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BLOCK CHAIN TECHNOLOGY: A LEGAL PRIMER

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***Abstract*— Ecosystem is common term used for interconnected systems. Technology when coupled with diverse system within the society, tangible and intangible, it creates an ecosystem that is complex in nature. One such ecosystem that is in vogue is the blockchain ecosystem. Being a complex ecosystem, the nature of technical and associated legal issues will be diverse and novel, which requires immediate attention owing to its widespread use in various sectors. In this research paper, the major issues addressed and analyzed with respect to blockchain technology are two-fold, first one being, the legal and technical inefficiency in applying blockchain to business process and secondly, the legal and technical inefficiency in applying blockchain to governance process. The need for a global regulatory and infrastructure to diminish the associated legal inefficiencies will be the major analysis.**

INTRODUCTION- BLOCKCHAIN TECHNOLOGY-APPLICATION AND PERFORMANCE

Block chain is the one of the biggest technological revolutions revolving around the world. As of the predictions the enterprise that applies block chain-based technologies will have annual revenue of $19.9 billion by 2025. Block chain, artificial intelligence and big data are the three important core computing technologies which are supposed to be exploring the financial industries in the coming generation. Using of these types of big data technologies and power machine learning algorithms are a big concern when it not used properly, because improper use of such complicated technologies may lead to the improper use of data. The prime object of creating block chain was to avoid intermediaries in currency dealings. Later the potentialities offered by blockchain technology dragged the attention of academic's governments and stakeholders to use it in their respective fields. A broad variety of utility can be attributed to this new revolutionary technology called blockchain such as identity verification, recording of property ownership both tangible and intangible and to its transactions, automation of smart contracts, data protection, instant money transfers etc. To have a better understanding of the industrial application and the legal challenges associated with blockchain; one need to know how this technology works.

UNDERSTANDING THE ALGORITHM OF BLOCKCHAIN TECHNOLOGY

Blockchain is a secure and private platform created for the

transaction of cryptocurrency Bitcoin. It is a peer to peer (P2P) network which ensures secure and accurate record of transactions or in other words a public ledger (block) to record transactions between the users. The term ledger here does not mean the physical ledger controlled by the centralized authority rather it is a distributed (digital) ledger which settles on each participant's device. It is a mechanism which enables the secure transfer of assets of any value from currencies to land title without intermediaries (P2P). The platform of blockchain is not restricted to cryptocurrency now; there are so many fields in which the blockchain technologies are utilized at present all over the world. The main reason for the widespread usage of blockchain is it is tamper evident and tamper resistant digital ledger because of cryptographic protection. Immutability is a core feature of block chain technology. Once the data is encrypted or recorded in a block it cannot be altered or deleted, data in each block is based on the block below or previous block. To decrypt the current block, it is essential to know the previous block. The timestamp in every block of a block chain designates authentication and verification. The blockchain uses a strong cryptographic hash function which requires a great computing power to decrypt the content.

Another key feature of blockchain is decentralized network governance. As per the classification of Vitalik Buterin (Co-founder of Ethereum and co-founder of bitcoin Magazine) , the blockchain is Politically decentralized because no person has central control over it, it is Architecturally decentralized no infrastructure central point failure as each nodes keeps a copy, finally the blockchain is

logically decentralized because the system behaves like one computer despite being spread apart on all the participating nodes in the network. The logical decentralization favour and attracts the industries because it has a zero probability of system failure and withstand any accidental errors in the system. Since the local system cannot work independently it maximizes the efficiency of decentralized system.

There are both open and closed types of blockchain. In open type public permission less one - here users need not get approval from any trusted authority; they can easily join the network and do block generation. E.g. Bitcoin, Ethereum). In the open public permissioned blockchain, it can be read by anyone, but the generation of block is permitted only to the authorized participants. The other two types of closed block chains are Consortium and Private permissioned. The participation in consortium is restricted to only to authorized participants for example multiple banks sharing the ledger. Private permissioned blockchain are strictly private usually used by the enterprises and restricted to limited set of authorized nodes. Usually internal bank ledger shared between parent company and its subsidiary can be taken as an example for it. Availability of different types of blockchain makes it user friendly according one's convenience.

Trust is another controversial feature of blockchain technology. As said by Bruce Schneider, "Block chain shifts the trust from people to trust to technology". Blockchain enables distributed trust, means without any trust in the individuals' one need to trust the system. Rather than individual one need to trust the cryptography, the system and the network. Blockchain establishes trust in an open environment. These all feature of the blockchain makes it acceptable to business world where multiple transactions (but limited per hour) can be done without waiting for the approval of the central authority and avoiding the intermediaries. With all these advantages it also has its own disadvantages.

BENEFIT, TECHNICAL AND LEGAL RISK ASSOCIATED WITH BLOCKCHAIN

Tampering hacking and data protection issues

The organization while picking up blockchain for its potential benefits also should aware of the associated risk involved and how it can be managed. The technical risk are unpredictable in blockchain as the transaction starts with an input in the system and ends with an output in another system. Exposing of the credential at the endpoint of the transaction is high risk associated with the blockchain. It can otherwise be termed as endpoint security risk. Use of public key and private key is another major concern. Blockchain operates with combination of public and private keys, public keys are widely spread where as private keys are kept secret. Without the right combination of keys, it is impossible to process the data, it can be called as the strength. But when the hacker gets the right key, he can easily access the data. In the blockchain world establishing of ownership is a difficult task once the private key access is lost.

Another important issue under this category is the issue relating to privacy within blockchain technologies. Peer to peer transaction and immutability are the core feature of blockchain transaction. It means that once the data is recorded in the ledger it cannot be altered or deleted and it can only be decrypted by the end peer. The questions of data protection in blockchain come into operation when the data processing is involved and the data is a personal data. When the data is not a personal data there is no question of privacy involves. But if the data is a personal data again the question is who is responsible for data processing and whether the party that determines the purposes and means of processing particular personal data, ie., the controller and the processor, the party responsible for processing personal data on behalf of a controller, such as an outsourced service provider are qualified under the legal regime to process such personal data. Here personal data means any data from which the identity of a person can be ascertained with a proportionate amount of effort. For example an email ID with name, Fingerprint, etc.. In the blockchain environment it is difficult to identify the controller and processor to fix the liability.

Jurisdictional Issue

Multi jurisdiction in the operation of blockchain is another major concern. It is real legal challenge which is faced by the blockchain users. It is often difficult to establish the jurisdiction of blockchain because the nodes of decentralized ledger operate in different location all over the world. So, fixing of jurisdictions of the laws and regulation is highly impossible. If the nodes of the distributed ledger are in different countries, each country will ascertain jurisdiction over it. Multiple governments will try to

implement its laws and regulations to it, and then the ledger will have to face different and sometime conflicting legal requirements. This may bring down the efficiency of the distributed ledger or make it a useless one. Fixing of jurisdiction is more important in blockchain in case of any dispute happens related to distributed ledger. Determining which court has subject matter as well as personal jurisdiction is difficult when it comes to blockchain. There are different issues involved in this, first a blockchain does not have a physical location, secondly there is no procedure to establish where it is located and thirdly it is not clear that whether the courts are having jurisdiction over it. Fixing of liability in case of breach of smart contract and trade transaction including cryptocurrency transaction will become the biggest challenges in the legal regime all over the world.

Lack of sovereign guarantee

The blockchain technology has induced the development of a new contractual manifestation called the Smart contracts. Smart contracts represent traditional contractual terms in lines of code- a series of if-then functions. Transactions or data recorded on the distributed ledger can trigger clauses in smart contract which can control real life assets such as real estate, insurance claims, etc. The self-executing and self-enforcing nature of smart contracts entails that the parties have no role to play and whatever result the smart contract achieves must be the ideal one, regardless of its absurdity and practicality. The issues posed by smart contracts will include lack of sovereign guarantee as question with respect to legal recognition remains unanswered. Second major issue being that, given the hyper-literal nature of smart contracts, can human interpretation be permitted to prevent absurd results and finally in case of breaches/hack, who should be held accountable.

Risk associated with Integration of blockchain technology with legacy systems

Considering a country like India, the legacy systems like the national IDs, payment systems, supply chain information, weather information, mostly handled by the Government sector, plays a very vital role in determining the economic stability. The seamless working and transparency offered by the Blockchain technology can only be utilized if there is a proper integration of the technology with the legacy systems. Only when these concepts are integrated it can resolve business and governance process inefficiencies. On contrary, allowing witnesses to verify transactions, electronically on blockchain thereby limiting the need for 'traditional intermediaries will affect the trust once maintained by the legacy system with respect to security and authenticity.

Legal concern and ambiguity regarding cryptocurrencies.

Since cryptocurrencies are backed by trust and consensus-based algorithms, the processing transactions involving validation procedures and network latency is time consuming. The difference between cryptocurrencies' transaction processing speed, and transaction speed of other electronic payment methods hampers the ability of cryptocurrencies to achieve their desired capabilities. Extremely high unpredictability exhibited by cryptocurrencies compared to traditional fiat currencies recommend that cryptocurrency markets are mainly motivated by speculation and hence huge variations in price prevent cryptocurrencies from being an appropriate hub of value. Since cryptocurrency markets and Initial Coin Offering markets have different exchanges transacting at different rates, law of one price does not seem to be working efficiently. The instability of the cryptocurrency to fiat exchange rates are not inconsonance with the essential features of money, and hence can never replace fiat currencies.

Considering the Draft Banning of Cryptocurrency & Regulation of Official Digital Currency Bill, 2019, the legal usage of digital currency is limited the use of processes or technology underlying any cryptocurrency for experiment, research, or teaching. But on contrary, in the Supreme Court Judgement in Internet and Mobile Association of India vs. Reserve Bank of India, struck down the Reserve Bank of India (RBI) circular no. RBI/2017-18/154DBR.No.BP.BC.104/08.13.102/2017-18 dated April 6, 2019 imposing a prohibition on the entities regulated by RBI to provide any services for facilitating any individual or businesses in dealing with or settling virtual currency.

CONCLUSION AND RECOMMENDATIONS.

From the above reading, it is obvious that blockchain ecosystem has its merits and a future, but,

the major issue that is associated with blockchain technology are two-fold, first one being, the legal and technical inefficiency in applying blockchain to business process and secondly, the legal and technical inefficiency in applying blockchain to governance process.

A well-organized regulatory and technical system can make a transition to blockchain ecosystem seamless. The technological system must be designed in such a way that the privacy concern, data protection concern and security concern of the user will be diminished. Whereas governance process based on blockchain must be formulated in such a way that issues relating to accountability, jurisdiction, sovereign guarantee on legal tender and legal concern and ambiguity regarding cryptocurrencies will be dealt with. A global level approach with national understanding must be brought in so that promotion of research and development in blockchain along with skilling of workforce and students will occur thereby the procurement process for government agencies to adopt blockchain solutions will be made easier.

Few recommendations include;

1. A global Regulatory and policy considerations for evolving a vibrant blockchain ecosystem must be formulated which has the capability to understand and work on the issues above mentioned.
2. A global and national infrastructure for deployment of blockchain solutions with inbuilt fabric, identity platform and incentive platform must be initiated.
3. Global and national regulation must be framed with respect to facilitation of Initial Coin Offering market at international and domestic level to handle the complexities posed by virtual currencies.

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