

# Revolutionize The Invoice Based Loan Management With SmartVIM

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## SUMMARY

The SmartVIM (Smart Vendor Invoice Management) platform represents a groundbreaking solution to tackle the pervasive issue of bad debts within the Micro, Small, and Medium Enterprises (MSME) sector. As India's economy is poised to grow to a \$5 trillion economy by 2025, the contribution of the MSME sector is expected to increase significantly. However, this growth is accompanied by the challenge of bad debts. India currently faces a record \$146 billion in bad loans, a portion of which is attributed to the MSME sector.

SmartVIM leverages the power of blockchain technology and smart contracts to simplify and secure the loan disbursement process. By providing a decentralized ledger management solution, SmartVIM aims to enhance the credibility of MSMEs, support economic growth, and reduce the complexity and time involved in loan disbursements. This document outlines the vision, expectations, and technological features of the SmartVIM platform, as well as the onboarding process for banks and business partners. It also details the order management and loan disbursement processes, highlighting how SmartVIM facilitates quicker and more secure transactions.

We hope this document provides valuable insights into the SmartVIM platform and its potential to transform the MSME sector by addressing the critical issue of bad debts.

## INTRODUCTION

India is positioned to grow to a \$5 trillion economy by 2025, with the MSME sector's contribution expected to increase from 8% to 15%. With all initiatives and market forces amplifying the growth around this sector, we foresee the issue of bad debt further amplifying. While working capital is the oxygen to sustain the MSME business, India currently stands at a record \$146 billion in bad loans, a portion of which is attributed to the MSME sector.

#ASIA OCTOBER 11, 2017 / 11:19 AM / 22 DAYS AGO

Source: Reuters India

## Exclusive - No respite for Indian banks as bad loans hit record \$146 billion

Devidutta Tripathy, Suvashree Choudhury

5 MIN READ

MUMBAI (Reuters) - Indian banks' sour loans hit a record 9.5 trillion rupees (\$145.56 billion) at the end of June, unpublished data shows, suggesting Asia's third-largest economy is no nearer to bringing its bad debt problems under control.

### Potential Impacts of Bad Debts on the Economy

Alarming figures lead to a lack of trust and relationship with financial entities such as banks and NBFCs. Apart from this, the following are various other key reasons:






- Multi-financing of the same order documents (PO/Invoices/Delivery Documents/LoCs)—Packing Credit
- Loan approvals based on forged documents
- The traditional paper-based loan disbursement process
- Identity theft
- Single source, inter-institutional auditing & reporting
- NBFC Consortium

With so many businesses potentially deprived of the support they need to grow; action is necessary to address these trade financing gaps.



## Siemens probe brings to fore purchase order fraud

Source: Economic Times

PTI | Updated: May 11, 2017, 05:58 PM IST

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Comments

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NEW DELHI: Engineering and technology firm Siemens today disclosed that an internal probe has unearthed a fraud that was perpetrated on the company over several years through fake purchase orders by certain employees.

However, the company sees no bearing of this on its bottom line for the quarter and six months ended March 2017 or the year to September 2016.

### Global Perspective

Micro, Small, and Medium Enterprises (MSMEs) in developing countries face challenges in accessing trade finance. The estimated value of unmet demand for trade finance in Africa is US\$120 billion (one-third of the continent's trade finance market), and US\$700 billion in developing Asia. Globally, over half of trade finance requests by MSMEs are rejected, compared to just 7 percent for multinational companies.

### The Vision

The vision of SmartVIM is to reduce the complexity of loan processes by leveraging the trust instilled by blockchain and smart contracts. This platform aims to help banks, and the banking ecosystem support new-age entrepreneurship without incurring significant losses. By establishing SmartVIM as a trusted network, banks can take the lead in fostering economic growth.

Additionally, SmartVIM seeks to contribute to economic prosperity by offering a consumable-as-a-service ecosystem that benefits businesses of all sizes. The platform's machine learning-based engine will enhance the credibility of MSMEs, helping them develop their brand instead of merely providing a rating.

### Setting Up the Expectations

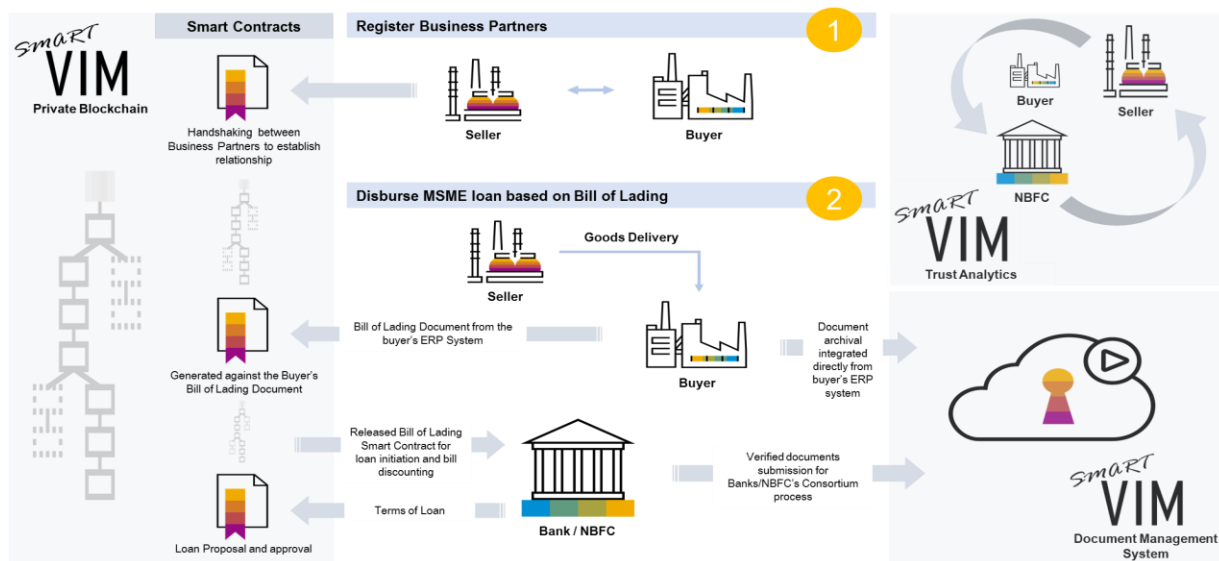
Banks and Non-Banking Financial Companies (NBFCs) expect an ecosystem where they can access genuine, unaltered transactional information and provide a platform for quick and easy loan approvals. Reducing the knowledge gap in local banking sectors for handling trade finance instruments is crucial.

Creating an ecosystem for open dialogue with trade finance regulators ensures that trade and development considerations are fully reflected in implementing regulations. Intense inter-institutional dialogue and coordination will be required to take this work forward, building on a track record of successful cooperation between MSMEs and their partners.

Improving the monitoring of trade finance provision is essential to identify and respond to gaps, particularly during future crises. Processing loan applications outside of such an ecosystem could lead to higher non-performing assets (NPA) and fraudulent activities.

### Concept in a Page

The SmartVIM platform is a decentralized ledger management solution designed to reduce the complexity and time involved in loan disbursement for various industrial sectors. It leverages the power and trust instilled by blockchain technology, coupled with machine learning-based analytics and recommendations. This platform provides stakeholders with a comprehensive, immutable ledger in the form of smart contracts.



### High-Level Flow Diagram

The high-level flow diagram illustrates the sample business flow for loan disbursement against delivery documents.

The process involves several key steps:

1. Order Placement: Business partners place orders in their ERP systems with predefined payment terms, lead time, and lot sizes.
2. Order Replication: If a business partner wants to replicate the purchase order into the blockchain network, they request PO replication via the web portal or mobile app.
3. Approval and Storage: The PO replication request is routed to the customer for approval. Once approved, the system copies the PO into cloud-based storage in multiple formats (e.g., XML, PDF).
4. Smart Contract Generation: The system automatically generates a smart contract for the PO, containing details such as the PO number, hash code of the PDF document, vendor and customer details, order details, total value, and terms and conditions.

## SCOPE

The SmartVIM platform aims to provide a decentralized ledger management solution to reduce the complexity and time involved in loan disbursement for various industrial sectors. It leverages the power and trust instilled by blockchain technology, coupled with machine learning-based analytics and recommendations. This platform offers stakeholders a comprehensive, immutable ledger in the form of smart contracts.

## INTRODUCING THE SMARTVIM ECOSYSTEM

The SmartVIM (Smart Vendor Invoice Management) ecosystem is a decentralized ledger management solution designed to reduce the complexity and time involved in loan disbursement across various industrial sectors. By leveraging the power and trust instilled by blockchain technology, coupled with machine learning-based analytics and recommendations, SmartVIM provides stakeholders with a comprehensive, immutable ledger in the form of smart contracts.

SmartVIM ensures that each invoice distributed across the network is verified, hashed, timestamped, and uniquely identified, preventing issues such as multiple financing on the same invoice or releasing loans based on tampered documents.

### Key Technology Functions and Features

1. Private Blockchain Ecosystem: Utilizes smart contracts to track transactions, ensuring transparency and security.
2. Machine Learning-Based Analytics: Provides recommendations and insights to facilitate future decision-making.
3. Document Management Repository: Complies with legal requirements and integrates secure document management.
4. Distributed Ledger: Guarantees a trusted ecosystem between business partners, eliminating the possibility of forged documents and identity theft.
5. Risk Mitigation: Reduces the risk of multi-financing by financial institutions.
6. Improved Loan Approval Process: Reduces response time for loan approvals, potentially leading to increased market share.
7. Cloud-Based Solution: Reduces operational costs through cloud-based infrastructure.

Let's deep dive into the different stages of SmartVIM Solution.

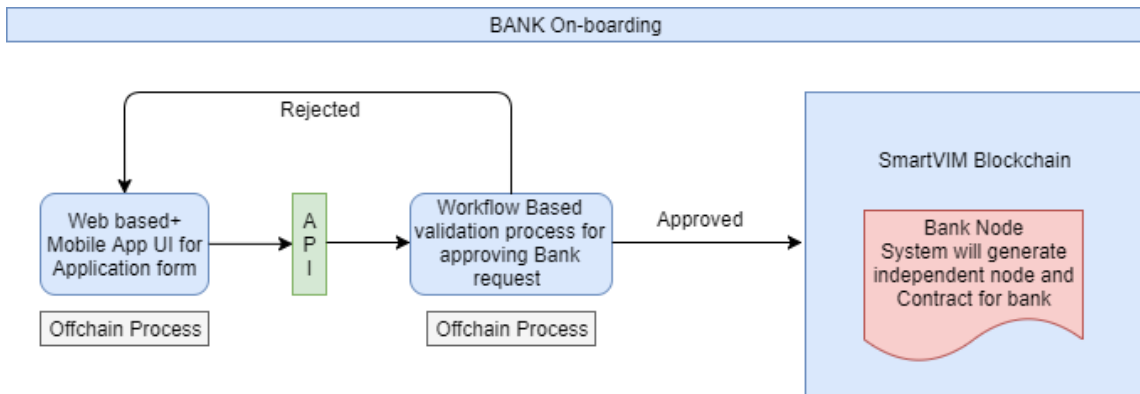
1. Setting up Minimal Onboarding Terms and conditions for Banks and Business Partners (Entities):

SmartVIM will be a Private/Permissioned Blockchain based on the official Go Implementation of Ethereum Protocol.

The very first smart contract of the Blockchain (the 'Genesis Block') will contain minimal onboarding terms and conditions. These terms and conditions will define the criteria that Business Partners / Banks need to fulfill to join this Blockchain.

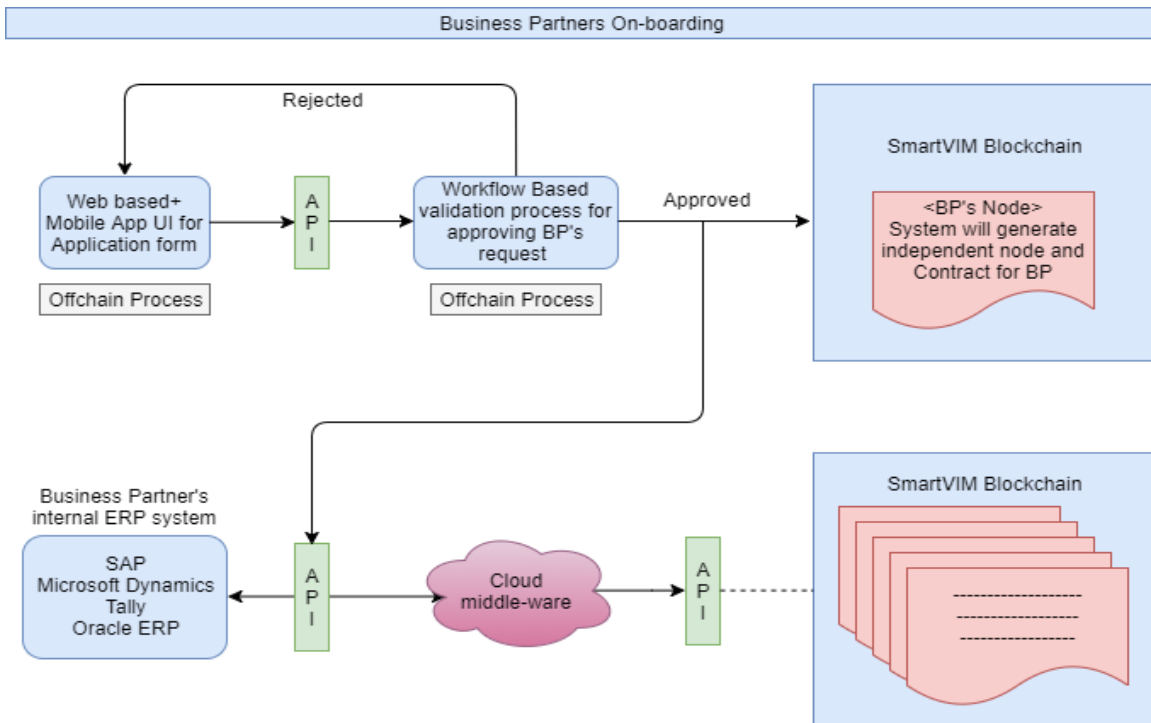
For simplicity, we will call this Smart contract a 'Foundation Contract.'

2. Bank Onboarding:

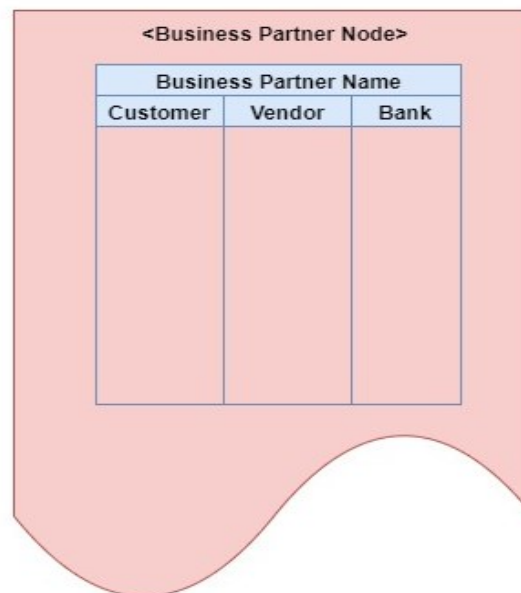


- 2.1 The bank will fill out the Registration form via Web-based / Mobile App-based UI frontend.
- 2.2 The registered form will then go to SmartVIM’s workflow-based approval process, where the authenticity and genuineness of the bank will be verified by cross-validating the legal documents. This will be an off-chain process.
- 2.3 Once the onboarding request by the bank gets approved, the System will automatically generate an Account for the Bank entity. In SmartVIM Blockchain.  
This account will be identified uniquely by its 256-bit Public key.  
The system will also generate a new smart contract for the Bank node in the Blockchain,  
This smart contract will define the authorities/Permissions this bank has, / Terms and conditions that the bank must fulfill and the validity period for which this bank is available on this blockchain.  
Technically, this Smart contract will be created as a contract of the ‘Foundation Contract.’

3. Business Partner Onboarding

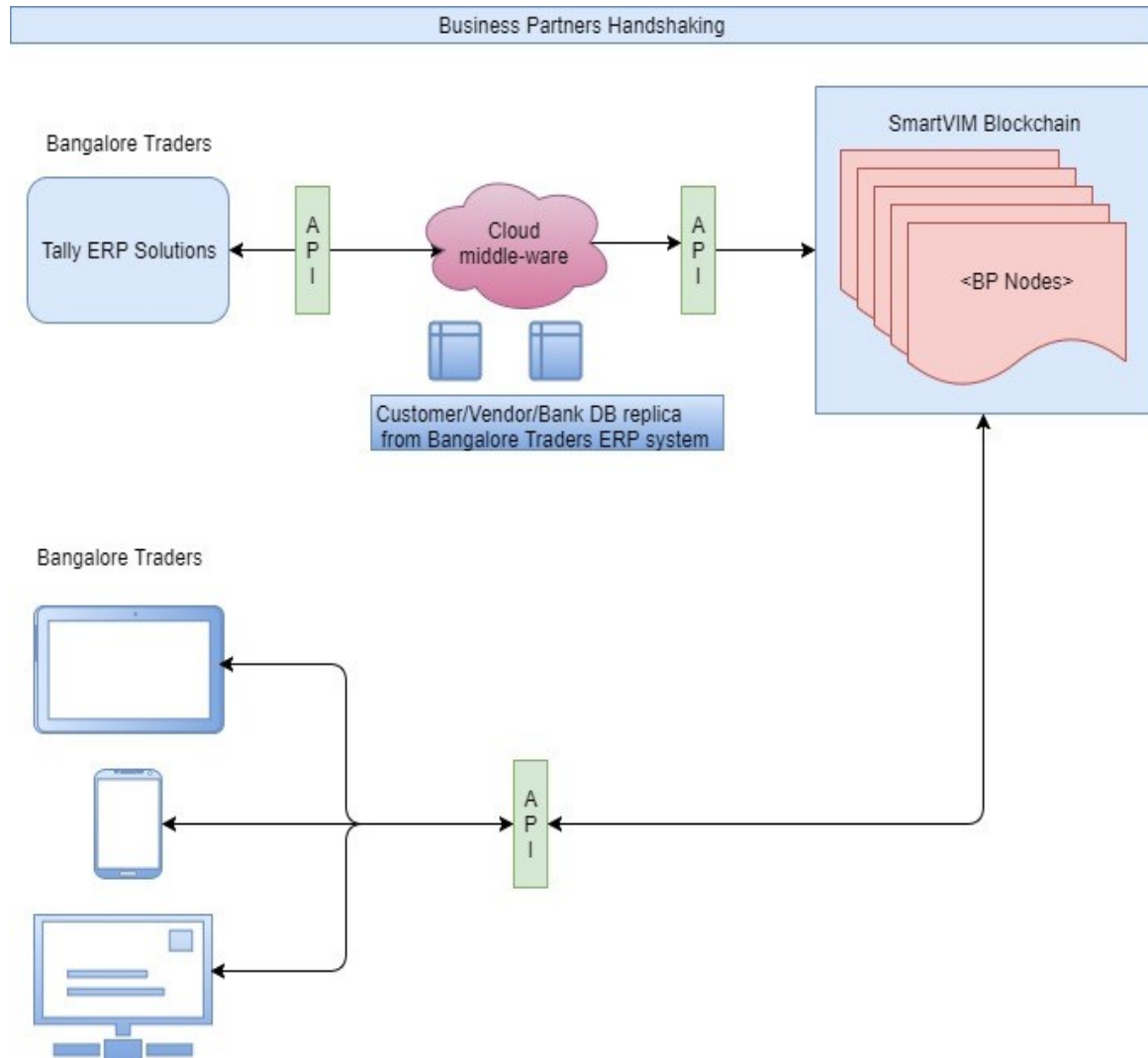


- 3.1 The business partner will complete the registration form via the web-based / mobile app-based UI frontend.
  - 3.2 The registered form will then go to SmartVIM's workflow-based approval process, where the authenticity and genuineness of the bank will be verified by cross-validating the legal documents. If the Business partner runs an ERP system, such as SAP / MS Dynamics / Tally / Oracle ERP, etc., the Business partner will also provide details such as an External Port number / Authorizations, etc., to connect with their ERP system.
  - 3.3 Once the onboarding request by the bank gets approved, the System will automatically generate an Account for the Bank entity. In SmartVIM Blockchain. This account will be identified uniquely by its 256-bit Public key. The system will also generate a new smart contract for the Bank node in the Blockchain, This smart contract will define the authorities/Permissions this bank has, / Terms and conditions that the bank must fulfill and the validity period for which this bank is available on this blockchain. Technically, this Smart contract will be created as a sub-contract of the 'Foundation Contract.'
  - 3.4 If the Business Partner runs an ERP system, then upon approving BP's onboarding request, the system will also trigger an API that will connect the SmartVIM system to BP's ERP system.
  - 3.5 SmartVIM will allocate some memory space to BP in the cloud upon successful connections. This cloud space will be used to store ERP documents in staging tables / Store BP's Customer and Vendor databases and any other essential data that needs to be fetched from the database.
  - 3.6 The SmartVIM Blockchain system will communicate with cloud storage with the help of APIs.
  - 3.7 Each Business partner will also have the option to invite the customer and vendors associated with that BP to join the SmartVIM network.
4. Business Partner Handshaking.  
Each Business Partner Node will have an internal table to store the Node IDs of other entities, such as Banks and other Business Partners, in the network. Once the Business Partner joins the Blockchain network, there is a chance that the Customer AND/OR Vendor AND/OR Bank associated with that Business partner is already onboarded to the SmartVIM blockchain network.



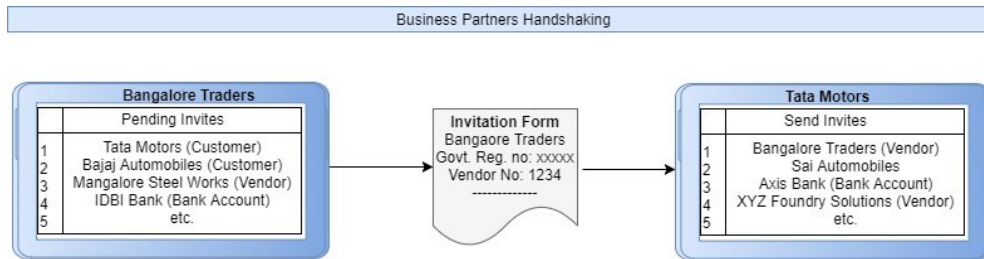
In this case, the respective business partner node will be updated with their associated bank and/or business partner nodes via the Hand-Shaking method.

Consider an example where an MSME, 'Bangalore Traders,' which manufactures and supplies automobile spare parts, recently joined the SmartVIM Blockchain Network and would like to perform handshaking with its associated nodes.



- 4.1 When Bangalore Traders was onboarded, the SmartVIM system automatically copied the Customer / Vendor / Bank Master database of Bangalore Traders ERP system into cloud-based Storage.
- 4.2 These database entries will then be verified to ensure that they match records with existing Business Partner / Bank Nodes from the SmartVIM blockchain network.
- 4.3 If suitable matches are found, the System will automatically send the list of already onboarded Customers / Vendors/Banks associated with Bangalore Traders.
- 4.4 Let's assume that a couple of Bangalore Traders, Customers / Vendors, and Banks have already been onboarded to the SmartVIM blockchain network.
  - 4.4.1 A list of these associated entities will then be visible to Bangalore Traders.

4.4.2 Assume that Bangalore Trader Supplies Bearings and Break Drums to Tata Motors, An Automobile giant already present on the SmartVIM network.

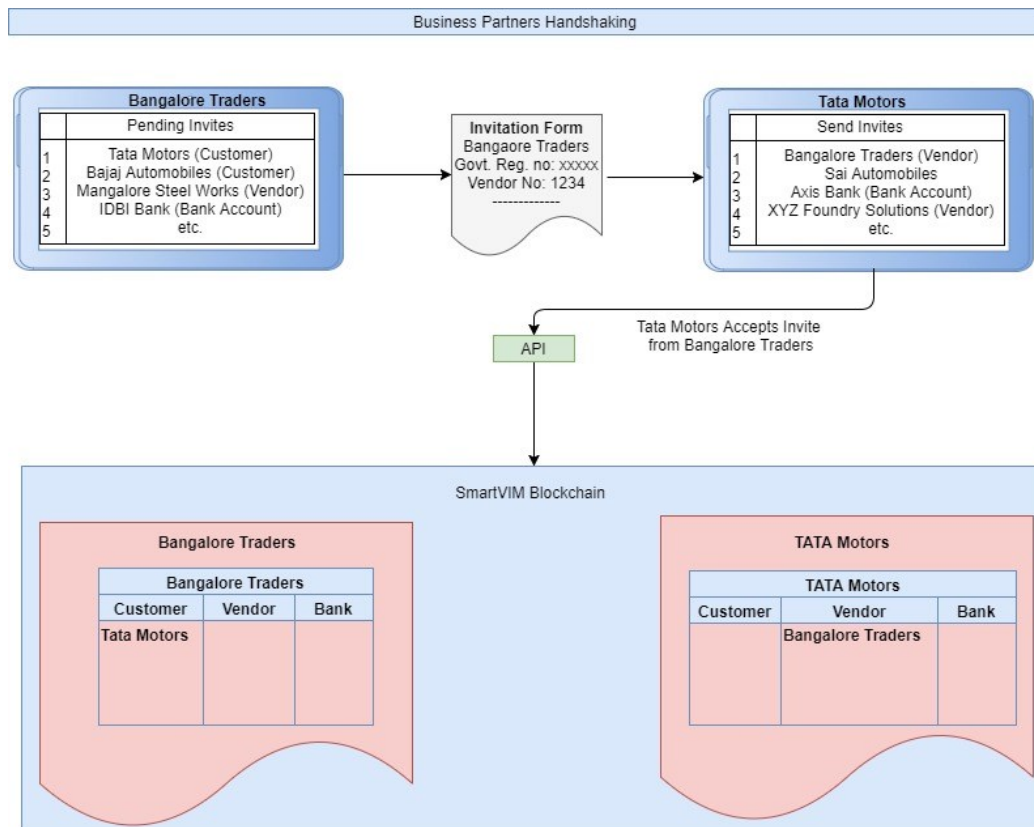


4.4.3 Bangalore Traders will then send an invite form to connect with Tata Motors. This invite form will contain some essential information to validate the identity of 'Bangalore Traders' such as

1. Legal Details of Bangalore Traders
2. Vendor Number of Bangalore Traders associated with Tata Motors
3. The public key of the wallet was created in the SmartVIM system for 'Bangalore Traders'. Any other required information to validate the identity

4.4.4 Tata Motors will then validate the information Bangalore Traders provided and either Accept or Reject the request.

4.4.5 Upon accepting Tata Motors' request, these details will be recorded in the Smart Contracts of both Tata Motors and Bangalore Traders, as below.





## 5. Order Management

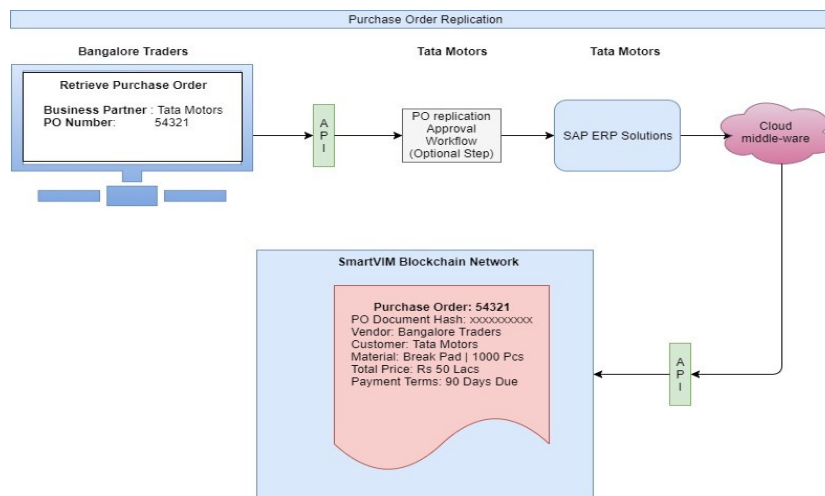
Upon completing the Hand-Shaking activity, SmartVIM Blockchain is ready to accept Purchase Orders or service Orders from the listed Business Partners.

### 5.1 Selection of Orders for replication.

Let's return to our old example, where Bangalore Traders and Tata Motors are now trusted business partners and ready to start with transactions.

Consider a scenario in which Tata Motors would like to procure Break pads worth Rs—50 Lacs from Bangalore Traders.

1. Tata Motors will then place standard Purchase Orders in their ERP system with predefined terms such as Payment Terms, lead time, lot sizes, etc.
2. Bangalore Traders will then receive the order in a predefined form of communication (this can be anything such as PDF / E-mail / XML file / Idoc / JSON Object, etc.).
3. If Bangalore traders would like to replicate the PO into the Blockchain network, they will request that the PO replication be retrieved online via a Web Portal or Mobile App.
4. This PO retrieval request will then be routed to Tata Motors for approval.
5. Upon approving the request, the system will copy the PO to cloud-based storage in multiple formats, such as XML / PDF, etc.
6. The system will automatically generate the Smart Contract for PO, which we just retrieved, This Smart Contract will contain the following details
  - a. PO Number
  - b. SHA 256 / ETHASH Hash Code of the PDF document of PO.
  - c. Vendor and Customer details of the PO
  - d. Order details such as Material / Qty, etc.
  - e. The total value of the PO
  - f. Details on terms and conditions such as payment terms/delivery terms, etc.



### 5.2 Quicker Loan Disbursement

Once the PO is replicated into the SmartVIM system as a Smart Contract, Business Partners such as Bangalore Traders can use this Smart Contract as a Proposal for a loan application.

Technically, each Smart Contract is a Turing Complete Machine, and all the properties of a Turing Machine apply to Smart Contracts as well.

Like the Turing Machine, a Smart Contract changes its State based on Input received from outside.

1. Once the Smart Contract is generated, it will be in State 1.



2. Bangalore Traders will then update this Smart Contract with details such as
- Loan amount for which Bangalore Traders is looking for
  - Loan Period

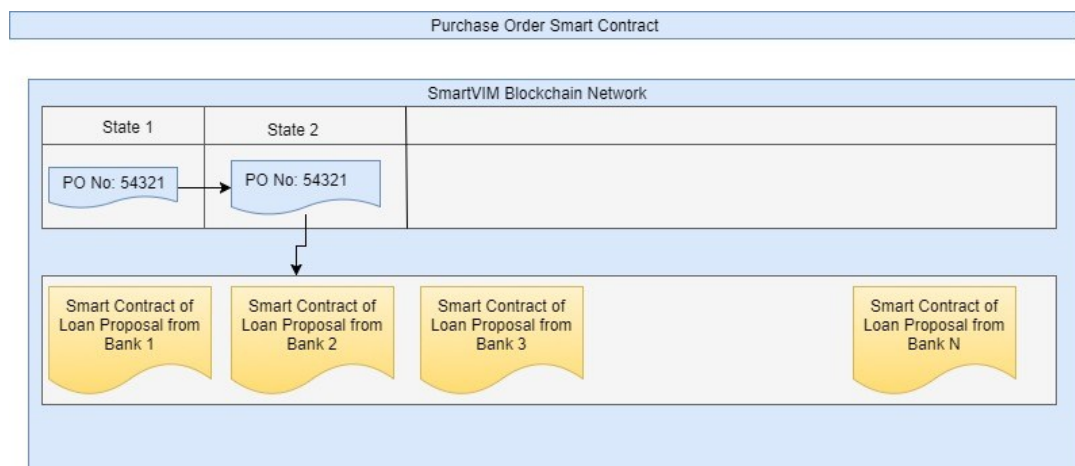
Upon updating these details, Smart Contract changes its State from State 1 to State 2



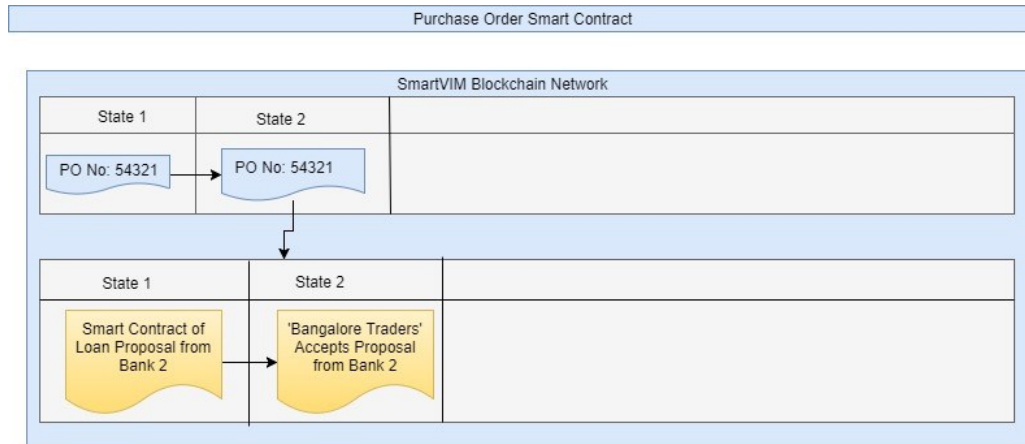
3. The Smart Contracts in State 2 will be visible to the banks in which Bangalore Traders holds an account.

4. Banks will then send their Proposals as Smart Contracts to Bangalore Traders.

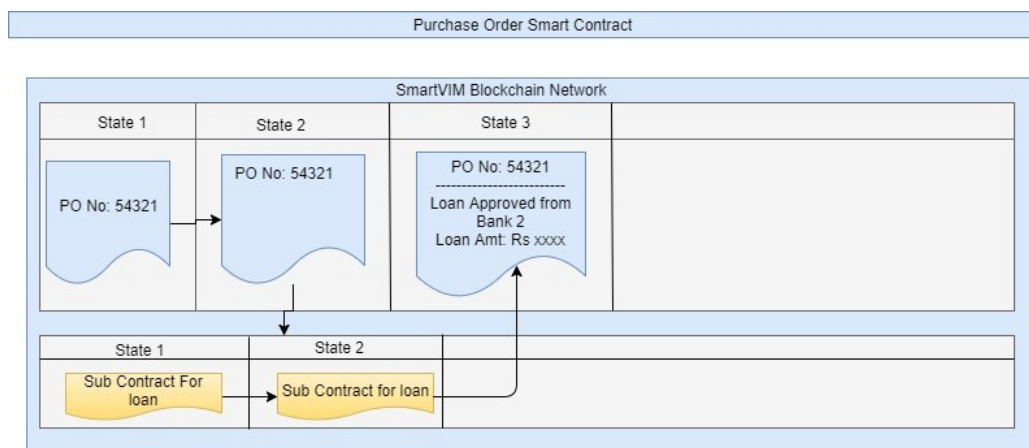
This Smart Contract will be created as a subcontract of the original contract against the PO.



5. 'Bangalore Traders' will lock down one of the most feasible options and respond to the bank by updating the Smart Contract with needed information.



6. Once the Sub Contract created for PO reaches State 2, the System will automatically update the same in the Original Smart contract created PO and change its state from State 2 to State 3



7. State 3 Smart Contract means that Bank 2 approved the loan for 'Bangalore Traders'.

Also, once the Smart Contract is in State 3, it is not possible to use the same smart contract again for a Loan Proposal.

## CONCLUSION

The SmartVIM platform is a transformative solution for addressing the critical issue of bad debts within the MSME sector. By leveraging the power of blockchain technology and smart contracts, SmartVIM simplifies and secures the loan disbursement process, enhancing the credibility of MSMEs and supporting economic growth. The platform's decentralized ledger management solution reduces the complexity and time involved in loan disbursements and provides a comprehensive, immutable ledger for stakeholders.

Throughout this document, we have outlined the vision, expectations, and technological features of the SmartVIM platform and the onboarding process for banks and business partners. We have also detailed the order management and loan disbursement processes, highlighting how SmartVIM facilitates quicker and more secure transactions.

As India's economy continues to grow, the contribution of the MSME sector is expected to increase significantly. However, this growth must be accompanied by solutions that address the challenges of bad debts. SmartVIM offers a promising approach to mitigating these challenges, fostering trust and collaboration among financial entities, and ultimately contributing to the economic prosperity of the MSME sector.

We hope this document has provided valuable insights into the SmartVIM platform and its potential to transform the MSME sector. By embracing innovative technologies and fostering a collaborative ecosystem, we can pave the way for a more secure and prosperous future for MSMEs.