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An empirical study to understand the effectiveness and scope of Blockchain Technology in Indian Public sector

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An empirical study to understand the effectiveness and scope of Blockchain Technology in Indian Public sector

By - Ketaki kawade, Hritika Gajarlawar, Radhakrishnan Airy, Ganesh Joshi, Nilay Bajaria

ABSTRACT -
The Blockchain is a distributed database that is maintained as Blocks and contains all transactions or digital occurrences. These are the records of transactions that take place between parties.Blockchain blocks are kept as blocks and shared among participants. Each Block is examined, validated, and saved by the parties who are a part of the system/network, each brick is unique and contains the details of a single transaction as well as the transaction's hash key. The study offers insights to researchers about the opportunity threat and future use of blockchain in the public sector.

KEYWORDS - Blockchain,Indian Public sector, Data Analysis, Technology, Digital transaction, cryptocurrency, India

PROBLEM STATEMENT
We all are consuming and are surrounded by data all day long and specially since the technology boom the past decade and everything is being digitized but there's a threat of data security, transparency in the system, tampering of financial ledger, tampering of data in civil registrations, governance, health care, educational sector, agricultural sector, and energy sector.

BACKGROUND -
In the industry 4.0 era, blockchain as well as related distributed ledger technologies has been an unmissable trend for both academia and industry recently. Since its depiction, blockchain has shown promising application prospects. From initial cryptocurrency to the current smart contract, blockchain has been applied to many fields. Many companies, from a plethora of non-financial services industries like telecom, cybersecurity, supply chain management, forecasting etc are on its way to establish the potential of blockchain use cases to positively disrupt their traditional business models or already implemented their pilot blockchain use cases.
Blockchain enables a layer of trust and eliminates the need for 3rd parties to validate transactions. It is an amalgamation of various technologies such as distributed systems, cryptography etc.
Seeing the growth of increase in blockchain adoption globally, indian policymakers too have taken too have taken cognizance of its potential and are exploring this distributed ledger technology in multiple domains such as asset registration, recordkeeping, benefit, etc. state governments are collaborating with startups and technology giants to develop proof of concepts and pilots. The government of Maharashtra too has been evaluating this technology for applications in e governance. As this trend continues, the public sector may leap frog into a new era of digital management

INTRODUCTION -
The advent of blockchain technology offers cap potential solutions. About the number one three disturbing conditions of financial inclusion. Simply put, the term blockchain refers to a decentralized digital ledger. These ledgers use the consensus protocol, truth. Cryptographic protocols do not permit you to alter recorded entries. It makes your digital ledger immutable. What is posted on the blockchain, It can be seen as an invariant truth. These abilities can be rendered in Blockchain. Blockchain technology is an attractive technology technique to promote Transactions amongst occasions that regularly have unique interests, which include:

Lenders and borrowers or carriers and customers. First blockchain
Ledger grew to be carried out through Nakamoto (2008) to support virtual devices Bitcoin Cash system. Blockchain can be characterized through three characteristics. First, blockchain is a distributed technology, Ogie to growth visibility and transparency of saved transactions Countermeasures. Second as an immutable Ledger, blockchain guarantees high-quality truth to help build Trust in stored information. Third, blockchain allows autorun Transaction (Lacity, 2018a). With these abilities, blockchain can understand many advantages (huge). In line with supply chain management goals. Naturally Therefore, modern-day supply chain research believes that AP has pretty cap potential.
Important problem Supply chain goals are steady with financial disturbing conditions Inclusion. In addition, trendy studies show many possibilities for blockchain. Support the UN time desk for sustainable development, which consists of finding solutions. Policies to cope with poverty and inequality, which include To prevent the exploitation of rural farmers in India 2019). To grow this concept, let's take a look at how your very personal Fea works. The form of the blockchain allows solving financial disturbing conditions 1, 2, and 3 Included in India.

REVIEW OF LITERATURE
India has seen a major boom in the digital sector in the past decade and it's going to grow massively in the coming years.
In the finance and banking sectors, the introduction of digital payments, Bitcoin and crypto currencies has resulted in a huge shift in the transaction processes. Trade, ownership, and trust are all guaranteed by Blockchain, which is a disruptive intervention in the entire transaction management process. In Spite of the progressiveness in digitisation there are still threat of fraud through e-payments and a sense of trust needs to be built among the users by a constructive examination of technology i.e Blockchain which will reveal further possibilities for how it can be safely used.
Some of the major challenges in the adoption of Blockchain in public sector includes Scalability, Privacy , security, lack of regulatory compliance and skilled people, legal ethical issue, lack of standard validation and knowledge, flexibility and much more

Blockchain is seen as a technology with the potential to transform all industries and Economies. It is estimated that blockchain could generate USD3 trillion per year in business value by 2030 The World Economic Forum (WEF) anticipates that 10% of the global GDP will be kept on blockchain by 2025 and also mentions that blockchain will be one of the 7 technologies that will change our life and revolutionize the things we do on a day to day basis. Seeing the growth of blockchain adopted globally, India too has taken note of its potential and are exploring this technology in multiple domains.There has been a growing need for large scale use of exponential technologies in India.

In India, BFSI leads in adoption, although other industries such as healthcare, retail and manufacturing are catching up. The government plays an important role not only as a regulator but also as a consumer of blockchain in india. Nearly half the states in India have initiated blockchain projects to address different elements of citizen service delivery. While most projects are in the pilot stage, the state government has taken a progressive approach to ensure startups and niche providers have a conducive framework to participate in these initiatives.

Currently, 40+ blockchain initiatives are being executed by the public sector in India, with around 92% in the pilot phase and around 8% projects in the production phase. Since a majority of the initiatives kicked off in early 2018, the benefits of these projects would be realized only in 2019 onwards. Compared to 2017, projects in the POC phase increased 7 times while projects in the pilot phase increased 6 times. The government of telangana and government of AP are 2 most leading states in terms of blockchain adoption in india

In the year 2015, the Indian government launched its mission to achieve the target of 100 smart cities. The main objective behind this mission was to promote sustained and inclusive cities that provide core infrastructure and decent quality of living to its citizens. The Blockchain technology played a major role to help achieve this target. Blockchain can be used in civil registrations, governance, health care, educational sector, agricultural sector, and energy sector.

In India, Blockchain saw early adoption in 2016 primarily among the banking and Financial services industry. But in the beginning of 2017 India saw an increase in adoption in other industries as well including FMCG and Pharmaceutical industry.

Another important aspect is the political issue of storing data on blockchain systems. Currently, the proposed guidelines are not clear about safety. Data stored inside the blockchain must be stored and maintained outside the blockchain, and if such data is expected to remain on the chain, that data is not guaranteed. This strategy helps to maintain reliable and long-term records. We need a clear access mechanism to allow more than 5 citizens to access specific data. Data relating to the functioning of public services (eg judicial data) and similar data. We must protect civil liberties and rights. At the same time, there are concerns about misuse of data and records.

Part of the chain. This is especially important if it is part of the data. The chain is not binding for some reason (whether the data is out of date or not it's Legally binding). There is a risk that your ID information will be authenticated.
 Blockchain is otherwise invalid, but you can find a way to traditional channels which allows the creation of new fake identities that can be used to disguise your true identities.

OPPORTUNITY
- Healthcare: the public sector can use blockchain to maintain medical records of all its citizens. Using blockchain to maintain healthcare records would make it easy for the doctors as well as patients to access their medical history.
- Education: like the healthcare records, education records and certifications are widely shared, not only of the students but also of the faculty. Using blockchain would make the authentication process more convenient and they can also be shared easily.
- Judiciary: Blockchain can be used to facilitate safe and transparent inter department coordination for providing justice to the citizens. Blockchain limits the tampering of evidence by authenticating the transactions by all the concerned nodes.
- Registration: Blockchain can solve one of the major problems faced by the government, that is the registration of assets like Land. Blockchain can reduce the paperwork required and can save a lot of time. This would also help limit the undervaluation of assets during the time of sale.
- Defense: Sensitive information related to the defense should not be stored at a single location. It should be distributed and stored at different nodes, which prevents the risk of data thefts, cyber-attacks and many more malpractices.
- Public Distribution System (PDS): Blockchain can be used very efficiently in the PDS, it would bring transparency at every stage in the process, right from the point of production to the point of sale. This would reduce corruption significantly and would ensure that the right quality and right amounts of grains reach the right people.
- Banking: Blockchain has the potential to revolutionize the banking sector. The use of blockchain would make the transactions transparent, safer and the recorded data would be stored in a decentralized manner minimizing risks.
- Governance: Blockchain can be used for day-to-day governance by the government. For example, blockchain could be used for recording of salaries of government employees, collection

of fines etc. Blockchain can integrate the various departments and increase efficiency and transparency of the various departments.

CHALLENGES

- Awareness: The knowledge pertaining to this technology is not very widely known. People with technical knowledge are needed to understand and further explain the benefits of using this technology.
- High power consumption: Blockchain technology requires a lot of energy due to the high number of node systems involved. The validation stage particularly requires the maximum energy.
- Infrastructure: Lack of infrastructure is one of the major challenges in implementation of this technology. Even today, we are on the road to digitalization and a lot more needs to be achieved.
- Skill: Blockchain requires technical knowledge not just for creation but also for operation. The people in the public sector need to be made aware of the benefits of this technology and be trained to use it efficiently.
- Compatibility: Another major challenge of using this technology is that it is not compatible with other software.

RESEARCH METHODOLOGY -

As mentioned before, our aim with this study was to explore the promise and the current scenario of online meetings and if it was a viable way of going about in the future.

This research made use of a Descriptive research design to conduct the research.

On understanding that the use of blockchain technology in the public sector is likely to be influenced by many different factors and in order to comprehend this the data for this study was collected via surveys. A comprehensive yet brief survey titled "Blockchain technology in the public sector" was sent out to people in order to understand the topic thoroughly and to get to know the current mindset of consumers in regard to the Blockchain.

(A) OBJECTIVE OF STUDY

1) To study the scope of blockchain technology in the public sector in india.
2) To analyze the benefits of blockchain in the public sector.
3) To analyze the implementation of block chain in public sector

(B) HYPOTHESIS

Ha - It would be beneficial for the public sector to to adopt blockchain
H0 - It wouldn't be beneficial for the public sector to to adopt blockchain

Ha- Government of India will support blockchain
H0 - Government of india will not support blockchain

(C) DATA COLLECTION

Ha- govt of India will support blockchain
Ho- Govt of India will not support blockchain

	yes	no
1	13	4
2	10	3
3	9	5
4	4	3
5	7	5

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	5	43	8.6	11.3
Column 2	5	20	4	1

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	52.9	1	52.9	8.60162602	0.01891537	5.31765507
Within Groups	49.2	8	6.15			
Total	102.1	9				

If F > F crit, we reject the null hypothesis
hence we reject the null hypothesis

hypothesis
ha- It will be beneficial for India to support block chain
h0- It will not be beneficial for India to support block chain

	yes	no
1	11	12
2	12	11
3	8	2
4	4	3
5	7	5

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	5	42	8.4	10.3
Column 2	5	33	6.6	25.3

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8.1	1	8.1	0.51266	0.49436	5.31766
Within Groups	126.4	8	15.8			
Total	134.5	9				

If F > F crit, we reject the null hypothesis
hence we reject the null hypothesis

(D) SAMPLE SIZE - We have collected survey responses from 47 random people.

(E) SAMPLING TECHNIQUE -
Anova has been used to analyze the data taken by team through the primary survey

INTERPRETATION

1) **if F > F crit, we reject the null hypothesis
hence we reject the null hypothesis.
Hence we interpret that public sector will be benefited by the use of blockchain technology.**

Anova: Single Factor

SUMMARY					
Groups	Count	Sum	Average	Variance	
Column 1	5	42	8.4	10.3	
Column 2	5	33	6.6	21.3	
ANOVA					
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8.1	1	8.1	0.512658	0.494357	5.317655
Within Groups	126.4	8	15.8			
Total	134.5.	9			

We have created data of some people by asking them questions about blockchain technology from which we have created dataset of 47 random people, further we have applied ANOVA single factor to check whether blockchain will be beneficial for public sector or no.

As you can see in the above table, there are various statistics of each group: Sum, Average, and Variance. Notice that the p-value or probability of obtaining an F statistic of 5.317 or larger when the null hypothesis is true is 0.494357. Since the p-value is smaller than the specified alpha of 0.05, the null hypothesis is rejected which is that blockchain will not be beneficial for public sector.
Hence we can say that people think that blockchain should be used in public sector.

The results for our objective "Will blockchain be beneficial for public sector" are shown above which shows that P-value was below the critical value of 5.317 implying blockchain will be beneficial for public

2.if F > F crit, we reject the null hypothesis
hence we reject the null hypothesis.
Thus, we can interpret that use of blockchain technology will be supported by government

Anova: Single Factor

SUMMARY						
Groups	Count	Sum	Average	Variance		
Column 1	5	43	8.6	11.3		
Column 2	5	20	4	1		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	52.9	1	52.9	8.601626	0.018915	5.317655072
Within Groups	49.2	8	6.15			
Total	102.1	9				

As you can see in the above table, there are various statistics of each group: Sum, Average, and Variance. Notice that the p-value or probability of obtaining an F statistic of 5.317 or larger when the null hypothesis is true is 0.018915 . Since the p-value is smaller than the specified alpha of 0.05, the null hypothesis is rejected which is that government will not support blockchain technology.
Hence we can say that people think blockchain will be supported by government.

The results for our objective "Will government of India support blockchain technology" are shown above which shows that *P*-value was below the critical value of 5.317 implying blockchain will be supported by government of India.

CONCLUSION

After doing a thorough research on Blockchain and its application in the Indian Public Sector, we as a group have concluded that there are a lot of advantages of using this technology. Blockchain is a breakthrough technology which will revolutionize the way data is stored and entered. As mentioned earlier in the paper, Blockchain has many advantages and the implementation of Blockchain would make the public sector transparent and accountable. But the other side of the coin is that Blockchain implementation requires a lot of energy, and this would increase the burden for energy significantly, other challenge of this technology is that the Government of India currently does not have the infrastructure to incorporate this technology. Blockchain is a completely new technology and hence the awareness is not very wide. It would take a lot of effort and resources, along with the right attitude of accepting change to make this technology an integral part of the public sector.

Hence, we as a group would suggest that the Government of India should consider the use of this technology and plan to roll out this technology in phases. The first phase according to us should be to educate the masses about this technology and its benefits. Then implement this technology in different states and different industries in phases. Thirdly, we feel that the Government of India should start Research and development on this technology and try to find a way in which energy consumption can be reduced while using Blockchain.

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