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ANALYSIS OF PRESENT DAY ELECTION PROCESSES VIS-À-VIS ELECTIONS THROUGH BLOCKCHAIN TECHNOLOGY

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ABSTRACT

Currently, Democracy is realised through representatives elected by the people. These elections are periodic activities. They involve expenditure of big amounts of manpower, money, time and other resources. It is important to note that during an election, the administration and day-to-day lives of people are affected as election activities take centre stage. Present day elections are amenable to influence where Voters can possibly be intimidated to vote against their will. In many instances, the trustworthiness of the election process is itself uncertain. In such a situation, we need an election process that is fair, convenient transparent, and inexpensive. Blockchain technology provides a possibility to attain a highly dependable and certifiable election process. This process is also inexpensive at the same time.

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This paper deals with examining possibilities of conducting elections through the Blockchain. Blockchain technology is briefly introduced. The procedure that underlies voting through Blockchain is defined. The advantages of such a system are then deliberated. The various points vis-a-vis present day election processes are analysed. The paper concludes by analysing the possible impacts of voting through the Blockchain.

INTRODUCTION

A cryptocurrency (or token) is a medium of exchange using cryptographic techniques to safeguard transactions and also manage the formation of additional units of the currency.

A BlockChain is a widely disseminated archive of data that maintains a continually-expanding register of records fully and reliably protected from any alteration or modification. Each block has a timestamp and link to the preceding block.

A Crypto wallet is an encrypted electronic device that allows an individual to make electronic cryptocurrency (or token) transactions. Each wallet will have a public key visible to anyone. But it can be operated only by a

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person who has a private key. Transactions on the cryptocoin network are anonymous.

When people send cryptocoins (or tokens) to each other, someone has to keep account of who spent how much at what time. In case of fiat money (or paper money) it is done by Banks (known as Trusted Third Parties, for which they charge a commission).But in case of Cryptocoins (or tokens), it is registered on a ledger called BlockChain (with nil or minimal fees).

The cryptocoin network makes this possible by detailing all the transactions made during a certain timeframe into a list. This list is known as a block. A certain set of people called 'miners' verify these transactions mathematically and register them on the BlockChain.

Those bona-fide miners who have successfully verified the transactions are paid freshly created Cryptocoins. This is how miners are rewarded, and new cryptocoins are generated. This is also the reason why no transaction costs are levied, as the network (in the form of miners) verifies the transactions.

The above process can be applied to any transaction. In this paper, cryptocoins are replaced by ballots or election tokens. The 'miners' or 'verifiers' will be

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Sovereign Authority mandated Blockchain Nodes that will use PoSv [1] to securely verify and confirm the voting process.

ELECTIONS

Democracy is a governance system in which sovereign power is entrusted with the people. The people periodically exercise this power directly or indirectly through a practice of representation by free elections.

The earliest Democracy was grassroots Democracy in which people used to come together in villages and directly decide on the laws that would govern their lives.

Later on, as populations grew and societies expanded, it was impossible for everyone to congregate at a single place and give their opinion. So the representative form of Democracy arose. In this system, people elect their representatives for a certain timeframe. These representatives take decisions on behalf of the people. People in this system go to designated places once every few years and cast their vote.

This method is less costly than earlier forms of grassroots village Democracy. Nevertheless, it is still a very costly affair in terms of money, manpower,

resources and time [2]. It is also vulnerable to manipulation and sabotage [3]. Voters can be harmed and coerced to vote for a particular person. Thus, it has many drawbacks.

In the 21st century we need an election process that is transparent, fair, inexpensive and convenient.

Blockchain technology can be used for voting. Votes can be cast as transactions. A Blockchain can be designed in such a way that it keeps track of the vote tallies. In this manner, everybody can confirm and agree on the final count as the votes can be counted by the voters themselves.

The voters can count the votes and confirm that the votes have been cast, but they cannot know which party the other individual voters have voted for. They will only get the final tally and a confirmation that those many numbers of voters have cast their ballots.

Only a voter (and the Election Commission) with access to his or her private key will know, which party an individual voter has voted for.

Because of the Blockchain audit trail, voters can attest that no votes were removed; changed or no illegitimate votes were added.

The process of voting goes on in the following manner:

In the Blockchain voting system, the voter will download and install the Blockchain Voting Program (BVP) on the mobile phone or a personal device of their choice.

A few days before the actual election, the voter will present suitable identity information to have her identity confirmed by the Election Commission or the organization in-charge of hosting the election.

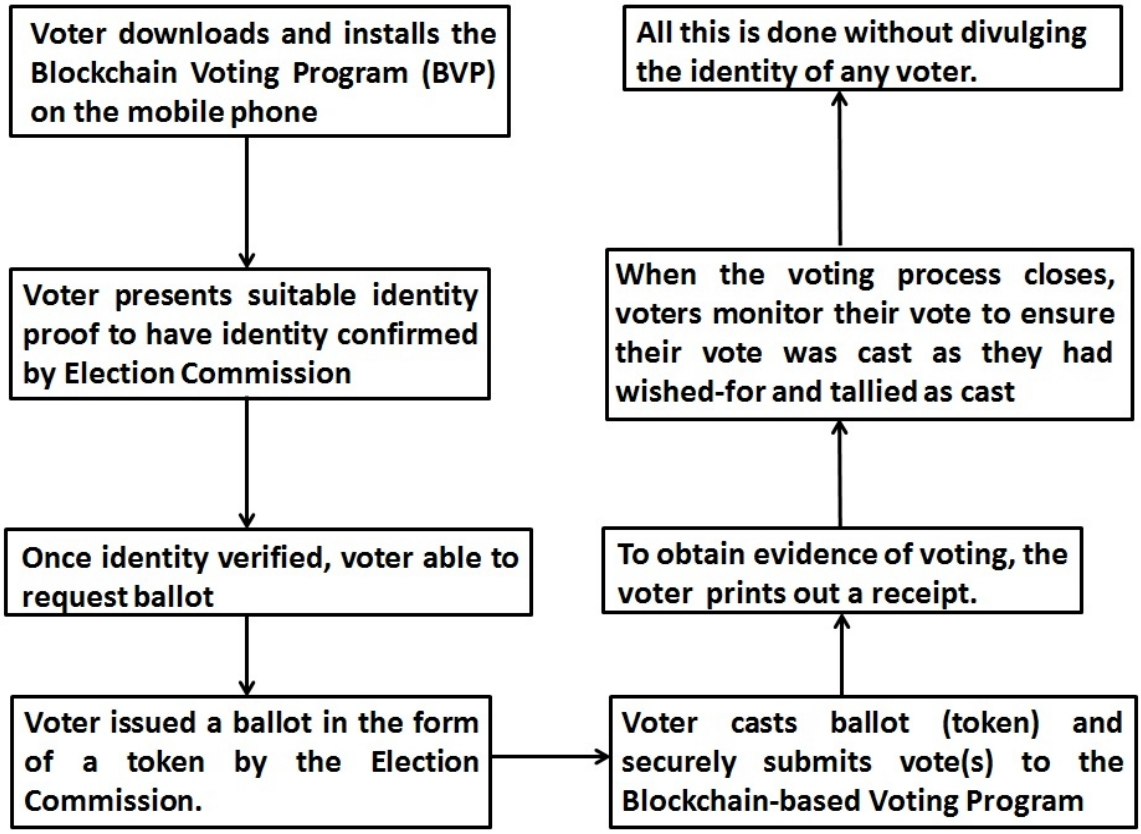
Once identity is verified, the voter would be able to request their ballot, at which point they are issued a ballot in the form of a token by the Election Commission.

The voter will then cast the ballot (token) and securely submit their vote(s) to the Blockchain-based voting program. This is like transacting a token, but with the vote cast on the Blockchain. To obtain evidence of voting, the voter will be able to print out a receipt with transaction ID.

When the voting process closes on Election Day, voters can monitor their vote to ensure that their vote was cast as they had wished-for and tallied as cast. Each voter can also audit other votes in the ballot box

(without the voter identities being revealed to the auditor).

One can satisfy oneself of the total votes being counted by the Blockchain Voting Program as accurate or not. All this is done without divulging the identity of any voter.



If we evaluate the process, we find that the advantages of BVP can transcend government elections. A representative or member of a nation's parliament can directly be in touch with her voters. The said member can put up certain issues of her constituency for opinion poll.

Interested voters can provide their opinion by voting through the BVP. The member will then come to know the mood of the public in her constituency. Based on the poll, she can raise a particular issue in the National Assembly or Parliament.

Blockchain technology makes it possible to attain a highly credible and verifiable election process at an inexpensive cost. By using this technology, one need not venture out of one's house to vote. It can be done on the personal device itself.

Moreover, people's opinions can be routinely sought on a host of challenging issues. This will lead to Grass-root participation by the people in the governance process. This will usher in a Democracy where Blockchain technology can put power back in the hands of people through their representatives (who may be vulnerable to many shortcomings). It allows the people tighter control and more direct say in the activities of their representatives.

In fact, the government can easily organize periodic referendums on a host of issues, which need people participation.

In the 2014 general elections, The Indian Government spent more than $500 million to conduct elections [4].

This cost is apart from the number of lost working hours due to holidays on Election Day and expenditure by provincial governments.

In 2014, there were almost 814.5 Million eligible voters in India [5]. Compare this to a billion mobile connections already present in India [6]. We can consider that some well-off sections may have more than one cell phone per person. On an average, 80% of the eligible voters can be assumed to have a cell phone [6].

Those who do not possess a cell phone can visit nominated local administrator's office or Blockchain Interaction Units (BIUs) to cast one's vote [7].

PRESENT DAY ELECTIONS	**ELECTIONS THROUGH THE BLOCKCHAIN**
1) It is costly process, especially in large democracies	1) Will be affordable as cost of registration and voting will be very less.
2) Takes lot of manpower to conduct.	2) It is an almost automated process. Very less manpower involved.
3) In many situations, people have to wait until after the elections are over to get a voter tally	3) Blockchain can be programmed to provide an almost real-time result
4)Administration and day-to-day government work	4) No such consequence as people can choose to vote

will be affected (at least for a day)	remotely through the Blockchain
5) Voter has to be physically present at the Booth to cast the ballot	5) Voter need not be physically present to cast the Ballot. In fact, Voting Booth is not required
6)Since the Voter has to be physically present at specified booths, migrants and travellers may not be able to vote on election day	6) Any registered and bona-fide Voter can vote on-the-move.
7)Voters are susceptible to coercion as they can be intercepted by unscrupulous elements on the way to the election Booth	7) Voters are less vulnerable as they can vote from the safety of their homes and work-places.
8) The amount of paper, energy, and other resources is very high.	8) Amount of resources used is minimal as Voters can vote through their mobile phones.
9) Election process has to be completed quickly to minimize costs and avoid slowing of administrative machinery. Therefore voting is done in phases and is usually over in a day	9) Election process can be conducted anywhere from 1 to 6 months (national Election) to a few hours (referendum) without significantly affecting administrative machinery.

or two.	

CONCLUSION

Elections these days involve a large amount of money, manpower, resources and time. In the process, the administration and day-to-day lives of people are affected. Moreover, elections can be manipulated and voters can be coerced to vote against their will. Many a times, the credibility of the election process itself is questionable. In such a scenario, we need an election process that is transparent, fair, inexpensive and convenient.

Blockchain technology makes it possible to attain a highly credible and verifiable election process at an inexpensive cost. The amount of money saved by using BVP will be immense. There will be minimal wastage of time, money, manpower and space.

Coercion of voters, the likes seen in many third world countries can be relegated to the side lines. Democracy will not only be feasible, but will be affordable too. Elections, a hitherto costly and tedious process (for the administration) can become a routine activity of the future if mobile voting through BVP is introduced.

Election activity may become inexpensive enough, so that governments may automatically opt for Democracy through mobile voting. African nations and other developing Countries, experiencing chaos and problems during power transition will be able afford Democracy which is fair, convenient transparent, and inexpensive.

P.S- This paper, deals with the Election process (i.e. the process of voters going to booths and casting their vote) as opposed to election campaigning (where candidates lobby and ask people to vote for them). Both are different processes and the BVP concerns only the Election process.

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