

# PNB SCAM: IS BLOCKCHAIN THE ANSWER?

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## ***Abstract***

*In the past few years, economies all over the world have witnessed incidents of major banking scams. India too has been a victim of few such bank scams with the biggest being the PNB Scam worth around \$ 1.4 billion. This paper is an attempt to explore the causes behind the scams and fraud, its modus operandi and the possible ways to prevent the recurrence of such scams. The has been done by taking a look at the current technology in place in the banking sphere, its lacuna and the alternative technologies that can be deployed. The authors have offered Blockchain as an alternative to the present technology employed by the banks and have tried to assess the potential benefits it may offer to the banking industry.*

## **Introduction**

*“If you owe your bank a hundred pounds, you have a problem. But if you owe a million, it has.”*

*- John Maynard Keynes, The Economist, (February 13th, 1982)*

In the wake of the increasing incidents of bank scams, John Keynes words do not seem like an exaggeration. Recently banking scams have become prevalent worldwide. The ubiquitous influence of banking scams has been felt by all economies, big or small. Banks, all over the world have witnessed lots of fraudulent transactions. According to a survey of Certified Fraud Examiners (CFEs) who investigated cases between January 2010 and December 2011, Organizations around the world lose an estimated five percent of their annual revenues to fraud, applied to the estimated 2011 Gross World Product; this

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figure translates to a potential total fraud loss of more than \$3.5 trillion.<sup>1</sup>

When it comes to banking scams, India is no different than the rest of the world. As per the Reserve Bank of India (RBI) data, state-run banks have reported 8,670 “loan fraud” cases which total to 612.6 billion rupees (\$9.58 billion) over the last five financial years up to March 31, 2017.<sup>2</sup> If we take the instances of banking scams that have occurred recently, the figures will be multifold.

The most recent and arguably one of the biggest banking scams in the history of the Indian economy till date occurred recently in the Punjab National Bank.<sup>3</sup> The extent of total money lost due to the fraud committed by two bank employees of the bank, in connivance with few officials roughly translates around \$2 billion. (current value is slated to be \$ 1.4 billion)<sup>4</sup> As per a report published by Bloomberg, the total volume of the fraudulent transactions is equivalent to eight times the PNB’s 2017 net income of about 13.2 billion rupees (\$206 million).<sup>5</sup> At the heart of the scam were few PNB employees who issued Letters of Undertaking (LOU) without due authorization of the higher management.<sup>6</sup> We will take a look at the facts leading to the scam, the present technology in use in the banking industry and its lacuna and the role of Blockchain in preventing such scams in future in the further segments of the article.

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<sup>1</sup>See, *ACFE Report Estimates Organizations Worldwide Lose 5 Percent of Revenues to Fraud*, <http://www.acfe.com/press-release.aspx?id=4294973129>. See also, ACFE report on fraud to the nations of April 2018 at <https://www.acfe.com/report-to-the-nations/2018/default.aspx>

<sup>2</sup>See, Aditi Shah and Devidutta Tripathy, *Exclusive: Unpublished Data Shows India’s Fraud Problems Extend Beyond PNB*, (February 16<sup>th</sup>, 2018), <https://in.reuters.com/article/india-banks-fraud/exclusive-unpublished-data-shows-indias-fraud-problems-extend-far-beyond-pnb-idINKCN1G00SJ>.

<sup>3</sup>Monojit Saha and Devesh K. Pandey, *Rs. 11,500/- crore fraud rocks state-run PNB*, (February 17<sup>th</sup>, 2018), <http://www.thehindu.com/business/markets/pnb-shares-fall-after-bank-finds-fraudulent-transactions-worth-177-billion/article22749241.ece>.

<sup>4</sup>PTI, *PNB Shares Slump 12% as Fraud Amount Raised to Nearly \$2 Billion*, (February 27<sup>th</sup>, 2018), <http://www.livemint.com/Industry/wB6bbaQfPRBB2S5LABp4AL/PNB-fraud-amount-could-be-Rs1323-crore-more-says-bank.html>.

<sup>5</sup>Anto Antony, Shruti Srivastava and Swansy Afonso, *Jeweler to Stars said to be Accused of Massive India Bank Fraud*, (February 14, 2018), <https://www.bloombergquint.com/pnb-fraud/2018/02/14/punjab-national-bank-drops-after-detecting-1-8-billion-fraud>.

<sup>6</sup>Khushboo Narayan, *Inside the Punjab National Bank fraud: What an LoU is, how Case may Impact the Bank*, (February 15, 2018), <http://indianexpress.com/article/explained/inside-the-pnb-fraud-what-an-lou-is-how-case-may-impact-the-bank-nirav-modi-5064357/>.

## SWIFT and the factual background of PNBScam

The PNB scam came to the highlight after the senior management of PNB detected some fraudulent and unauthorized transactions in one of its branches in Mumbai, investigations into which has until now revealed a mammoth scam worth about \$1.4 billion (Rs 11,360 crore approx.). On prompt investigation, it came to the light that two of the employees of PNB looking after import payments and management had fraudulently issued LOU on behalf of Nirav Modi Companies to foreign branches of Indian Banks, including Axis Bank and Allahabad Bank among others.

Under the instructions of LOU obtained fraudulently, the foreign branches of the Indian Banks were paying the overseas suppliers, on behalf of the prime accused's firms and the payment, in turn, was guaranteed by PNB through the LOUs. The payment of the loans was made to the overseas suppliers via Nostro Accounts. Nostro Accounts are a type of account maintained by Banks for inter-bank transactions. A Nostro Account is the Issuer Bank's account held in another bank in a foreign country for the purpose of holding foreign currency. These are foreign currency accounts, which are held by the banks for cross-border foreign currency dealings.

In order to understand this better, it is necessary to look into the technology currently in use in the banking industry. The underlying technology used to disburse loans and carry the above transactions by banks was SWIFT. Known as Society for Worldwide Inter-Bank Financial Telecommunication, SWIFT is a global member-owned cooperative and the world's leading provider of secure financial messaging services. In order to use SWIFT, it is necessary for the banks to be affiliated with SWIFT. Once they are affiliated, the banks are given alphanumeric SWIFT codes which are used to identify the banks. A SWIFT code is a unique identification code, to identify the specific bank to which the currency is being sent. *“SWIFT codes, also called Bank Identifier Codes (BIC), are composed of eight or eleven characters, and contain the following information:*

- *First 4 characters identify the bank and are usually closely related to the bank's name or abbreviated name.*
- *Next 2 characters are the country code, identifying which country the bank is located in.*
- *Next 2 characters (letters or numbers) identify which city in that*

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<sup>7</sup>See, <https://www.theswiftcodes.com/>.

country the bank's head office is.

- *Last 3 optional characters (letters or numbers) identify the bank's specific branch office, instead of its national head office.*<sup>77</sup>

In order to send messages via SWIFT, a manual entry is required to be made. After the account is logged in, confidential information like the account number and the SWIFT code are required to be fed. Once this information is fed into the system, the transaction is carried out. In most of the cases, this SWIFT code is linked with CBS, called Core Banking System. Therefore, when a particular transaction takes place through SWIFT, it is recorded in the CBS Network. A CBS is software that supports the daily transactions and accounts within a bank internally.<sup>8</sup> The CBS permits the customers to perform basic transactions from any member branch office of the bank or banking system. Generally, the servers of CBS are centrally located and any of the customers can transact from anywhere in India subject to certain conditions where the Bank Branch of the particular Bank is located. However, in case of PNB, SWIFT was not integrated with the CBS.<sup>9</sup> In the PNB case, through the LOU the customer was allowed to raise money from another Indian bank's foreign branch in the form of a short-term credit. The LOU serves the purpose of a bank guarantee for a bank's customer for making payment to its offshore suppliers in the foreign currency. This credit is usually applicable for a period of 90 days but in case of PNB scam, the undertaking was extended fraudulently much beyond this 90 days period.

The general practice set in place in order to raise the LOU is that the customer pays margin money to the bank that issues the LOU and on payment of the margin money, the customer is granted a credit limit. Surprisingly, this procedure was not adhered to in the case of PNB as neither the margin money was paid, nor there was any credit limit.<sup>10</sup> The procedure that was to be followed next was that after the foreign branch of the Indian Bank accepts the LOU, the lender transfers money to the Nostro Bank Account of the issuing bank. In the case of PNB, once the foreign branch of the Indian Bank received

<sup>8</sup> Neha Alawadhi, *What is SWIFT Technology and How is it Connected to PNB Fraud?* (February 19<sup>th</sup>, 2018), <https://www.moneycontrol.com/news/business/what-is-swift-and-how-technology-is-it-connected-to-pnb-fraud-2510711.html>.

<sup>9</sup> Rohan Abraham, *A SWIFT Autopsy: How Nirav Modi Defrauded PNB*, (February 24, 2018) <http://www.thehindu.com/news/national/a-swift-autopsy-how-nirav-modi-defrauded-pnb/article22844201.ece>.

<sup>10</sup> Devidutta Tripathy, *Explainer: How PNB Says it Fell Victim to India's Biggest Loan Fraud*, (February 15<sup>th</sup>, 2018) <https://in.reuters.com/article/punjab-natl-bank-fraud-explainer/explainer-how-pnb-says-it-fell-victim-to-indias-biggest-loan-fraud-idNKCNI1FZ1AT>.

the LOU via SWIFT, loans were disbursed to the overseas suppliers of Nirav Modi's firms. The primary reason that the scam went undetected for the longest time by the top management was that in case of PNB, SWIFT was not integrated with the bank's CBS.<sup>11</sup> The unauthorized LOUs were deliberately not entered into the bank's CBS and that thereby lead to the scam.

Of late, SWIFT has become a breeding ground for scams all over the world. Approximately 11,000 institutions enjoy access to SWIFT.<sup>12</sup> *"The Banks leverage multiple applications, resident on various user endpoints, to interface with the SWIFT network. Each connected endpoint presents an avenue of attack for threat actors to fraudulently create and send financial messages"*<sup>13</sup> The security around the SWIFT technology has become a cause for concern lately.<sup>14</sup> As per the RBI publication *Information Technology & Cyber Risk in Banking Sector – The Emerging Fault lines*, reliance on SWIFT transactions without originating a corresponding transaction in the CBS is highly vulnerable and prone to cyber forgery.<sup>15</sup> In the wake of the same, stakeholders across the world are exploring the opportunities for strengthening banking transactions to make it more secure. This need has led to the experimentation of various technologies including Blockchain. The hype around Blockchain can be validated by the fact that major industry players are exploring its use and implementation in the banking sector. The emphasis on the implementation of Blockchain could be seen from the fact that it is being touted as a robust replacement for the current technology in use. Among others, SWIFT, too, is planning on implementing Blockchain. A press release on the website of SWIFT from October reads, *"tests show Blockchain has the potential for global liquidity optimization."* Thus it is evident that SWIFT, in order to improve security features, is exploring the

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<sup>11</sup>Anon, *Could Blockchain Have Stopped The PNB Fraud?* <https://medium.com/@indianmoney.com/could-blockchain-have-stopped-the-pnb-fraud-10f3b03107bb>.

<sup>12</sup>SWIFT: *The Global Financial Messaging Provider*, May 2015 (on file with authors).

<sup>13</sup>*Cybersecurity in ASEAN: An Urgent Call to Action*, a report by global management consulting firm, A.T. Kearney, and commissioned by technology company, Cisco Inc. (on file with authors).

<sup>14</sup>Leslie D Monte, *Banks Vulnerable to Hackers Without Online Interface Between CBS, SWIFT*, (February 21, 2018) <http://www.livemint.com/Industry/9MUXbcogEecwkm0Rn3gvTK/Banks-vulnerable-to-hackers-without-online-interface-between.html>.

<sup>15</sup>Speech by S. S. Mundra on *Information Technology & Cyber Risk in Banking Sector – The Emerging Fault lines*, (September 7<sup>th</sup>, 2016), [https://www.rbi.org.in/Scripts/BS\\_SpeechesView.aspx?Id=1022](https://www.rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=1022).

applicability of Blockchain in banking and financial industry.<sup>16</sup>

## What is Blockchain?

Don & Alex Tapscott, authors of the *Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World*<sup>17</sup> defines Blockchain as-

*“The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value.”*

A Blockchain is essentially a distributed database of records or public ledger of all transactions or digital events that have been executed and shared among participating entities. Each transaction in the public ledger is verified by consensus of a majority of the participants in the system. The unique feature of the system is that the information once entered, can never be erased. Thus, Blockchain is a tamper-proof ledger shared within a network of entities, where the ledger holds a record of transactions. A Blockchain contains a certain and verifiable record of every single transaction evermade.<sup>18</sup>

## Application of Blockchain in Banking Sector

Blockchain is being hailed worldwide for the level of security it provides and its applicability across universal sectors in the economy. As per World Economic Forum report, by 2025, 10% of the GDP will be stored on Blockchains or Blockchain-related technology.<sup>19</sup> Blockchain has the full ability to address the basic concerns of information security. The primary concerns being Confidentiality, Availability and Integrity also called - the CIA trinity.<sup>20</sup> Since Blockchain is a distributed ledger, therefore being a

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<sup>16</sup>Anon, *Applications of Blockchain Technology to Banking and Financial Sector in India*, (February 20<sup>th</sup>, 2018) <http://www.idrft.ac.in/assets/publications/Best%20Practices/BCT.pdf>.

<sup>17</sup>DON TAPSCOTT AND ALEX TAPSCOTT, *BLOCKCHAIN REVOLUTION: HOW THE TECHNOLOGY BEHIND BITCOIN IS CHANGING MONEY, BUSINESS AND THE WORLD* (Penguin, UK, 2016).

<sup>18</sup>Michael Corsby et. al., *Blockchain Technology: Beyond Bitcoin*, 2 APPLIED INNOVATION REVIEW2 (2016) <http://scet.berkeley.edu/wp-content/uploads/BlockchainPaper.pdf>.

<sup>19</sup>*Global Agenda Council on the Future of Software & Society, Deep Shift Technology Tipping Points and Societal Impact Survey Report*, [http://www3.weforum.org/docs/WEF\\_GAC15\\_Technological\\_Tipping\\_Points\\_report\\_2015.pdf#page=24](http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf#page=24).

<sup>20</sup>*Supra* note 15.

fundamentally disseminated system, Blockchain ensures high availability and integrity of the transaction data. This essentially means that the data can be suitably shared between the parties of interest. Further, by the appropriate use of cryptographic keys, confidentiality of transactions can also be addressed. This, on one hand, ensures high security of the transactions and on the other hand, secures vigilance of the parties to any underlying transactions faded into the ledger. The ledgers are distributed across a network of computers that store data and execute computations. Each of the computers represents a “node” of the network. The transaction ensures full integrity of the data present in the system as all nodes, in essence, agrees to the state of records, viz. the ledger, based on a historical chain of transactions. This makes Blockchain systems robust from an information security perspective.

The applicability of the Blockchain in the financial sector has been widely explored and speculated by various banks and agencies. The RBI has been closely monitoring developments related to Blockchain technology and is keen on adopting them in banking space. In July 2016, the Institute for Development and Research in Banking Technology (IDRBT), the technology research arm of RBI formally took the initiative of exploring the applicability of Blockchain to the Indian Banking and Financial Industry by conducting a workshop involving all the stakeholders such as the academicians, bankers, regulators and technology partners.<sup>21</sup> In the White Paper, the IDRBT has attempted to explore the possibility of Blockchain usage in the Banking sector. The Report analyses the use of Blockchain in the financial and industrial sphere and the advantages that can be derived from its use.

As per a report prepared by Deloitte in April 2017, Blockchain potentially provides a solution for banks as it “*inherently helps eliminate intermediaries, maintain an immutable log of transactions and also facilitates real-time execution of transactions.*”<sup>22</sup> This is relevant as financial institutions across the globe spend anywhere from \$60 million up to \$500 million per year to keep up with Know your Customer (KYC) and customer due diligence regulations.<sup>23</sup> Switching to Blockchain technology will ensure that the independent verification of one client by one organization can be accessed by

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<sup>21</sup>*Id.*

<sup>22</sup>Anon, *Blockchain Technology in India: Opportunities and Challenges*, (February 16<sup>th</sup>, 2018), <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/strategy/in-strategy-innovation-blockchain-technology-india-opportunities-challenges-noexp.pdf>.

<sup>23</sup>Anon, *Thomson Reuters 2016 Know Your Customer Surveys Reveal Escalating Costs and Complexity*, <https://www.thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html>.

other organizations as well avoid duplication of the KYC process.<sup>24</sup> This will also, and most importantly, ensure transparency and therefore fewer instances of frauds.

The primary and utmost benefit of adopting Blockchain in banking industry lies in the fact that a Blockchain is a shared public ledger. Every single confirmed transaction anywhere in the world is recorded in the ledger. Information held on the Blockchain exists as a shared and continually reconciled database. This Blockchain database is not stored at a single location. The records in the Blockchain database are public and verifiable. There is no centralized database for a hacker to attack. This, in turn, ensures minimization of the threat of fraud.

Now, let's examine how could the PNB scam have been prevented by use of Blockchain technology? The financial transactions in the banking industry are marked by some basic characteristics like securing loans with collaterals, issuing of LOU's etc. Often the said transactions require an increased amount of human interaction and therefore are at the receiving end of frauds. In the PNB scam, the employees in a malafide manner misused the LOU register, exploiting the loopholes of the SWIFT. The bank employees used SWIFT to send LOU's to foreign branches of Indian banks, for disbursing loans to overseas diamond suppliers of Nirav Modi firms. If the transactions were recorded in a Blockchain (ledger) any unauthorized LOU entered into the system could have been detected by higher-ups. In the Blockchain technology, it could have been prevented as no single person could manually complete the transaction without due verification. Therefore, it ensures that all the participants including the management were kept in the loop. Any discrepancy could have been detected immediately and other banks could have been warned. Therefore, one can safely argue that employing Blockchain in the banking transactions would minimize the risk of fraud and other threats which plague the banking industry.

## Conclusion

In the wake of the mounting incidents of financial forgery and bank scams, there has been a lot of debate about whether technology can help in busting

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<sup>24</sup>Bernard Marr, *Practical Examples Of How Blockchains Are Used In Banking And The Financial Services Sector*, (August 10<sup>th</sup>, 2017), <https://www.forbes.com/sites/bernardmarr/2017/08/10/practical-examples-of-how-blockchains-are-used-in-banking-and-the-financial-services-sector/#258bc8c61a11>.



and detecting scams.<sup>25</sup> As for the PNB scam, the question that remains is whether reconciliation between SWIFT and CBS could have saved the terror? While there are no definite answers to that, it can be said that linking SWIFT with the CBS could help the parties detect a scam at an earlier stage. Recently, RBI has directed all banks to link SWIFT with their CBS by April 30, 2018.<sup>26</sup>

This is where the numerous benefits that Blockchain can provide potentially in banking sector come in picture. Firstly, Minimum human involvement shall ensure reduction of time, costs and opportunities to commit fraud. Secondly, with blockchain, information can be shared in real time, and the ledger can only be updated when all parties agree. This will ensure that all the decision-making shall be at the behest of the parties, including management of the banks.

That said, before the implementation of Blockchain in the banking sector, it is necessary that one takes a look beyond traditional endpoint protection and adopt an all-inclusive approach which would not only include authentication and authorization of all the entities accessing the Blockchain but also other factors such as transaction and communication infrastructure security, business security through transparency and audit, and security from malicious insiders, compromised nodes or server failure. Further, employing Blockchain will require ensuring the security of the following perspectives-Ledger level security, Network Level Security, Transaction Level Security, Associated Surround System Security, Smart Contract Security.<sup>27</sup> The implementations of Blockchain would depend highly on its specific architecture and application. Any Blockchain implementation would require a combination of factors in order to fully address the lacuna in the current banking system. In order to design the appropriate architecture of Blockchain platform, it is necessary that there exists a right balance between security, privacy, functionality, risk, and scalability. The RBI, having recognized the issues of security breaches in the banking sector in India for a while now, has been exploring options to overcome the said lacuna. However, despite the same, it has not yet taken concrete steps to address it. It is high time that the RBI goes a step ahead

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<sup>25</sup>Maria Konnikova, *The Future of Fraud-Busting: New Technology that Could Stop Scams Before They Happen*, (March 1<sup>st</sup>, 2016)<https://www.theatlantic.com/magazine/archive/2016/03/the-future-of-fraud-busting/426867/>.

<sup>26</sup>PTI, *RBI Instructs Banks to Link Their Core Systems with SWIFT after PNB Fraud*, (February 21<sup>st</sup>, 2018) <https://economictimes.indiatimes.com/industry/banking/finance/banking/rbi-instructs-banks-to-link-their-core-systems-with-swift-after-pnb-fraud/articleshow/63047828.cms>.

<sup>27</sup>*Supra* note 15.

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and comes out with appropriate guidelines/ policies for the implementation of the use of Blockchain or other secure technologies to curb the hydra-headed menace of banking scams in the country.

However, one must bear the fact that, it is too early to fully speculate the implications of adoption of Blockchain into the banking sector as Blockchain is still in early stage of development. The full extent of the applications and implications of Blockchain would emerge only as the technology becomes more embedded and efficient. As additional uses for the technology emerge over time, the full potential of Blockchain and the prospective opportunities it may offer to businesses and individuals will be revealed.<sup>28</sup> Therefore in the interest of the economy, the RBI should set in place an appropriate mechanism for securing the banking infrastructure at the earliest at the same time balancing it with a wait and watch policy, so as to ensure that the country does not become a victim of another PNB scam.

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<sup>28</sup>*The Future of Blockchain: Applications and Implications of Distributed Ledger Technology*, (on file with authors).