority of volume) voluntarily following stringent KYC and other AML/CFT related processes in-line with other financial services, as well as guidelines introduced by the government from the RBI, CERT-in, ASCI, etc.

As a result of persistent frictions, Indian VDA investors have chosen to use foreign VDA exchanges and FX platforms as INR on-ramps to trade in VDAs which has resulted in: Indian funds and business moving to foreign platforms resulting in a loss of employment, wealth, and tax revenue. Further, multiple Indian VDA exchanges shutting down or moving abroad, with the trend starting in 2018, and picking up pace in 2022 – hampering the development of local employment, knowledge and expertise

Damage to overall visibility w.r.t India's burgeoning VDA market for government & law enforcement due to the formation of a robust P2P & underground market for trading VDAs with INR. An alternative is a policy approach that integrates compliant Indian VDA exchanges into the financial system is key in arresting any concerns the government may have.

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[3] On March 4, 2020, a three-judge bench of the Supreme Court had quashed the ban that the RBI had imposed on trading in VDAs in April 2018

[4] Consequently, the RBI has stated in its notification dated May 31, 2021 titled 'Customer Due Diligence for transactions in Virtual Currencies (VC)' that in view of the above judgment, the 2018 RBI circular "is no longer valid from the date of the Supreme Court judgment, and therefore cannot be cited or quoted from."

[5] CoinDCX, BuyUcoin, CoinSwitch Kuber, Unocoin, Flitpay, Zeb IT Services Pvt Ltd, Secure Bitcoin Traders Pvt Ltd, Giottus Technologies, Awlencan Innovations India Pvt Ltd (ZebPay), Zanmai Labs (WazirX)

2.1. Key points around legal frictions and the Indian VDA ecosystem

2.1.1. Dozens of Indian Web3 startups folded up after being cut off from banks following the RBI 2018 circular:

▶ Founded by IITians, Koinex was Indias leading VASP in 2018 raising over USD 1.5 mn in seed funding from global investors before shutting down within a year

▶ Several exchanges, like Coinsecure and CoinDelta were forced to shut down, other players, like Zebpay, relocated abroad to survive

▶ This in turn led a vast number of Indians to turn to foreign exchanges, P2P, and the black market for VDA related services

2.1.2. Grassroot demand for VDAs has proved fundamental, with individuals finding other means to invest

▶ According to the Chainalysis VDA Adoption Index (a globally cited index for VDA activity), India ranked 4th in 2022

▶ There are an estimated 25 million Indians who have currently invested in VDAs

2.1.3. Between 2020-2022 when banking support was restored, the Indian Web3 industry created world class developers and firms

▶ There are multiple Indian VDA exchanges that are now valued as Unicorns, with the local space attracting $1.5bn+ in FDI over the last two years

▶ Web3 startups like Solana and MATIC started by Indian origin entrepreneurs have market caps of over USD 10 billion, and are considered world leaders in the industry

▶ There are currently 15,000-20,000 active India developers, and 200+ firms in the Web3 industry, and is already a global hotspot for uncovering talent

2.1.4. These firms are now once again fighting for survival due to the inability to keep consistent banking and payment rails:

▶ Several small to medium Indian Indian VDA exchanges have temporarily closed their INR deposits through any means, with all suffering intermittent loss of payment rails

▶ There has been an ~85% reduction in monthly volume on Indian exchanges since February whereas international trading volumes have remained fairly stable for the same period;

▶ India trades at a premium of ~5-7% compared to global VDA prices[6]

▶ There has been an 80%+ reduction in the number of monthly downloads and active users on Indian VDA exchange apps between February and July; whereas apps of top foreign exchanges were downloaded by < 11,50,000 between June and July.

2.1.5. Indian users are not only shifting their funds to foreign VDA exchanges, but also entering the market via P2P services on the same platforms

▶ Most major international VDA exchanges have begun offering P2P to clients directly through their platform.

▶ As per a top online VDA P2P platform, in 2020 they had over 500,000 Indian users and over ~25% of trades within India involved gift cards being exchanged for VDAs.

▶ For example, as of September 2022 across the top 5 international VDA exchanges by overall volume, on a day there is at least INR 10 cr.+ worth of liquidity at competitive prices (less than 1.5% difference from market prices)[7].

2.1.6. As well as other platforms, like unregulated FX firms to trade VDAs

▶ Foreign online trading platforms offering USD based FX and VDA trading continue to receive both banking support and UPI support[8] for Indian customers.

▶ These platforms also allow the deposit and withdrawal of VDAs in lieu of INR without KYC; a practice that even Indian VDA exchanges have halted voluntarily due to regulatory uncertainty

▶ These platforms have less stringent KYC requirements, allowing customers to deposit and trade without completing KYC

2.1.7. Ultimately, compliant Indian VDA exchanges creating local employment and contributing to the economy have been borne the brunt of losses

▶ The estimated opportunity cost for volume lost to foreign platforms is estimated to be over INR 3 lakh crore in annualized volume[9] shifting to overseas exchanges that otherwise would have been conducted in India

▶ This is not counting the loss of revenue to banks, PSPs, IT firms & developers etc. , or the loss of local employment opportunities

▶ Constant regulatory uncertainty has made it so that the vast majority of investment into Indian Web3 companies has come from foreign firms via FDI, as opposed to domestic investors

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[6] Compared with XE.com USDINR rates https://xe.com

[7] Based on industry estimates

[8] As of August 2022

[9] Based on industry estimates

2.1.8. This is despite Indian VDA exchanges voluntarily following strict KYC and related processes in line with other financial institutions, as well as guidelines provided by the government.

▶ As per the RBI 2021 circular previously referred to, regulated financial entities should continue carrying out appropriate due diligence in line with regulations before onboarding new customers

▶ Indian VDA exchanges follow governing standards related to KYC, AML/CFT as per PMLA, FEMA etc.

▶ As well as providing comprehensive risk disclosures, 24x7 grievance redressal, and dedicated awareness campaigns

▶ Additionally, sophisticated transaction monitoring processes for VDA transactions are often employed to detect fraud and other suspicious activity

▶ The platforms voluntarily (and at great cost) updated their software to calculate and deduct TDS on behalf of customers

2.1.9. In summary, attempts to ring-fence Indian VDAs from the financial system through denial of banking rails has ultimately had a counterproductive effect – incentivizing illicit activity, tax evasion, and capital flight

▶ This is largely in line with the experience of other countries

▶ India, China, Pakistan, Russia, Nigeria and Vietnam regularly feature in the top 10 countries by VDA adoption[10] despite having complete or partial bans, or isolation from the financial system due to central bank pressure

▶ As opposed to nations who took a more supportive stance, and did not suffer a relative increase in illicit activities via VDAs[11]

2.1.10. For assets and technology as accessible as the internet, integrating and ensuring funds move through compliant platforms is key in creating visibility and arresting valid concerns the government may have. Therefore, an alter native policy approach is suggested where:

▶ The way to address the valid concerns of the government and RBI is by providing clarification and sufficient guard rails to ensure both VDAs and Indian VDA exchanges are not party to any AML, CFT, FEMA or other violations

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[10] Details of methodology are provided at:

https://blog.chainalysis.com/reports/2022-global-crypto-adoption-index/

[11] Estimates of 0.62 of all VDA transaction flows https://blog.chainalysis.com/reports/
2022-crypto-crime-report-introduction/

► Introducing a licensing system under an appropriate regulatory body (such as SEBI or an independent body) to monitor Indian VDA exchanges would provide accountability

► Compliances specific to Indian VDA exchanges, such as appropriate monitoring of VDA transactions, security measures, risk disclosure and asset listing will provide ad equate visibility and mitigate any perceived risks with the industry

► Involving the industry itself particularly in initial stages via an SRO to create best practices as many domestic Indian VDA exchanges are already following global standards in terms of KYC, transaction monitoring, security, etc.

3. Perspectives on the Intersection of the Foreign Exchange Management Act, 1999 and the Indian VDA Market

The Foreign Exchange Management Act, 1999 is India's capital control legislation. It provides the framework for regulating forex flows into and out of the country, with the objective of maintaining fiscal stability. VDAs and other digital assets provide a relatively frictionless way of moving money across borders, raising questions about whether FEMA applies to these assets.[12] Resolving these questions is particularly important for the Indian VDA ecosystem as domestic exchanges have received show-cause notices from the Enforcement Directorate, the enforcement agency under FEMA, for alleged violations of the Act.

The starting point for understanding whether FEMA applies to digital assets is to determine if they can be accommodated within asset classes defined under the Act. This determination will decide whether digital asset transfers are considered capital account or current account transactions. These are the two kinds of transactions overseen by FEMA. Broadly, capital account transactions involve cross-border transfers of money that affect wealth, and the acquisition or sale of an asset in a foreign country by an Indian resident is a capital account transaction. Capital account transactions require sanction from the RBI – unless specifically permitted (e.g., investment in foreign shares and immovable property are permitted subject to criteria) and are subject to various compliance requirements and monetary thresholds. In FEMA, current account transactions are more broadly defined – as any transaction other than a capital account transaction. e.g., transactions that essentially do not alter the assets or liabilities outside India of an Indian resident. Current account transactions are permitted unless specifically prohibited. Both current account and capital account transactions are processed through Authorised Dealers of foreign exchange, with due reporting and declarations.

A reading of the Finance Act, 2022 and the Supreme Court judgment in IAMAI vs. RBI reveals that digital assets are a form of virtual intangible property.[13] While the FEMA deals with four kinds of intangible property, namely securities, foreign currency, intellectual property rights, and software, none of these adequately cover the unique nature of digital assets, which can serve a variety of purposes. For example, NFTs are considered as digital goods, whereas tokens such as Ethereum are more like utility instruments. Hence, a one size fits all definition under FEMA is unlikely to capture these nuances. Additionally, it is unclear whether VDA transfers that do involve the exchange of fiat currency or foreign exchange are covered by FEMA. A perusal of show cause notices issued by the ED to Indian exchanges would suggest that such transfers are covered within the Act. However, there is no policy guidance on the subject from the RBI, which is the relevant authority to make this determination, regarding compliance with FEMA for digital asset businesses

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[12] Indian users can perform cross-border VDA transactions using international credit cards. They can also participate in initial coin offerings (ICOs) by blockchain startups based outside the country. Some foreign blockchain projects can also send tokens to users based in India for free. This is known as airdropping tokens.

[13] The Finance Act 2022 has, for the purpose of the Income Tax Act, 1961 introduced a new asset category known as virtual digital assets (VDAs). VDAs have been classified as property both movable and immovable property. From the above provision as well as certain observations of the Supreme Court in the matter of the Internet and Mobile Association of India vs Reserve Bank of India (IAMAI v. RBI) we can glean that VDAs are a type of intangible, movable property.

Another problem in bringing digital assets within the FEMA framework is that there is no guidance on how to establish the location or situs of digital assets. Identifying the situs of is crucial as it determines whether the transaction involves the movement of assets across borders. However, digital assets are intangible and do not exist in any particular location, making it difficult to assess whether a cross-border transfer is involved.

Given the gaps in the current framework, the Esya Centre report recommends that the Government adopt a sui-generis law to govern cross-border transfers of digital assets. The salient features of such a law would include:

▶ A utility-based definition for digital assets that classifies them based on their ramifications for capital controls. Illustratively, stablecoins, which are pegged to the value of real world assets, require closer monitoring than NFTs, which are primarily used as collectibles or digital art.

▶ A reporting framework that stipulates how Indian VDA exchanges are to capture and report data on digital assets to the RBI to facilitate better oversight and monitoring of these transactions.

▶ Principles that assign a situs or location to digital assets based on the location of the owner. Such principles are in line with other legal doctrines, including taxation.

▶ Clarification of the status of VDA transfers – the sui-generis law must specify how such transfers are to be treated.

F.

Unlocking transcendent opportunities in Web3

Key themes covered

This section looks at the opportunity cost involved with respect to sustained regulatory uncertainty in India. It discusses how Web3 presents opportunities for domestic employment generation, and highlights areas of synergies between the VDA ecosystem, the larger Web3 space and India's digital fiat currency – the e-Rupi.

1. Employment generation

"New technology allows us to provide services across borders and you don't need to migrate to another country for that. Services provided at a distance can do 2 things - it provides livelihood at a distance and also reduces inequality," – Raghuram Rajan '22

1.1. India's most crucial issue – ensuring the demographic dividend does not become a demographic liability.

The transformation of a workforce from agriculture to manufacturing and services has long been established as a key track for transforming an emerging economy into a middle-income and eventually developed nation. However, the creative destruction brought about by automation and other technologies, such as AI/ML, has resulted in a situation where crucial employment sinks like manufacturing can no longer be competitive relying on labor-intensive processes, with almost all industries now requiring capital-intensive manufacturing – a phenomenon known as premature de-industrialization. This is corroborated by data:

Manufacturing accounts for nearly 17% of India's GDP, but the sector has seen employment decline sharply in last 5 years - from employing 51 million Indians in 2016-17 to reach 27.3 million in 2020-21

A reverse flow of employment into Agriculture and Construction (which remain the two biggest employers by a large margin) will soon come to represent a backward step in Indias development journey

▶ It is worth noting that the manufacturing sector that provides the maximum output to the Indian economy is refined petroleum products (along with others like pharmaceuticals) – which are extremely capital intensive industries

▶ While IT-BPM accounts for 9% of Indias GDP, and 56% of the global IT outsourcing market, it still only generates 5 million jobs

▶ It is notable that the Indian IT industry still primarily outsources , with the majority of revenue and knowledge flowing into foreign firms

▶ The Mckinsey Global Institute estimates that a total of 90 million new jobs will need to be created by 2030 – with no obvious solution to make up the shortfall

▶ To capture frontier opportunities, India needs to triple its number of large firms, with more than 1,000 midsize and 10,000 small companies scaling up.

▶ This simmering employment problem has resulted in a booming gig economy, which currently employs 7.7 million people, and is expected to reach 23.5 million people by 2030

1.2. India must walk a policy tightrope for the next decade to achieve this – and by doing so, leapfrog into an economic superpower. Some key principles are:
A multi-prong approach is needed where employment is led by services exports, and supported by ownership of platforms providing retail services, and grass-roots consumption and participation

▶ Develop a physical and digital infrastructure that enables value creation by any Indian citizen

▶ Create employment through entrepreneurship, where there are low barriers to entry for individuals to innovate

▶ Support this by creating enabling policies that address Indias 'Missing Middle' – allowing small to medium size firms to become large firms

▶ Identify multiple high-value, high-employment industries in the rapidly evolving digital-industrial landscape – since neither industry or services will suffice alone

▶ Embrace the local and global gig economy as a key employment safety net for young Indians

▶ By 2030, India will have 23.5% of the worlds workforce – it is essential that education, skills, and opportunities are aligned to leverage Indias strengths, and global needs

▶ To balance exposure to global markets and protectionism to ensure knowledge and technology transfer while nurturing local products and platforms - by liberalizing service exports and appropriately controlling service imports

1.3. Web3 and VDAs – a perfect skill fit for Indian talent

▶ India will soon have the largest developer pool (an estimated 10 million by 2030), with the majority of developers fluent in English and ready to engage global markets and firms.

▶ The next generation of Indians will be internet natives, with an expected 900m people on the internet by 2030 – making it one of the most (if not the most), important market for internet companies, both local and global

▶ This has been made possible by decades of government policy, with initiatives like the JAM trinity creating a globally competitive IT/telecom national infrastructure

▶ Despite persistent regulatory uncertainty, the Indian Web3 industry has thrived – there are over 200 VDA/DLT firms in India or of Indian-origin, that have raised over $1.5bn in the last 2 years

▶ However, the majority of firms are still early-stage, and primed for expansion both domestically and globally

▶ Indians also have a high affinity for VDAs – with an estimated 25 million Indians having invested in VDA. According to VDA intelligence firm Chainalysis, India is consistently in the top 10 countries for highest VDA flows

1.4. VDAs are no longer a novelty – and there is growing acceptance that the industry is here to stay

▶ According to BCG, there are close to 300 million VDA investors as of 2022 – the rate of adoption is similar to that of the internet

▶ Close to $16 trillion was transacted via VDAs in the last year (an 880% increase), with nearly 70% being through permissionless DeFi (Decentralized Finance) platforms

▶ Currently, the market capitalization of the VDA market is close to $1 trillion, reaching a high of $3 trillion in 2021. Similarly, there is over $50 billion locked in Defi platforms, with a high of over $200 billion

▶ The largest investors via public companies in 2021-2022 include Alphabet, Microsoft, Blackrock, Morgan Stanley, Goldman Sachs & Samsung (for a combined total of $10 billion+)

▶ Community participation measured by resources put into mining, developer contributions, and user activity have remained on an upward trend for the last decade, largely invariant to price movements

1.5. Web3 and VDAs – a sunrise industry that aligns with Indias aspirations

▶ While Web3 does result in automation via disintermediation, it differs from other technologies such as AI/ML – which feed into and have primarily benefited megatech firms (Google, Meta, Amazon)

▶ As opposed to AI/ML which will increase the ability of large tech firms to rent-seek and create wall gardens

▶ On the other hand, VDAs and DLT have given rise to user-owned, distributed organizations (the way a VDA like Bitcoin or Ethereum operate for example) that mitigate rent-seeking opportunities at the cost of lower throughput for transactions or data

▶ Additionally, Web3 networks value is often anchored on open-source code and transparent governance – allowing anyone with internet to access both the technology and global market

Thus, the Web3 industry is characterized by:

▶ Extreme ease of access and low barrier to entry for entrepreneurs

▶ Has complete technology transfer baked in its design – allowing complete access to knowledge & code

▶ Public blockchains take this one step further, providing essentially free infrastructure to develop applications once they have been developed (i.e. a dApp on Ethereum)

▶ Creates products that are integrated with the global internet economy directly, allowing Indian entrepreneurs and developers to get direct access to high value global customers

▶ Will be a key cornerstone of the future internet gig economy, by allowing content creators and users to own and accrue value as opposed to platforms capturing the majority of value

2. Areas of synergies between exchange & Central Bank viz., CBDC, Cyber Security, etc.,

2.1. Exchanges enable compliance capabilities –

In the world of decentralised blockchain networks, where transactions of value transfers can take place between peers on the network directly (P2P), there are centralised layers built on top of these networks that act as the front-ends which enable convenient access to blockchain networks by aggregating liquidity for building efficient marketplaces that can be regulated in a manner that is similar to existing financial services.

2.2. Harsh regulations on VDA are contrarian efforts –

While centralised systems continue to be subject to harsh regulations, policymakers seem to overlook their contributions of being the only reliable identity layers who will have the wherewithal to implement AML/CTF frameworks as financial intermediaries to enforce the required controls that are needed for financial stability. Harsh regulatory measures on centralised exchanges actually squeezes out market participants and forces them towards decentralised systems like smart contract based decentralised exchanges or DEXs. A recent report by Chainalysis indicates that the DEX volumes exceeded the volumes on centralised exchanges.

On-chain transaction volume on centralied vs. decentralised exchanges

2.3. What happens if volumes move to DEXs? –

Decentralized exchanges are exchange and custodian services built on blockchain networks by entities that depend primarily on code executed "on-chain" to provide their services. DEXs are borderless and not subject to jurisdictional controls hence make it impossible to implement compliance frameworks. Given that decentralised means of value transfers are possible in VDA networks, the lack of identity layers makes it impossible to have any kind of tracking or traceability. On the contrary, if volumes are sustained on CEXs the ecosystem remains regulated by implementing sufficient guard   rails in the form of withdrawal limits, declarations at the point of withdrawals and PAN linkages for asset purchases. Therefore it is important that we do not inadvertently

over regulate CEXs and consequently end up driving volumes to DEXs. Regulators and exchanges across the world are working together to enable compliance frameworks against misuse of VDAs. India should not be an exception.

2.4. The world views VDA exchanges & brokers favourably –

Globally VDA exchanges and brokers are licensed as money transmitters or the like and are provided access to traditional banking rails on the back of compliance measures. In the US large VDA exchanges are licensed entities listed on the stock exchange and have access to banking, FIUs and LEAs. The Financial Action Task Force, (FATF) has carved out a definition for entities providing virtual asset (VA) services as Virtual Asset Service Providers (VASPs) favourable regulations such that the larger aggregate of the trading volumes within VDA are performed in a legally sound, monitored and controlled environment.

2.5. Exchanges & FEMA Compliance

As per an RBI report dated June 2022, the degree of cryptoisation (in India) thus far appears limited, however its growth circumvents restrictions on exchange rates and capital controls and limits the effectiveness of domestic monetary policy transmission, posing a threat to monetary sovereignty. To ensure an effective capital flow management in an environment of growing VDA use, Indian VDA exchange and broking platforms have built several guard rails to allay the concerns of regulators. There are several solutions implemented for countries with capital controls

2.6. Co-regulation of the VDA industry

The exchanges and key policymakers have to work to build a multifaceted strategy to ensure optimal co-regulation for the industry with key highlights as below:

▶ Outlining the broad contours for the legal status of VDAs;

▶ Building and applying effectively, a comprehensive, consistent, and coordinated regulatory framework that covers investors and entities engaged in VDA activities and services;

▶ Ensuring the coverage of such a framework with oversight on transactions within the country and across the globe to ensure complete supervision of inflows and outflows of VDAs;

▶ Addressing data gaps and leveraging technology (regtech and suptech) to create anomaly detection models and red-flag indicators that will allow for timely risk monitoring and effective capital flow management.

2.7. Web3 and CBDCs

While the Bank for International Settlements (BIS) has concluded that CBDCs represent a unique opportunity to design a technologically advanced representation of central bank money, one that offers the unique features of finality, liquidity and integrity, RBI is also keen to launch India's CBDC and has made amendments to the RBI Act to include the CBDC as bank notes. While this opens up a variety of use cases within Wholesale & Retail banking, enabling on-ground adoption of CDBCs will be the key to its success. Web3 platforms can direct billions of dollars of trading volumes and on-chain transactions that take place on stablecoins, to India's CBDC and accelerate the retail adoption of CBDCs in India. Fiat on-ramps and off-ramps powered by CBDCs, can become the most compliant bridge for users to get onboarded into the VDA ecosystem and carry out transactions within Web3 use cases like NFTs, Metaverse, etc.

2.8. Long term & short term approach to VDAs

According to a report published by the Policy Department for Economic, Scientific and Quality of Life Policies, comissioned, it is recommended that a comprehensive regulatory approach is built towards virtual currencies over time. Preferably this is done through de signing a tailored regulatory regime along the lines of the following characteristics:

▶ Creating a virtual currency scheme governance authority that is accountable to the regulator,

▶ Customer due diligence requirements, fitness and probity standards for individuals performing specified functions in a scheme governance body, exchange or other relevant market participants,

▶ Mandatory incorporation in an EU Member State (can be extrapolated to each country's own jurisprudence),

▶ Transparent price formation and requirements against market abuse, authorisation

▶ Corporate governance requirements, capital requirements,

▶ Evidence of secure IT systems,

▶ Payment guarantee and refunds requirements, separation of virtual currency schemes from conventional payment systems

▶ And a global regulatory approach.

While the above take time, as a more immediate response, the EBA recommends to include market participants at the direct interface between conventional and virtual currencies, such as virtual currency exchanges, in the scope of the AMLD or FEMA in India as 'obliged entities' and thus subject these to anti-money laundering and counter terrorist financing requirements. VDA exchanges in India can help the regulators achieve both the short & long term objectives.

3. Public-Private Partnership is Critical for a Successful Indian CBDC

The RBI recently published a Concept Note on Central Bank Digital Currency. The Note aims to explain the regulator's objectives, choices, benefits and risks of issuing a CBDC in India. It broadly defines CBDC as the legal tender issued by a central bank in a digital form and refers to the Indian CBDC as "e₹, or digital Rupee". Many of these choices render the space ripe for public-private partnership between the RBI and India's thriving Web3 ecosystem.

The Concept Note envisages the introduction of two types of CBDCs. Wholesale CBDC, designed for restricted access by financial institutions and retail CBDC, potentially available for use by all private sector, non-financial consumers and businesses. Retail CBDC has been conceptualised as a token-based system with universal access. The RBI will be the sole creator and issuer of tokens which will then be distributed by "authorised entities" called Token Service Providers.

These considerations offer a unique opportunity for the RBI to leverage the experience and expertise of Indian virtual digital assets service providers. For instance, Indian exchanges have essentially been functioning as Token Service Providers for a wide variety of virtual digital assets and have built sustainable businesses providing these services. Their core value proposition has been "on-ramping" users into virtual digital assets. They offer safe and secure platforms for users to easily access virtual digital assets, using fiat currency. These robust platforms eliminate hassles otherwise associated with transacting on blockchains, such as maintenance of private key and seed phrase etc. Given that the distribution of CBDCs is envisaged to be done through third parties, and the tokens are designed to be stored in wallets, existing players' experience in this space can help with seamless implementation.

As close followers of the development of the Web3 ecosystem across the globe, virtual digital asset service providers have also developed a keen understanding of the prevalent cybersecurity risks. They have successfully built resilient security frameworks to address cyberattacks. The CBDC ecosystem is also likely to face similar risks and be prone to such sophisticated attacks. The learnings of Indian virtual digital asset service providers will be valuable in this regard as well.

While the Concept Note categorically states that the CBDC will be built on a blockchain, it does not commit to many specifications of the underlying technology. For instance, there is a lack of clarity on whether the infrastructure selected for implementing CBDC would be based on a conventional centrally controlled database, or on a distributed ledger. Multiple successful blockchains have been built by Indian founders and the ecosystem maintains extensive knowledge that can help the RBI choose the most optimal way forward. The Concept Note also acknowledges that the technical possibility of programmability is an interesting application of CBDC. Indian developers who are building Web3 solutions not only for India, but for the rest of the world, are also key stakeholders who should be considered and consulted in determining the nuances of the functioning of the underlying technology of India's CBDC.

The RBI Concept Note explicitly acknowledges the need for interoperability and integration with existing payment systems. It notes and lauds India's position as a global leader in terms of digital payments innovations. One of the considerations listed in the Concept Note is that the Indian CBDC should utilise the current payments infrastructure including digital wallets like Paytm, Gpay etc. There is however no mention of collaborating with successful Indian ventures in the Web3 space.

Our Honorable Prime Minister Shri Narendra Modi has repeatedly acknowledged the private sector as partners in the nation's progress. Public-private partnership has been a core tenet of India's development story. The nation is often touted as a global leader in terms of readiness for such collaborations. The model's success has also been seen across a variety of sectors, ranging from delivery of high-priority public utilities such as the COVID-19 vaccine, to infrastructure development. The monumental CBDC project should be no different. India's Web3 ecosystem holds a wealth of knowledge which, if leveraged, will substantially contribute towards a successful implementation of the e₹.

G.

Future Outlook – India's Approach to VDAs at the G20

Key themes covered

This section looks ahead at how India can exercise a leadership role in shepherding global VDA regulation. It highlights the need for robust responsibility frameworks over VDAs and stresses on the critical role played by industry in architecting robust regulatory frameworks.

As India gears up for its first G20 presidency, the first hints that global regulation of VDAs will be a key priority have begun to trickle in. Identifying "consensus-based solutions for accelerating the scale and scope of the response of the global community to many transboundary challenges such as regulation of virtual assets," as the third of eight key objectives during India's G-20 presidency, the chief economic adviser to the government, V. Anantha Nageswaran, said during a Tuesday speech at an annual event hosted by ICRIER on the upcoming G-20 conference. This follows multiple comments by the Finance Minister pointing out that international cooperation is a necessity for domestic regulation, and the RBI confirming its hawkish stance on VDAs with currency substitution, i.e. dollarization featuring as the newest threat to financial stability.

With the presidency, India – which has passed what the local industry has criticized as a crippling tax regime while the country's central bank has called for a ban on VDAs – will now have a prominent role in framing global VDA regulation, at a time where the perception of VDAs amongst governments is transforming from being written off as a temporary fad to an enduring and rapidly evolving asset class that has left regulations far behind.

The total estimated VDA market capitalization at its height last year stood at over USD 3 trillion, conducting an estimated USD 15.6 trillion during the same period. This latest growth spurt has led to a rapid rise in efforts to regulate VDAs, both by state actors – i.e. MICA in the EU or RFIA in the US – and international organizations – FSB, OECD, IMF, BIS etc. have all released suggested frameworks and consultation papers on the subject in the last year – indicative of both an alarm at the rapid growth of the industry, and an acceptance that VDAs are here to stay. As a result, there is now a wealth of templates for framing VDA regulations both domestically and internationally.

Nevertheless, effectively regulating VDAs has proved to be a difficult task – aside from the borderless, pseudonymous transactions they enable (they 'exist' on the internet), the backbone of any VDA – the people who maintain and participate in the system – are dispersed around the globe without any one entity having complete ownership or liability. A common mistake amongst experts and policymakers has been to treat VDAs as technology independent from its participants, when in fact the human aspect is as, if not more, important.

For example, despite the lack of defined hierarchy, the economic communities behind VDAs like Bitcoin & Ethereum (boasting historical uptimes greater than Visa or Mastercard and have comparable annual transaction volumes) have not only endured, but thrived – making the platforms in question worth hundreds of billions of USD. A robust framework that can be followed globally to appropriately classify both the assets behind VDAs as well as the economic communities behind them has thus far remained somewhat elusive.

This problem is confounded with DeFi platforms (who at their peak, had over USD 200 billion in assets locked along with several trillion USD in transactions over the last few years), who allow users to access more sophisticated financial instruments; such as lending, staking, futures and options. As a result, DeFi analogues of financial products are cropping up before simple transactions via VDAs have been appropriately regulated. What is clear from the experiences of nations trying to regulate VDAs is that effective regulation can only be achieved when paired with appropriate technological infrastructure and support from local industry; creating a dynamic map of individuals interacting with VDAs domestically and internationally is essential for tracking, tracing, and consequently enforcement. This is only possible with the cooperation and support of the local industry. For example, some part of why the US or the EU have a warmer policy stance towards VDAs is because they have the technological nous and support of doemstic companies (like Coinbase and Chainalysis) enabling them to track transactions; a similar technology ecosystem is what allows China to maintain relatively strict controls on VDAs.

Given India's reluctance and hostility towards VDAs, the Chinese experience is particularly relevant, and warrants special mention. Before the current regulatory environment in China for VDAs, Chinese companies led the market and contributed the majority of volume for several years. Multibillion dollar companies like Binance, Huobi, oKX, Bitmain etc. all benefited greatly for years due to a relatively light touch approach from the Chinese government. The 'bans' in China only came after these companies grew into world VDA leaders – positions they keep to this day. The expertise gained from their experience is the source of the Chinese governments confidence in controlling the local market, and would not be possible without it. It is important to note that despite bans on VDA trading, China remains one of the largest VDA markets in the world (according to Chainalysis), and continues to exert a significant influence on the market as a whole. This story is seen in other countries as well; for example the Central Bank of Nigeria (CBN) has banned entities from transacting in VDAs, yet Nigeria has the highest VDA adoption rate in the world. Other examples of countries where strict VDA regulations have backfired include Vietnam and Turkey – thus, it should be clear to policymakers that strict regulations have been historically unsuccessful in deterring individuals from engaging in VDAs, and that the source of demand likely stems from domestic financial and economic instability.

What can, and must, be immediately addressed at an international level is regulating the multinational intermediaries that allow international customers to enter the space, such as

exchanges, asset-backed stablecoins, custodial wallets, remittance platforms, etc., once again, because of the borderless nature of VDAs. Once an individual owns some amount of VDA like Bitcoin or Ethereum, they are able to access services and transfer funds to people anywhere in the world, the same way someone can send an email or post something on facebook. Like the internet, the VDA industry is prone to monopolization by centralized tech companies (We can think of Binance and Coinbase as early analogues of Microsoft or Yahoo) this has led to a few platforms cornering large parts of the international market. In the absence of regulation, these platforms represent a dark spot in information, which is only provided upon request to law enforcement, granted the platform in question cooperates. They also confer significant financial risk onto their international users, who often end up trading on platforms with inadequate disclosures and no legal redressal mechanism in case of bankruptcy – as seen in the collapse of FTX, the worlds second largest C2C exchange which operated out of the bahamas. While recent efforts to regulate stablecoins in the EU, the US and by global SSBs is a step in the right direction, a broader template to govern how governments can interact with these mega exchanges is urgently needed.

Initial impressions from press releases and other tidbits of information suggest that combating capital flight, user protection, and money laundering are the key concerns on the VDA agenda – in line with the Indian governments broader view on VDAs. VDAs will likely feature most prominently in the G20 finance track with discussions revolving around establishing information sharing norms and harmonizing national regulations via a set of Standard Operating Procedures.

What remains thus far unsaid is any reference to the opportunity leadership of the G20 presents for India in terms of setting global VDA SOPs in the context of EMDEs (Emerging Market or Developing Economy), and ensuring that EMDEs can appropriately benefit from the Web3 and VDA ecosystem; in contrast to the few multinational tech companies that currently serve as gatekeepers of the internet. While the mitigation of ML/CFT is certainly a pressing issue in India, ensuring the creation of avenues for employment and wealth generation as India's working age population begins to bulge rapidly over the next decade surely assumes primacy.

To put things in perspective, the Mckinsey Global Institute estimates that a total of 90 million new jobs will need to be created by 2030 – manufacturing employment has declined 47% over the last 5 years while the IT industry, despite its success, still only employs 5 million people. To capture frontier opportunities, India needs to triple its number of large firms, with more than 1,000 midsize and 10,000 small companies scaling up. This simmering employment problem has resulted in a booming gig economy, which currently employs 7.7 million people, and is expected to reach 23.5 million people by 2030.

This story is seen around the developing world, as manufacturing is increasingly automated and capital intensive (a phenomenon coined as premature deindustrialization), and the digital economy increasingly centralized with a few entities accruing the majority of value. Ensuring that India and other EMDEs are not left behind in this rapidly shifting industrial landscape such that their bulging cohorts of working age individuals have gainful long term employment is a goal of comparable importance to energy and food security.

Web3 is one of the few industries left which still has the potential to generate the kind of wealth and employment needed to contribute to industrial transformation. A quick back-of-the-napkin

calculation reveals the size of the opportunity for India (and the rest of the developing world) to capture – currently there are approximately 300 million individuals who own or use VDAs, of which 25-30 million are in India, making up a market worth USD 3 trillion at its height. If VDA adoption continues to grow on a similar trajectory to the internet, we can conservatively conclude that over the decade, that number could easily double, or triple. As VDAs become increasingly productive assets with multiple uses on any one platform, a commensurate amount of capital is likely to enter via not only investors, but institutions as they begin increasing their exposure. Given the current valuations and revenues of major VDA players, several studies by organizations like USISPF or NASSCOM have concluded that if the domestic industry is nurtured and allowed to interact with the global market, the Indian VDA industry has the potential to contribute more than USD 1 trillion to GDP over the next decade. While employment may not grow directly from these companies, appropriate Web3 regulation can enable the liberalization of services, allowing many of the 20+ million employed in the gig economy to export their services without middlemen.

Given Indias strong competitive advantage in terms of talent – it is estimated that India will have over 10 million developers by 2025 – , companies – India currently has two unicorns operating domestically (coinDCX, coinswitch, wazirx), as well as home to major VDA players like Polygon (who recently raised USD 450 million), and a thriving community with 25+ million people, it is crucial not to let this opportunity pass. Making all efforts to ensure the next Coinbase, or Binance (with a combined valuation of over USD 300 billion, comparable to many of the larger public ltd. companies in India) is allowed to blossom in India should be one the key principles guiding how India approaches its own regulation and stewardship of the VDA dialogue at the G20.

As things stand, the danger that this opportunity will be lost to incumbent players stemming from a lack of appropriate regulation and global standards is very. At this crucial juncture India has been given an opportunity to ensure a level playing field for VDA companies from EMDEs by bringing in appropriate norms for regulation of mega companies, and enabling nurturing domestic regulatory environments by incentivizing funding and use of local firms. It is essential that this key narrative is not lost in the fear and zeal to suppress and regulate the space.

H.

Recommendations: towards Uniform National-Level Regulations for the VDA Ecosystem

Key themes covered

This section recommends a set of guiding principles and for a comprehensive regulatory framework over the VDA ecosystem in India

The Indian VDA market has thrived despite regulatory frictions that have persisted since the inception of the industry in India, with over 25m users and an estimated 75m who have downloaded apps or signed up on platforms and are interested in entering the space. In the absence of correct, proportionate regulation, this industry is likely to shift underground which would erode the ability to enforce capital controls, and be counterproductive to the economy, employment, and national security interests. The rapid rise and evolution of this industry speaks to the pent up demand for digital assets native to the internet; meaning that even if this particular iteration of VDAs is replaced, the idea, and the demand for the asset type is now cemented in the minds of the public. Given the constant improvement and development of the underlying technologies and governance of the dispersed economic organizations that underpin private blockchains like Bitcoin and Ethereum, the industry warrants a balanced, principle based regulatory approach that will provide the flexibility to keep up with changing technology and the freedom to local players to best contribute to the country.

1. Guiding Principles

While developing the model regulation, there are a few key principles we believe any policy makers should be cognizant of:

1.1. Compatibility with Global Regulations

Global regulation is leaning towards acceptance, and given the borderless nature of VDAs, it is essential that Indian regulation is in line and compatible with those of their allies and global standards to best maintain an appropriate measure of control on the industry

1.2. Benefit of Positive Regulation

VDAs and Web3 represent a tremendous opportunity for wealth creation in India. As opposed to the 90s, thanks to the government's efforts to digitize the country India is in a position to take the lead in a technology that will be ubiquitous in the next iterations of the internet. India already has a large, talented, and work-ready talent pool as well as multiple unicorns competitive by global standards

1.3. Counterproductive Effect of Regulation Targeting Compliant Activity

Disproportionate regulation that targets the wrong set of customers and companies will have a counterproductive effect by strengthening the already significant Indian user base on foreign platforms or the informal VDA market. This will have a negative impact on the economy, employment, and national security interests.

1.4. Targeted Regulation for Specific Stakeholders

It is crucial to recognize the differences between the various stakeholders in the industry – for example, exchanges cannot be compared with freelancers and creators who receive payment in VDAs for exporting their services and content internationally. Trading platforms, custodians, retail investors, institutional investors, developers associated with international VDA organizations, miners, NFT companies, remittance companies etc. all work in different ways, and cannot be classified and treated homogeneously.

1.5. Regulate Industry Players, not Technology

VDAs are made up of technology, capital, and economic communities that often do not fall within conventional corporate frameworks, all of which are equally important. Thus, being allowed to interact with these markets directly through ownership of VDAs is necessary to actually understand how these systems work, and improve on them by developing new use cases. Restrictions on the underlying technology are unlikely to be effective as they occur on the internet, and not any one country. Similarly, attempting to shrink the market as a whole would only drive activity underground. Instead, regulating and collaborating with domestic companies to incentivize users to trade locally in compliant exchanges with appropriate risk disclosures will bring visibility, traceability, and control to the government.

2. 10 Key Aspects of Regulation

The following list provides 10 key aspects of regulation that must be considered when developing an appropriate framework in order of priority.

2.1. Definition & Classification

2.1.1. Proposed Regulation:

As a first line, define VDAs along the lines of 'digital representations of value', as opposed to trying to classify them within an existing asset bucket, i.e. a commodity, or a security. For the purposes of regulation the asset must be identified depending on the situation, i.e. for trading it may be looked at as a commodity or security and partially overseen by the relevant authority, while treated differently in situations involving cross border remittance.

2.1.2. Rationale

It is categorically not possible to fit VDAs into a single existing bucket, i.e. commodity, security, other asset etc. as they are digital representations of value. While something like Bitcoin is closer to a commodity, while fundraising via a token would be more similar to a security, or a stablecoin like USDC would resemble a money like instrument. In fact, one may see Bitcoin as either a commodity or a security – it has many characteristics similar to gold, but relies on an evolving technology and economic community. The native assets of these platforms make up one layer of complex dispersed economic organizations made up of people and capital all around the world – without whom no VDA could survive.

Given that new technologies can be deployed in many different ways, and that new use cases are constantly being developed, VDAs should be defined and regulated based on the underlying activity or use case. Adopting tailored definitions for specific activities and use cases will balance the need to appropriately regulate activity against the harms that might arise from sweeping definitions that inadvertently regulate other activities and use cases, while encouraging innovation that benefits consumers, businesses, and the economy.

2.2. Regulatory Body

2.2.1. Proposed Regulation:

Create a special body that includes stakeholders from RBI, SEBI, IFSCA, MeitY and industry to oversee and regulate the workings of the domestic VDA economy. Such a body will tap the know-how and address concerns of different regulators while harnessing industry expertise. Second, define legislation by which other relevant departments and ministries may regulate VDAs, i.e. tokens akin to securities for SEBI, ED & LEA for FEMA etc. A working group can be set up in the interim

2.2.2. Rationale

The ecosystem stands at the intersections of several competencies including technology and finance. No one public authority is thus equipped to manage this space. Just as it is not possible to fit all VDAs within a bucket (even a single one of just 'VDAs') for classification, different government ministries already specialize in dealing with certain types of VDAs. Having said that, a single regulatory body to help coordinate and focus on overseeing the industry that aids in distinguishing between both the different types of VDAs, but also the different types of entities that make up the ecosystem in India.

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This body can also lead the standard setting and development of technological infrastructure for the government to collect and collate data on VDA usage in India for broad purposes. Additionally, it may find synergies between the VDA industry and other; similar to how by promoting Bitcoin mining for almost a decade China created an avenue to develop and begin gaining the knowledge to specialize in microchip manufacturing, or how Texas has recently begun giving subsidies to mining companies to set up near power sources to provide additional avenues of money for stressed electricity providers.

2.3. Licensing & Registration for VDA Service Providers

2.3.1. Proposed Regulation:

Introduce licensing framework for exchanges and brokers that cater to Indian investors. The license may require minimum standards such as majority Indian holding, Minimum prescribed net worth, registered office in India etc. Principles of ease of doing business to be kept in mind.

2.3.2. Rationale

A licensing framework will allow authorities to easily enforce the regulations. The minimum standards to obtain a license will also promote homegrown Indian businesses. This will also be a key step in leveling the playing field by forcing foreign exchanges to create local companies and seek registration, which in turn will increase the government's visibility of VDA activity in India, and decrease the quantum of Indian funds held on foreign platforms.

However, for the purposes of this note the licensing framework described above is most suited for VDA exchanges that serve and nodal points for interaction with existing financial institutions and customers to enter and exit the VDA market. Additional compliance requirements for different companies, i.e. VDA foundations, development companies, developers, or freelancers who earn in VDA by exporting their services to foreign clients should be created after licensing for exchanges is introduced.

2.4. User Protection

2.4.1. Proposed Regulation:

Mandate education campaigns, responsible advertising, disclosure and transparency requirements, grievance redressal mechanisms and minimum security thresholds to safeguard investor funds. Allow the creation and introduction of insurance products so that VDA entities and banks can better protect customers.

2.4.2. Rationale:

The public policy governing VDAs should include a framework of standards and rules that appropriately safeguard the privacy and security of every transaction, protect consumers' interests, and give consumers confidence to use the technology for in-person and online transactions. Policymakers should also ensure that consumers understand those protections and how they may differ from those offered by other payment methods. The ability to identify and reduce fraud is critical and should be part of the regulatory framework. A robust investor protection framework will allow Indian investors to safely engage with VDAs.

2.5. Traceability & National Security

2.5.1. Proposed Regulation:

Create necessary compliance protocols - mandate and standardize KYC, introduce an information sharing mechanism and incentivise whistleblowing entities. Dedicate resources to creating appropriate technological infrastructure and principle based techno logical requirements compatible with a rapidly evolving industry to begin collecting data in real time. In collaboration with Industry, dedicate resources to develop appropriate knowledge and expertise to best protect national interests from dangerous external actors

a. Rationale:

Collaboration with industry is key, particularly when the domestic market is still at a relatively nascent stage. Industry players that have strong compliances and are privy to information about transfer of VDAs can significantly contribute towards addressing national security threats such as money laundering and terror financing. They should thus be allowed and incentivised to share timely and comprehensive information with key government authorities. Additionally, continuous collaboration with local industry players will be essential in developing appropriate knowledge and expertise locally, as well as creating a dynamic picture of the Indian VDA ecosystem.

2.6. Taxation

2.6.1. Proposed Regulation:

Introduce a conducive income tax framework in line with the treatment of similar assets. Remove all direct and indirect tax incentives for foreign platforms and place domestic players at a level playing field

2.6.2. Rationale:

The TDS mandate under the current income tax framework is only impacting Indian start ups and encouraging Indian investors to use non-compliant foreign exchanges. It is in India's national interest to introduce a clear and friendly tax structure that pushes Indians to use Indian exchanges that maintain KYC and deduct TDS, consequently informing Indian authorities of all the VDA activities on their platforms.

2.7. Safe Harbor & Support

2.7.1. Proposed Regulation:

Introduce a safe harbor for VDA intermediaries and start-ups. Support incubation and establish acceleration centers to empower and support the developer community. Establish infrastructure to support token based projects

2.7.2. Rationale

The Web3 ecosystem, if allowed to develop, is estimated to contribute USD 1.1 trillion to the Indian economy by 2032. 11% of the global Web3 talent is in India and this rate is growing rapidly. Encouraging the development of Indian entrepreneurs and developers can help the Indian economy grow exponentially and enable India to cement its position as a global leader. Continual investment in innovation is at the heart of past, present, and future improvements to the financial ecosystem. Our financial system has benefited greatly from

the development of new technologies and capabilities, which serve to strengthen cybersecurity and consumer protection, increase efficiencies, and expand access to financial services. As a technology, VDAs, have the potential to further many of these developments and promote new innovation and developments. Accordingly, any regulation of VDAs should consider the technology's promise to improve existing capabilities while serving as a catalyst and platform for continued innovation.

2.8. Self Regulation & Industry Participation

2.8.1. Proposed Regulation:
SRO formed by the industry should be recognised by MoF

2.8.2. Rationale:
Recognise VDA / Web3 industry body as 'Self Regulatory Authority - SRO' with registration mechanism. SRO should constitute a 4 member independent Self Regulatory Authority to prescribe operation rules & compliance.

2.9. Harmonizing With Existing Regulatory Frameworks

2.9.1. Proposed Regulation:
Exchanges operating in India / accepting investments from India should remain in compliance with all applicable laws, regulations and rules in force in India.

2.9.2. Rationale:
The payments industry is heavily regulated, and the adoption of any new laws or regulations governing VDAs should be designed to fit within this established, robust, regulatory frame work. This framework includes federal and state laws relevant to anti-money laundering, economic sanctions, and other anti-fraud and consumer protection requirements. New public policies for VDAs should complement, and not conflict with, existing laws and regulations as well as private sector rules and practices.

2.10. International Cooperation & Coordination

2.10.1. Proposed Regulation:
Use the G20 presidency as a platform to influence global standards to align more closely with Indias and other EMDEs interests. Create channels for information sharing between international organizations i.e. FSB, OECD, BIS etc. limited international organizations like BRICS. Bilateral agreements between countries in the same vein as double taxation treaties would provide a productive sandbox experiment in international VDA information sharing

2.10.2. Rationale:
Internationally, there is acceptance that VDAs are here to stay, and both the technology as well as the economic communities behind private blockchains like Bitcoin or Ethereum are productive technologies that should be nurtured, evidenced by global policy leaning towards regulation and fostering the industry. Considering the global reach of VA activities, we believe that collaboration between regulators internationally is imperative to mitigate the variety of risks they pose. To do this, India's regulatory stance must be compatible with

that of its allies and trading partners, which is why platforms like the G20 are important in influencing global standards to align more closely with India's needs.