Block-Chain Management: A solution to reduction in NPA of UCBs

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ABSTRACT
Digital technology has become a disruptive force and is increasingly becoming a critical factor, not only in banking sector, however, across a variety of industries all around the world. It has changed the how business operate by changing the entire business models and has gained remarkable interest in all sectors. Various industries are now customizing and personalizing the Block chain technology to fit their needs and generating multiple use cases. The technology is employed to provide a decentralized method for app creation. The framework/architecture of Block-chain technology in the banking process is explained in this article. It also discusses the features and benefits of Block chain, and how to utilize block chain to enhance the KYC procedure and reduce bank NPAs, with particular attention to cooperative banks. In addition, the research assumption is used in the formation of a questionnaire focusing on significance of block chain management in reducing NPA in UCBs in Mumbai region.
Keywords: *Blockchain, Architecture of Blockchain, Blockchain in Banking, Blockchain in KYC, Security Aspects in Blockchain, NPA.*

1. INTRODUCTION

Each block in a blockchain has a timestamp and a link to a prior block; a blockchain is a decentralised, distributed database that is used to store a continuously growing list of documents called blocks. Blockchain's are naturally resistant to data alteration because of their purpose and construction. A block can theoretically work as "an open, distributed ledger that can record transactions between two parties effectively, in a verifiable, and permanent way." Blockchain, also known as Distributed Ledger Technology, is the main technology that underpins bitcoin. Processes can become more safe, efficient, transparent, and dependable thanks to blockchain technology. The significance of blockchain technology development has been recognised by businesses and the media worldwide.

Due to the digitalization of records, a huge volume of data gets generated daily. It becomes important for every organization to protect its data from security threats in a cost-effective manner. Blockchain technology is capturing the attention of chief executives because it assures invariability, cryptographic security of data, and decentralized ownership. First to dip their feet were the financial institutions. More than 90 central banks were engaged in worldwide conversations about blockchain, according to the World Economic Forum, and as a result, banks are prepared to test out several blockchain prototypes in 2017. Blockchain has also gained a lot of importance in non-financial industries like supply chain management, crowd funding, telecom cyber security, the insurance industry, retail, etc.

Humankind has always exhibited cooperation. Cooperation will inevitably play a significant and beneficial role in the global economy. Even the global development of cooperatives has not been a straight line, and the cooperative movement has clarified the dynamic character of

cooperative activities that suit the local and regional environment, in addition economic and social situations, at various times. In India, the banking industry has a significant impact on the country's growth. There are cooperatives in almost every village in India. Cooperative organisation is one of the most crucial elements for the underprivileged part.

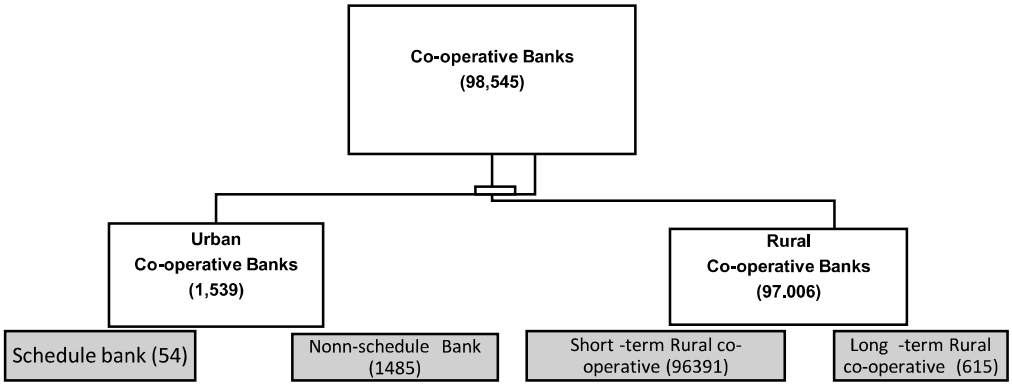
1.1 TYPES OF CO-OPERATIVES BASED ON STRUCTURE

The co-operative banking structure in India includes the following two main types:

- Urban Co-operative Banks
- Rural Co-operative Banks

According to the RBI survey report 2019-20, India had 98545 co-operative banks, of which 1539 were urban co-operative banks and the remainder, or 97006, were rural co-operative banks. UCBs' total assets grew from 1,32,145 crores in 2004-05 to 6,23,905 crores in 2019-20. It equates to a 71 percent increase over a 15-year period. The information amply demonstrates the significance of UCBs in the Indian banking industry. The basic origin of the cooperative movement in India comes from Maharashtra. The social and economic advancement of Maharashtra state was significantly influenced by the cooperative movement. Based on the data reported by UCBs in off-site returns, the total number of UCBs in India was 1539, of which 494 existed in the state of Maharashtra alone. This means that approximately 33% of UCBs in Maharashtra are alone. The total number of UCB branches in Maharashtra is 6620, accounting for 60% of all UCB branches in India. Deposits collected and advances given are also the highest in comparison to other states in India, at 314210 Cr. and 193136 Cr. by the fiscal year 2019-20.It shows the massive contribution of Maharashtra state in the urban cooperative sector. In a megacity like Mumbai is the most populated, city in India, the role played by UCB is very vital. The total number of UCB branches operating in Mumbai in 2019-20 was 60.It not only accepts the deposits but additionally offers them a credit facility for their developments. The UCBs in Mumbai really help the population attain their socio-economic objectives.

Chart 1: Cooperative Bank Structure



Source: Trend and Progress Report 2019-20(RBI)

2. NON-PERFORMING ASSET:

Non-performing assets, or NPAs, are used in banking and finance. The amount that has not been recovered will be considered a non-performing asset (NPA) if a bank or finance firm is unable to get back the money it has provided to the borrower in 90 days. It stands for bad loans whose debtors did not fulfil their payback requirements.

2.1 TYPES OF NPA

NPA may be classified into

a. **Gross NPA**

Gross non-performing assets (NPAs) are advances that are thought to be unrecoverable, for which banks have made provisions, but which are nonetheless recorded in the banks' books of account.

b. **Net NPA**

Net NPA is calculated by subtracting from Gross NPA factors like unpaid interest, partial payments, and accounts held in suspense.

NPA and UCB:

The RBI said that the number of UCBs has declined from 1926 in March 2004 to 1539 in March 2020 based on off-site surveillance returns, indicating that the UCB has experienced a number of problems over time. It means that there were financial issues facing the UCB in India. The result is the RBI took the initiative to close a number of financially weak banks. Further sector consolidation as a result of the number of mergers and acquisitions at UCB from 2004 to 2020 Between 2004-05 and March 2020, a total of 387 UCB 136 were merged and remained. In Maharashtra, a total of 73 UCBs were merged and closed. It was the highest as compared to any other state in India. In Mumbai, UCBs like Panjab Maharashtra Co-operative Bank, CKP Co-operative Bank, Kapol Co-operative Bank, etc. are also subject to the restrictions of the RBI. The asset quality of UCBs is also declining due to non-performing assets. The number of poor investors who suffer the incidental loss of their life savings of PMC banks, CKP banks, and Kapol Co-operative banks.

3. REVIEW OF LITERATURE

The results of a review of the pertinent literature are listed below.

Tejal Shah (2018), in her research paper on “"Blockchain Technology in Banking and Finance" This essay seeks to describe both the structure and operation of the blockchain technology. Along with the Blockchain's numerous features, its advantages are also explored. For a select few banking transactions, the use cases and blockchain suitability assessments have also been completed. We also look at the Blockchain's security features in the final segment.

A. Shanti Bruyn (2017), Give details about the blockchain technology, its background, and how it operates in your "Blockchain" research paper. The report also provides background on the development of blockchain technology. Finally, it discusses how the many variables within blockchain interact with one another in more detail.

Arati Dua (2017), According to her writings on "Banking on Blockchain" that were published in today's business, block chain technology is used in the banking industry when a corporate customer's suspicious transaction with another bank is not revealed by a bank's know-your-customer (KYC) check. What if banks were able to communicate corporate KYCs, including investigation reports and cross-border wire transfer reports, in real time while also making money off of them on a shared digital ledger that was private, secure, immutable, and based on consensus?

Anuj Sharma (2014), International Journal of Computer Applications research articles on "Reducing Risk in KYC for Large Indian Banks by Using Big Analytical Techniques” This essay aims to examine the Know Your Customer process, outline the difficulties it faces, and draw attention to the inadequacies of current methods for successfully putting KYC regulations into practise (particularly in large Indian banks). It then proposes a convincing solution using Big Data analytical approaches like Fuzzy Matching & Map Reduce while leveraging real-

world examples. The authors are convinced that the solution's framework, which has been supplied, may quickly result in a functional prototype.

4. OBJECTIVES

The following are the broad objectives of this research paper:

1. To understand the framework/architecture of Blockchain in Banking Sector.
2. To perform cost benefit analysis after using Blockchain management.
3. To suggest the use of block chain management to control NPA

Hypothesis:

H_1: Blockchain Technology significantly helping in reducing NPA in UCBs in Mumbai

H_o: Blockchain Technology is not significantly helping in reducing NPA in UCBs in Mumbai

5. RESEARCH METHODOLOGY

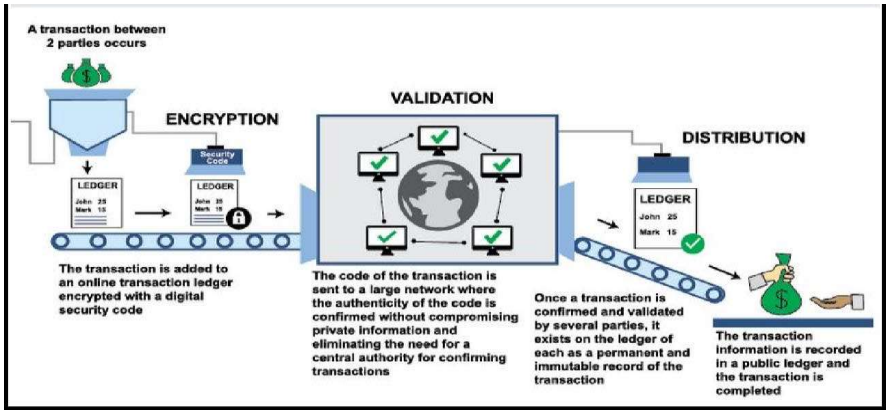
The current study is analytical because it uses statistical information. The study is supported by both primary and secondary data. The 239 respondents who completed the structured questionnaires, mainly the staff of 12 UCBs in the Mumbai district, provided the primary data. The primary sources of secondary data collection include online sources like papers, journals, and websites. While data analysis is carried out using Excel and SPSS software, data is displayed with the use of graphs, charts, tables, etc. The following list includes the statistical tools used:

1. Mean in mathematics used to compute values for evaluation purposes.
2. Analysis and elucidation using ANOVA and the Friedman's Test.

Framework of Blockchain:

Decentralization, digital signatures, data mining, and integrity are just a handful of the fundamental ideas that make up the blockchain framework.

Chart 2: Blockchain Decoded

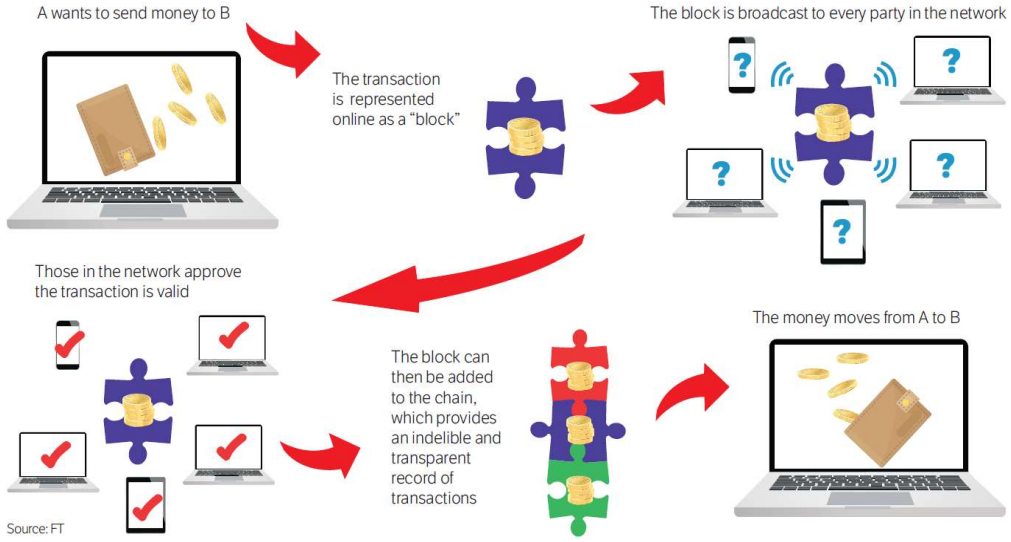


(i) Decentralization: Blockchain distributes power across all participants in the transaction chain, rather than retaining a single central authority to control all other actors.

(ii) Digital signature: Blockchain uses a unique digital sign to facilitate the sharing of information using public and private keys. Everyone on the network is aware of the public key, while the sender of the information is the only one who is aware of the private key.

(iii) Data Mining: In a distributed network system, each miner digs deeply into the data, which

is then assessed in accordance with the encryption standards. Miners are also acknowledged for the confirmation and verification of the transactions.
(iv) Integrity: Transaction data is protected against manipulation once it has been agreed upon through the use of sophisticated algorithms and user consensus. In order to reduce the danger of fraud, data saved on blockchain serves as a single source of truth for all parties. Chart 3 : Work of Blockchain



6. ANALYSIS OF DATA:

Axis Bank is the country's third-largest private sector bank. The Bank offers the whole spectrum of financial services to a variety of customer groups, including big and mid-sized firms, MSME, agro, and retail businesses. Axis Bank, one of the earliest new generation private sector banks, began operations in 1994. Let's look at Axis Bank, which used block chain in its operations in 2017-18. The table below illustrates the advantages of block chain management in the context of Axis Bank.

Table 1: Axis Bank KYC on Blockchain and cost-benefit analysis

Particulars		FY 17-18 (Without blockchain)	FY 19-20 (With blockchain)
KYC Cost/Account (FY 17-18 approx. Rs. 500-2000, FY 19-20 approx. $5) (1)		Rs. 500.00	Rs. 360
# Of Axis Bank customers (crore)	(2)	4.7	5.4
Total # of banking relationship/customers	(3)	2	2
Total # of KYC that needs to be done (crore)	(4)=2*3	9.4	10.8
KYC cost	(5)=1*4	Rs. 4700.00	Rs. 3888.00
Savings because of blockchain (crore)			Rs. 812.00
Net Profit (crore)		Rs. 275.68	Rs.1627.00
Retained Earnings		Rs. 1732.58	Rs. 2458.58
Shares outstanding (crore)		244.51	244.51

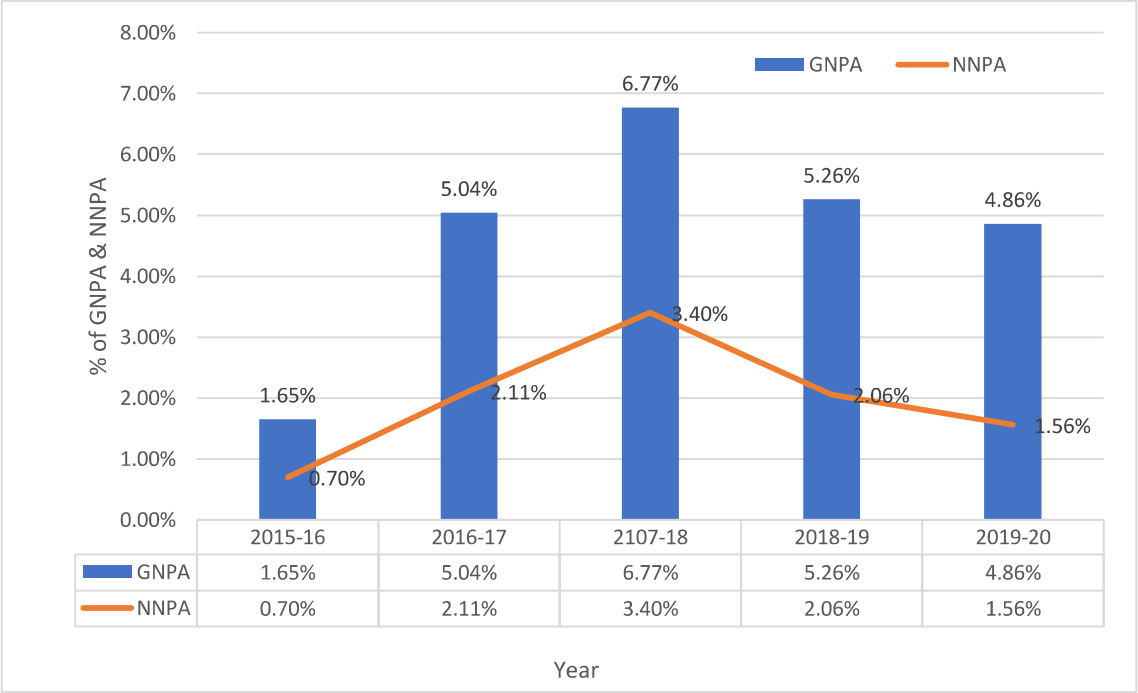
Reported EPS	**Rs. 1.13**	**Rs. 5.99**
Absolute increase in EPS (with KYC on blockchain)		**Rs. 5.96**
% Increase in Net Profit (with KYC on blockchain)		**529%**
% Increase in EPS (with KYC on blockchain)		**527%**
EPS: Earnings per share, 1 USD = 69 INR (FY 17-18), 1USD = 72 INR (FY 19-20)		

Source: Annual Report of Axis Bank

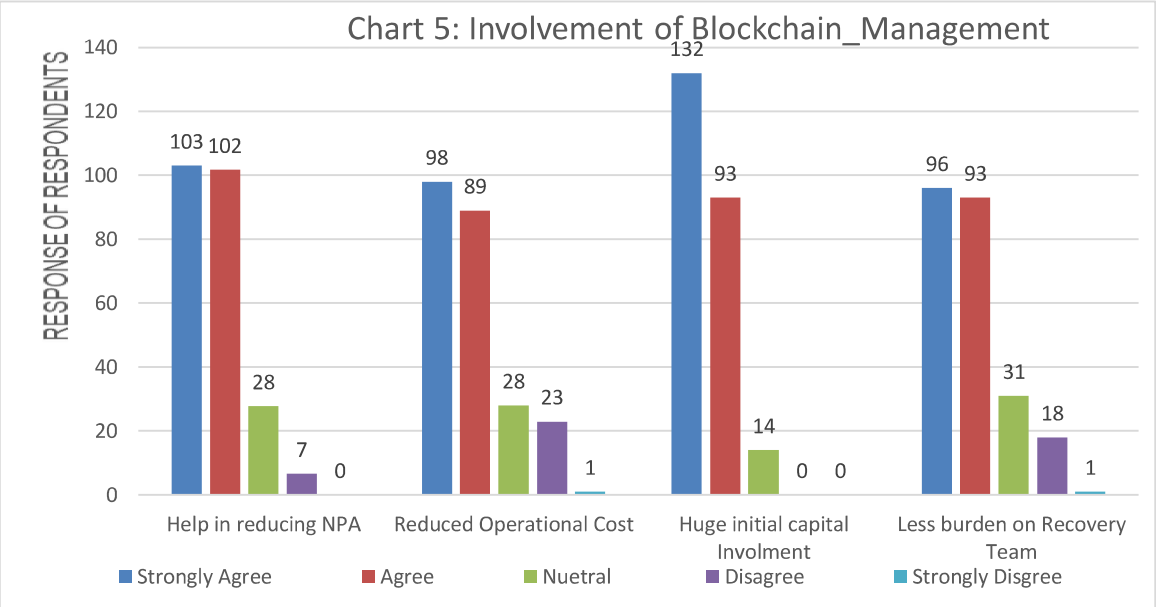
In the above table 1, it is indicated that the cost of KYC without Aadhar is INR 500–2000 (USD 7–30), whereas the cost of KYC on the blockchain is less than USD 5. So, assuming 1 USD = 72 INR, the cost of KYC using blockchain will be 72 x 5 = INR 360 crores.

Before blockchain, the total KYC cost was INR 4700 crores, whereas after implementing blockchain, the cost was reduced by INR 812 crores to INR 3888 crores. Thus, the reported net profit of Axis Bank was INR 275.69 crores in FY 17–18, which increased to INR 1627 crores in FY 19–20, which is an increase of 490%.

Chart 4: GNPA and NNPA % of Axis Bank



According to Chart 4, the ratios of gross and net non-performing assets (NPAs) decreased from FY 17–18 to FY 19–20. The total NPA was 6.77 percent in 2017–18 and dropped to 4.86% in 2019–20. A similar decline was seen in the net NPA ratio, which went from 3.40% in 2017–18 to 1.56% in 2019–20. demonstrates how well block chain technology works to cut down on problematic loans. The case of Axis Bank clearly shows that the block chain not only helps to reduce the KYC cost, but it is also a great method to manage the problems of bad loans. Using a systematic questionnaire, the researcher obtained first-hand information from 239 persons. The below chart 5, gives idea about involvement of blockchain management.



Source: Researcher Compilation

As per the above chart 5, 86% of respondents agree that blockchain technology helps in reducing NPA. 78% of respondents agreed that blockchain technology required less operational cost for NPA management, and 79% agreed that it helped relieve the recovery team's burden. At the same time, 94% of respondents felt that blockchain management required huge initial capital investment and maintenance.

The above-mentioned data of respondents is analysed using IBM-SPSS software, and one-way ANOVA is applied as follows:

Table 2: Descriptive Statistics

Particular	N	Minimum	Maximum	Mean	Std. Deviation
Involvement Blockchain	239	1.00	2.00	1.2845	.45213
Help in reducing NPA	239	2.00	5.00	4.2636	.76255
Reducing Operational Cost	239	1.00	5.00	4.0879	.97264
Huge Initial Cost Investment	239	3.00	5.00	4.4937	.60717
Less burden on Recovery Team	239	1.00	5.00	4.1088	.92847

Source: Researcher -generated according to the primary data as per IBM SPSS software.

Table 3: Reliability Statistics on Involvement of Blockchain Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.850	.777	5

Source: Researcher -generated based on the primary data as per IBM SPSS software.

As per table 3, indicates the validity of data for the involvement of blockchain management the Cronbach's Alpha score is 0.850. If $\alpha \geq 0.8$ then data set is reliable for testing. As $\alpha = 0.850$ which indicates the above data set excellent or very reliable for the testing.

Table 4: ANOVA with Friedman's Test						
		Sum of Squares	df	Mean Square	F	Sig.
Help in reducing NPA.	Between Groups	8.160	1	8.160	14.849	.000
	Within Groups	130.234	237	.550		
	Total	138.393	238			
Reducing Operational Cost	Between Groups	11.814	1	11.814	13.124	.000
	Within Groups	213.341	237	.900		
	Total	225.155	238			
Huge Initial Cost Investment	Between Groups	24.568	1	24.568	92.171	.000
	Within Groups	63.172	237	.267		
	Total	87.741	238			
Less burden on Recovery Team	Between Groups	11.252	1	11.252	13.752	.000
	Within Groups	193.920	237	.818		
	Total	205.172	238			

Source: Researcher -generated according to the primary data as per IBM SPSS software.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The categories defined by Involvement_Blockchain = Yes and No occur with probabilities 0.5 and 0.5.	One-Sample Binomial Test	.000	Reject the null hypothesis.
2	The categories of Help_in_reducing_NPA occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
3	The categories of Reducing_Operational_Cost occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
4	The categories of Huge_Initial_Cost_Invesment occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.
5	The categories of Less_burden_on_Recovery_Team occur with equal probabilities.	One-Sample Chi-Square Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Source: Researcher -generated according to the primary data as per IBM SPSS software

As per Table 4, the Anova with Friedman's Test is applied to test the hypothesis. The Anova result as given in Table 4 shows that the 95% confidence level of significance is 0.05. The F value is less than that, i.e.,.000. It is understood that blockchain techniques is important measures that reduced the NPA. Therefore, the null hypothesis "blockchain technology is not significantly helping in reducing NPA in UCBs in Mumbai," i.e., is rejected.

7. FINDINGS

Block chain technology is used by prominent banks in India to reduce their overall operating costs.
These technologies also help banking sector to reduce the NPA. Axis Bank, ICICI bank, Kotak Mahindra banks are successfully implemented block chain in their operation. It means only Private bank took the initiatives.
The employees of UCBs also feel that blockchain management will help the cooperative banks reduce their NPAs.
One of the main worries is that the initial investment required to implement block chain is very large, and other banks may not find it appropriate for us.
If the UCBs want to stay in the business, then blockchain management will really benefit in the future by reducing cases like PMC bank crises, CKP bank crises, Kapol bank crises, etc.

8. CONCLUSION:

Though blockchain has enormous potential, banks must recognize the key features of this technology and how they can use it to solve their current business problems. It can also use this technology to exchange data, which also involves an exchange of value. Banks need to identify various opportunities, decide on the feasibility of implementation, and also consider the impact on existing processes. However, the question arises about the security framework, the cost of implementation, and other risks associated with it. As a result, they will have a deeper understanding of the technology, reduce risk, and be able to create a solution that is tailored to their particular problems.

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