UNPACKING BLOCKCHAIN POTENTIAL FOR GOVERNANCE

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ABSTRACT

This research paper is about how we can unpack the disruptive potentials of blockchain technology and make it useful or human development. The focus of this work is mainly on potential used in political governance. Blockchain technology is the core technology behind bitcoin, potentially able to redesign business interactions also used in the area of political and social critiques. The work of this paper states the points of decentralized governance base on blockchain technology and the way of blockchain technology to bring and justify new models of governance. This paper also proposes the analysis of risks in a dominant position of traditional private central authorities in distributed economy systems. Thus focus of this work is on the emptying prospective of blockchain technologies to alter political and social institutions those are having centralized authority of human societies, as property rights administrations, money and democratic authority systems. Trust versus governance is the important factor explained in this paper.

***Keywords**- autonomous, blockchain, decentralized, government, mining*

1. INTRODUCTION

Increasing popularity of blockchain technology beyond crypto currency since last few years encourage the use of blockchain technology in democratic governance. Though this is based on decentralized network and no need of third party interaction there are risks has to be consider before implementing fully in governance sector. One of the thinking for this type of systems is the DAO (Decentralized autonomous governance). Individuals groups are working for common output, and controlled by laws of code, i.e. without interference of human beings the overall process is controlled by software without no more discussions among the groups also. There are some issues that need to be highlighted -

Coding and Code comprehension - Who is the programmer and doing actual coding for outcomes. Who operate the smart contract and in which language the coding and in which language translate that agreements between DAO. How to triggers outcomes after fulfilling certain criteria in code written. Also code comprehension i.e. reading and understanding of agreement is important. Who can actually audit and read the code. Client or operator must know the way of understanding of code itself.

Scalability-is also the considerable issue with blockchain technology. Because keeping blockchains count to a smallest then it might be productive but when this number increases then interoperability among blockchains becomes a bigger problem.

Trust versus Governance- due to decentralized structure it cannot imply enhanced political governance. Nodes and users that were not part of the basic structure of blockchains hence did not directly be the part of decisions in governance. So user can be a part under given criteria or also free to go if not like the process. Hence blockchain technology cannot give assurance of orders and dissimilarity among peers will not happen. In case of mining of blockchains the similar thing is happen with developers, Technology related entrepreneurs, all of them have a controlled state in the network and can gathering extensive power over different nodes and it makes blockchain governance feasible. The main needed is the transparency and algorithm based democratic governance by decentralized network.

This paper work gives short description of how blockchain technology works, assumptions and principles of blockchain-based governance, strengths of token-less blockchain for public sector. This paper then describes with the example of ethereum, how we can regulate the political governance using blockchain that is how governance model can be created and justification of them.

Due to bitcoin popularity blockchain technology spread vastly against regulations and local policies. And this is main threat in developing countries where regulatory body is still incipient. Also the key theft and key trafficking issues related to public key infrastructure policies.

2. LITERATURE SURVEY

In case of blockchain technology the focus in the last few years has been on the unpacking potentials of this technology. So in this area of unpacking potential for human development lots of research work has been done by different researchers.

If blockchain drives straight, someone who can interact with internet or knows how to operate on network can use it to maintain records regarding transactions. Near about 0.025% GDP is the very small part of global GDP is related to blockchain as this is the result of World Economic Forum's council of Global Agenda. In the next few years this may increase definitely as a way to fast cut cost and settlement in firms like banks, insurance sectors, or any technology related firm. Companies racing to adapt blockchain include UBS, Microsoft, IBM and PwC are the companies competing to acclimate blockchain technology. The Bank of Canada is also testing with the blockchain concepts. The financial technology consultant Aite projected a report that banks expended near about $75 million in last year on blockchain. And Silicon Valley undertaking financiers are also line up up to back it. Thus for this paper work consider and studied all circumstances regarding blockchain based governance.

2.1 HOW BLOCKCHAIN WORKS?

How Blockchain works in cryptocurrencies following figure gives the short pictorial representation of how blockchain works in transferring money from person A to Person B using algorithmic consensus without human interference and new block can be added to previous one while transactions. [1]

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┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│  A wants to send │ ───► │    Blockchain    │ ───► │  Broadcasting of │
│    money to B    │      │  represents online│      │ block to each node│
│                  │      │    transaction   │      │   on network     │
└──────────────────┘      └──────────────────┘      └──────────────────┘
                                                              │
                                                              ▼
┌──────────────────┐      ┌──────────────────┐
│  Then add block to│ ◄── │ Transferring money│
│ chain by representing│   │   from A to B    │
│ transparent transaction│ │                  │
└──────────────────┘      └──────────────────┘
```
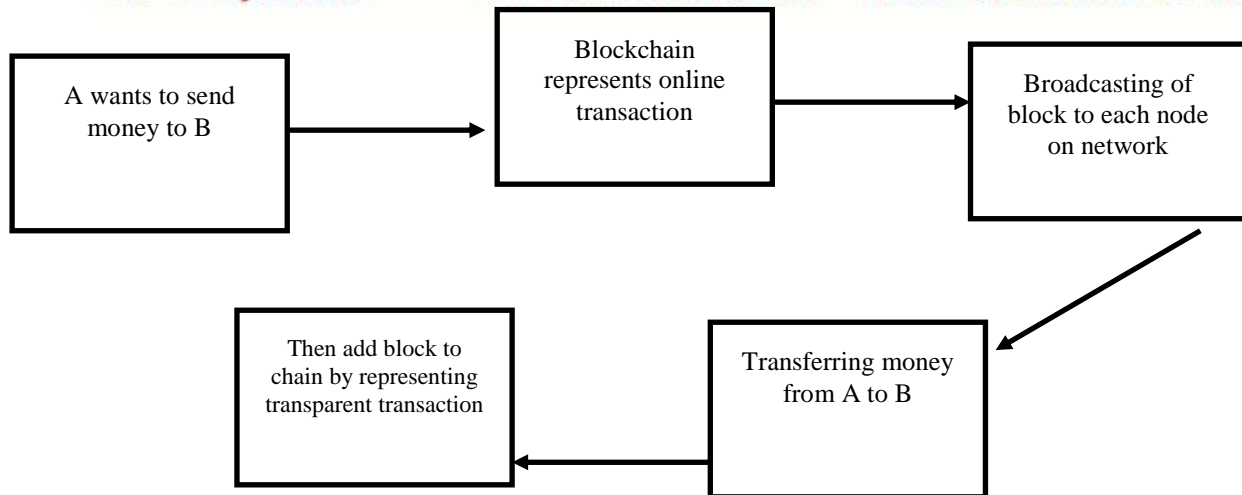
Fig.1 flow of transferring money from person A to Person B on blockchain

Here are the following principles on which the work of blockchain technology performed.

a. Each user has authority to access that database. Control is not handled to specific party. So each party can verify its transaction by its own without interference of third party with transaction partners.

b. Peer to-Peer transmission structure control the communication between peers. No need of central controlling node. Each node stores and send same information to all other nodes.

c.each transaction with its value is visible to each node, user, of blockchain has a unique 30 plus alphanumeric character set as address that can uniquely identify the node. User can remain without name but they have to provide proof of their addresses because all transactions in blockchains occurs based on addresses.

d.once transaction added to chain then no one can alter the related record as is connected to previous one and linked to every transaction before taken placed. According to deploying algorithms databases in blockchain remains permanent once record is added.

e. the ledger in blockchains are digital means it based on code that regulations or agreements are written in algorithm by users which automatically triggered the transactions in blockchain. So the logic is computational that make this technology transparent and free from human interaction and free from corruption also.

3.   PROPOSED METHODOLOGY

3.1 ASSUMPTIONS AND PRINCIPLES OF BLOCKCHAIN BASED GOVERNANCE

As per Buterin in 2014- "As an alternative of an ordered structure achieved by a humans interacting set in individual through the lawful system, a distributed organization involves a humans interacting set with among their selves rendering to a protocol stated in code, and imposed on the blockchain" [2]

The consistent structure of blockchain-based governance is still missing as till date models of the same does not exist at academic level also. For this paper work, data is collected from different research papers, in a non-exhaustive manner, from different forums, blogs, related websites, and articles. In this paper can state different valuable points regarding visions and assumptions associated with the governance through global network of

different new technology supporters; with internet and entrepreneurs. Hence assumption stated in this paper is not having attribute to a specific author.

Following are the main beliefs of governance based on blockchain evaluated from different papers, blogs etc.

1. Decentralized architecture and based on computation where algorithm where law is constructed according to code- Most of the services can be implemented using blockchain technology and most of the decentralized governance model. The main aim behind this is to build or shape governance with transparency from corruption and neutrality of the algorithms used in distributed agreement s and transaction auditability can decrease the failures in decision making of centralized systems.[3] All this can be achieve because the potentials of blockchains that shifts the control from human interference to open source code, people or users can now reach the direction at comprehensive near complete cryptographically confirmed peer-to-peer networks. So we have to shape the governance which is decentralized properly with some regulation then it would be the best alternative for centralized vertical authority.

2. Scaling problem associated with centralized systems- though the centralized governance like state, democracy representative has been developed in large scale; they have been mostly developed for the purpose of co-ordination between heterogeneous or different groups of people with mutual interactions. But in decentralized systems each node is separate and grow independently base on some consensus so it can overcome the scaling problem in centralized systems.

3. Atomic interactions –individuals power and politics- With the help of the blockchain technology the association amongst entities and the fully or partially automated state can be cryptographically secured public ledger and human can be replaced by smart contracts and DAO that is Decentralized autonomous organizations i.e. group of individuals. Thus blockchain can deliver supremacy facilities in a more truthful method without human interactions.

4. Direct democracy systems and vote for values-Liquid democracy is best model base on blockchain technology in which direct participation of citizens is possible in decision making process. Thus we can make democracy more effective using blockchain governance. Economist Robin Hanson proposed on engineering approach toward public policies called Futarchy base on two key points as "Individuals first vote on generally specified outcomes and vote on achieving these outcomes". Then if the suggestion is recognized; all skills regarding market of rejection would be returned, but on the receipt of market. Everyone would be paid after some time amount of token based on the futarchy's success of chosen metric, and if the proposal is rejected then it would be vice-versa.

5. State authority and decentralized society- promoting good governance as a decentralized systems using blockchain technology is the goal, and not to discharge the state. This simply means that we can build government better by eliminating the centralization of powers in few hands, in hands of few people. As in SWAN 2015 –"the end point is not lawlessness without regulation, but that legal frameworks become more granular and personalized to the situation. Bitnation blog.com 2015 stated that "fundamentally what we are responsibility to making national state administrations completely inappropriate and no government, whether democratic or autocratic, can survive without the agreement of its subjects" The blockchain technology having the potential to transform our societies, governments to more like business and less of a default monopoly

provider of governments services. One more benefit of blockchain based governance is authority floating freely because of decentralization. This blockchain-based governance promotes individuals and societies to grow in to new level of maturity in areas like authority, independence authority etc.

6. SPOF-State as Single point of failure-This condition of SPOF is occurs in centralized government only because of its top-down approach and authority is only in few hands. Due to this structure single failure in this system will responsible to affect negatively the entire system so decentralized approach which is transparent and based or trust on computation reduce such risk in governance and provide efficient quality governance so its rally important and good that unpacking the blockchain technology potential to transform society into self-sustainable systems, drive by consensus and with decentralized networks.

3.2 STRENGTHS OF APPROVED TOKEN-LESS BLOCKCHAIN FOR PUBLIC SECTOR

Digital transformation of governance is still the problem. In a digital world the way we regulate and maintain the central control has to change to decentralized work. To overcome this problem blockchain technology can be used is the main strength of blockchain. Blockchain is distributed and open ledger used to record the transaction in digital format and automatically triggered the transactions in it based on predefined consensus. The world of blockchain technology gives the idea of world with digital contracts, which are stored on distributed databases with transparency. No one can alter or delete the records. No need of any intermediate person because each and every record would be secured.Blockchains can dramatically change the economy by reducing the cost of transaction and adopt it widely.Again the potential of blockchain technology unpacking as a token-less permissioned blockchains for society. Because of this kind of systems having more advantages which overcome the fully distributed, not permissioned blockchains like bitcoin. Examples of approved blockchains are –school medical records; birth certificates, marriage certificates, death certificates, driving licenses and electronics voting systems etc.

These applications based on permissioned blockchains having advantages over traditional databases and fully distributed blockchains –as these provided –reliability level of network co-ordination security through human interaction when necessary. Intermediary no requires anymore in this type of applications. Organizations, banks, machines, systems can freely interact with each other and this is the main potentials that we try to mention with permissioned blockchains in governance and make it transparent.

Approved blockchains are controlled by one or more systems or organizations. Unlike of crypto currency verification they are free from speculative verification mechanism. The interest is only on store data properly. These applications are synchronized and distributed with their network having only trusted members and nodes, recognizable by controlled access permissions. These are faster than any other blockchains as nodes are limited in such systems. These are only focused on required functionality for application instead all the functionality for all of the people for all of the time.

If we consider database those are traditional are inefficient, for data replication use a master-slave structure which is centralized is normally use by them. In this structure only data on master is original and require authorize source. So when there is changes in master database those changes only reflect in the slave; so master and slave needs to be synchronized. Sometimes this architecture arises problems like traffic, latency etc. so

multi-master replication system can be used in which operations can perform on any slave database and then report to each other. But again they are complex for maintaining data consistency. So distributed systems of approved blockchains may having rewards to services which are public in terms of statistics integrity, information security and accessibility also result in the error drop, costs etc. Governance requires security and availability, so governance can be improved with the help of blockchain technology. Though approved blockchains use decentralized network they cannot provide resistance towards restriction and closed system with centralized structure. So apart from its potential benefits they are target of criticism. As we know the limits of fully distributed systems we can state that vertical centralization is better for quick mechanical challenges, compared to flat mounted structures. Also due to large nodes in distributed systems modification in protocol may result in time consuming procedure and complex procedure, it requires core miner, developer and consensus. So due to this sometimes there are chances to failure of economy against unexpected challenges. Although approved blockchains are still at an early phase of development, should be remarkable with a possible application in public sector.

3.3 HOW CAN WE REGULATE OR SHAPE GOVERNANCE USING BLOCKCHAIN?

The aim of this paper is explain the potential of blockchain for governance. But when we are using this technology for decentralized governance then there are some threats to regulation of governance limits and regulation to blockchains that can shape governance definitely.

For this discussion we take example of ethereum –the blockchain technology. Ethereum is good for example as it has most similar to criteria with similar scope of technology and it can be coupled with cryptographically secured transactions. The aim is developed blockchain –base application like property contracts. The efforts of miners in blockchain technology described as a time stamp transactions public record. This record called as public ledger.

Analysis required the core features of blockchain design as below-

A.   Nature is digital, the users co-ordinate with each other through its public ledger.

B.   In specific time interval some defined checking done and certain outcome expected in that limit that is some time stamped blocks.e.g. bitcoin

Interactions based on blockchain technology can be accomplished and controlled by blockchain technology itself.e.g. decentralized government organization. The entity which is product or transacted by blockchain processes need not be money oriented entity like bitcoin, but it can be rule-based agreements in political government or any other agreement for another application of blockchain technology. The term IoTi. e. internet of thing is nothing but where the blockchain works for governance devices related to the internet or operated by internet would necessitate one credentials of their proprietor in order to be utilized, with the privileges of ownership of each expedient on the block network as Wright and Defilippi in 2015 stated.[4] As Dupont and Maurer argue, traditional social systems and blockchain technologies are different in terms of contracts based on cryptography lean towards to build social and functional characteristics within the organization means the agreement or validation is done in blockchains without intervention of third parties but rather is based or controlled by consensus, algorithm.[5] Because of this important features, ethereum framework developers state

that the blockchain can perform a task as a lawful framework capable to help as the foundation for online interactions, claiming that "ethereum is a new law" and in contrast with social traditional governance which together with their social establishments, thus establishing and keeping forms of political organization can be possible by blockchain technologies which are self-sustaining.

According to Dupont and Maurer (2015) argue, the public records are about social intervention that are verified on the records accessible to every person in the organization. In case of ethereum ledger both artificial agents and human can see the ledger. The decentralized implementation of smart contracts "dematerialized and depersonalizes the auditing authority. For this first two terms i.e. traditional social contracts and smart social contracts should be clear

Traditional Social Contracts- Human interactions is necessary between the contract made among more than two parties as well as between two parties for the auditing or validating purpose of the agreement terms in that contract in Traditional social contracts. Smart Social Contracts- is defined by Buterin 2016 as "a process involving smart or numerical assets as well as gatherings of two or more participants, where few or participation of all parties place resources in and resources are robotically reordered amongst these participants as per the certain statistics based formula that is not known at the time of initialization of contract".

In this way in a smart contract all the prescribed conditions are readable by machine and can be made compulsory to computational inspection, without only human intervention. "The difficult social and emotional effort of constricting with self-executing code" is replaced by the theory of smart contracts as stated by Dupont and Maurer. Thus from above discussion we can say that blockchain technologies can support the society governance as- property regimes, currency systems, even democratic voting processes.

3.4 JUSTIFICATION FOR USING BLOCKCHAIN

In this section of paper, we inspect the degree of the justification for governance enabled based on blockchain. The foundation of Rausseau's theory of social contract is a notion of "original situation" i.e. Completely dissimilar from that of the social contract theories of Hobbes.

Philosophical supporting of blockchain governance varies from that of the tradition of social contracts, there are some important traits of the justification for blockchain-based governance which explains comparisons with justification presented by social contract philosophies. The ethereum public provides revealing of the different essential features of the distributed system's blockchain of implementation of communications and public ledger. The paper on ethereum explains that this solve the two political paradoxes as no human authority over central body such as banks and states and corrupted systems by corrupted people. Other form of authority, supporters claim that self-directed individuals are able to create an independent community with few particular protocols without any dominant authority by using blockchain technologies.

Matches between the validation of blockchain governance and validation of governance based on theories of social contracts can be analyzed. It is like the original situation, blockchain governance is analyzed against the impression of an original society before the blockchain technology. [6] Blockchain governance is analyzed by orientation to flawless original unwanted situation which is defined by the current formal truth of central societies, which focus is on human interference. Blockchain-based governance can be analyzed with orientation

to an indication of "impartiality". The blockchain governance varies considerably from the explanations offered by Rousseau and Rawls as. Initially, uniform though people participating in blockchain technology could supposedly participating in it as "veil of ignorance" and still power is distributed oddly.

This is situation because, as its explanation of the smart contract tells, relations between contracting participants are stated in relations of numerical resources. The explanation for the theories of social contract varies powerfully with the beginning of human environment obtainable for the validation of blockchain governance. Rousseau views human civilization as logically peaceful and friendly, but claims that it has been dishonored by civilization. The blockchain community, in disparity, predicts human environment and particularly the view of "faith" in humans as the debasing aspects in existing civilizations.

4. CONCLUSION

With reference to all points discussed in this paper the blockchain technology has potential that make governance more effective. If decentralization of government services managed properly through approved blockchain then it sounds desirable and increase functionality of public administration. Otherwise distributed blockchain like bitcoin presents serious risks or drawbacks. Though blockchain make governance realistic and transparent but implementation of blockchain-based governance can difficult for developing countries because citizens has to know the way of participation and understanding as well as lock of resources related to this technology. When blockchain technology initiates target the weak or deprived sectors of the residents then it would be the good start and truthful. Though the systems are transparent one more issue of handling public and private keys must know to each recipient user is not practical. The solution to this issue is to develop alternatives that furnish accessibility of nodes towards tools via intermediate power such as organizations which are community based. The blockchain based governance can play a role as a prodigious implementer of individual's power in an unconditional intelligence. The blockchain-based governance application of rights in law which increase the strengths of individuals over government services denationalization through market determined decentralized boards. This paper explains the fundamental idea of justification of blockchain governance against traditional social contract models. "Veil of ignorance" being non-discriminatory in blockchain governance by different perspectives. The blockchain is "neutral" non-political technology as its political suggestions are significant as it affords application like-redesign logical institutional, broader social politics and relationship. Finally, this paper shows as the study of the blockchain governance potential consequences and exploring future research opportunity on more applications of blockchain technology by unpacking potential of this technology.

5. ACKNOWLEDGEMENTS

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