Chapter **12**

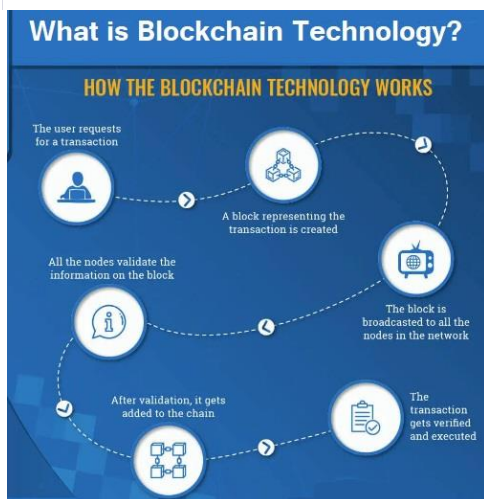## Cultivating Trust in Your Gram Panchayat

"Honesty is the first chapter in the book of wisdom." –

Thomas Jefferson,

Former President of the United States of America

Emerging from his two-bedroom home that he shares with his parents, Tanveer is neatly dressed in blue jeans and a crisp white cotton shirt, pressed to perfection daily. Tanveer grew up in this village where he completed middle school. His parents, firm believers in the transformative power of a good education, sent him to the city to complete his high school education, followed by a degree in computer science. After a successful 12-year career in an IT company in the city, Tanveer chose to return to his village. He was driven by a conviction: if he could apply the knowledge and skills, he acquired in the city to improve his village, it too could prosper like the city. Affectionately known as Technology Tanveer, he became the go-to person in the village for complicated tech matters, as he was the only one with such expertise.

Recently, Technology Tanveer won an election as a Gram Panchayat member and was subsequently elected as the Gram Panchayat Upadhyaksha. Today, he left his house, heading to the Gram

Panchayat office. As he neared the office, he saw an elderly man seated outside. From his posture and demeanour, Tanveer could tell that the old man was in profound distress. His face was a map of wrinkles, his eyes brimming with unshed tears.

The elderly man lived in the village with his ailing wife and regularly visited the Gram Panchayat office to claim his government old age pension. However, Tanveer was puzzled as to why the man was so distressed today. It was highly unusual; most seniors who visited the Gram Panchayat usually left in high spirits after collecting their pensions. Without a moment's hesitation, Tanveer approached the old man.

"What's wrong, daada? Is there a problem with your pension?" Technology Tanveer attempted to probe into why the elderly man was so visibly upset.

"Sir, I came to the office today to renew my property papers, recorded about 25 years ago. I need to sell the property to afford my wife's treatment. But they're insisting that the land doesn't belong to me," the old man quivered as he relayed the predicament to Tanveer.

"They are demanding proof of ownership, but I don't remember where I kept the document. The current register indicates that the land belongs to the state."

"Please, could you check the registers? I noticed white ink over some entries in the register. Perhaps my record has been altered or transferred to someone else," the old man implored.

Technology Tanveer was taken aback by the old man's pleas and decided to investigate the matter in the register.

"Allow me to examine the register. If what you're saying is accurate, I'll escalate the matter to the Adhyaksha," Tanveer reassured the old man, who continued to weep outside the office.

This story sets the stage for our meeting discussion regarding how many transactions can often get lost or manipulated when managed manually.

"In our gram panchayats, these situations might arise due to data manipulation or destruction over time. When data is recorded in registers as we do today, it becomes susceptible to such manipulations," I explained.

"We do record all transactions in a register. I have some records that are more than 30 years old and barely legible. But, Shankranna, are you suggesting we should use technology for this too? Like a computer?" Nanjamma questioned from her usual corner of the room.

"That is an excellent question, Nanjamma. Even when data is stored in a computer database, it remains vulnerable to manipulation, or even hacking. Are any of you familiar with the term 'hacking'?" I posed this question to the elected representatives in the room.

"Yes, sir. I have worked in the IT field for over ten years. But many here may not be familiar with this term. Could you please explain it to them in simpler terms?" requested Technology Tanveer, who was sitting in the back. He was eager to participate in the conversation, given his prior knowledge in the field.

"Hacking refers to when your data is manipulated or destroyed due to external interference. Somebody might want to erase or manipulate data on your computer. This often happens when there is valuable information stored on your system," I elaborated.

"How can we safeguard our data in such cases?" Nanjamma immediately inquired after I explained the problem. As I delved deeper into the issue, I noticed the elected representatives nodding, indicating their comprehension.

"Today, I want to introduce a new concept called blockchain technology. Currently, it's the most effective technology to ensure the safety of your information," I proposed.

"Each of your gram panchayats also gathers and stores information. Such data is an asset that must be protected from corruption and unauthorized access. Only then will your citizens feel confident that their information is secure from all forms of misuse. However, as I've mentioned earlier, in the current dealings between citizens and the Gram Panchayat, there's a potential risk of third-party intervention."

"During the times when documents were only kept on paper, the physical document had to be securely preserved to serve as proof. As experienced by the old man in the Gram Panchayat office, if there's no transaction proof, future complications may arise. Is that right?"

"Yes, Shankranna. That is true," Nanjamma affirmed.

12.1. Blockchain for Recording Transactions

"What's the solution, Shankranna? I want to know right away." Simple Sudarshan, who was attending the meeting, eagerly asked.

"There is a solution for this kind of problem, known as blockchain technology," I replied to Sudarshan's inquiry.

Simple Sudarshan asked, "What is blockchain, Shankranna? How is it relevant?"

"I'll explain this technology in detail, so please listen carefully. By the end of our discussion, you'll see how you too can implement blockchain technology in your panchayats," I assured them of the technology's applicability.

"In simple terms, blockchain technology is akin to a ledger or a distributed record available to everyone involved. Technically, it's referred to as data. This doesn't imply that it's freely accessible to all. It's open only to members who are part of the Blockchain System. As the name suggests, a blockchain is a chain of 'blocks'. Those participating in this system work as part of it. Every block of this informational chain records data in real time. Its unique feature is that it's entirely transparent. Unlike our current digital payment or other tech-based systems, which are not decentralized, blockchain technology advocates for decentralization."

"When I mention 'blockchain' technology, I refer to a system that records information in the form of 'blocks' or 'sections', right? A block or segment contains transaction information and is structured in a way that it can't be overridden, hacked, or altered later on," I started explaining the concept of blockchain technology using a presentation.

"Once a block or partition is created, this block or partition is distributed across the blockchain network in the form of distributed ledgers. Let me further elaborate on what a distributed ledger is and how it enhances security," I said.

"When you make a transaction, for example, registering newly purchased land at the Gram Panchayat office, you document it in the register, correct?"

"Yes, we enter it in the registration book and provide them with a receipt," Nanjamma instantly responded.

"But what if the receipts are lost? Or if the registration book is destroyed over time, what proof would your citizens or you have regarding the purchase transaction?" I questioned and continued: "These are very common issues and occur when transactions are not secure. A record book or receipt can be misplaced or destroyed. Hence, numerous problems can arise in these types of manual transactions."

"Yes, I agree, Shankranna. We have encountered several instances of lost land registration documents and receipts. So, how can blockchain assist us in this regard?" Simple Sudarshan's curiosity piqued even further.

"Blockchain is a technology that creates digital records of your transactions instead of documenting them on paper. As previously mentioned, blockchain technology operates by creating a block or segment for each new transaction. It then adds this new block or segment to the chain of already created blocks. Let me demonstrate this with a visual aid," I explained, showcasing a diagram through the projector.

Figure 12.1: Creation of Blocks as Digital Ledgers

"Each time a new transaction is recorded, a new block is created as evidence and added to a chain of existing blocks. Now, let me explain what the existing chain of blocks means and what a distributed ledger is," I clarified the first stage of how blockchain operates.

12.2. Distributed Ledger in Blockchain Technology

"A distributed ledger means that the record of transactions is disseminated among many parties, not just you and the gram panchayat. Do you understand why this is crucial?"

"I don't, Shankranna. Please explain further," replied Nanjamma.

"Currently, the only proof regarding any transaction is the document held by both you and the gram panchayat. This implies that there's a risk of these documents being lost or tampered with. So, how can citizens verify their transactions?"

"In a distributed ledger system, everyone on the blockchain network maintains a record of your transactions. Consequently, even if a record of the transaction is destroyed or tampered with at one location, the evidence of the transaction cannot be entirely erased or tampered with," I elucidated the concept of a distributed ledger to the elected representatives attending the meeting.

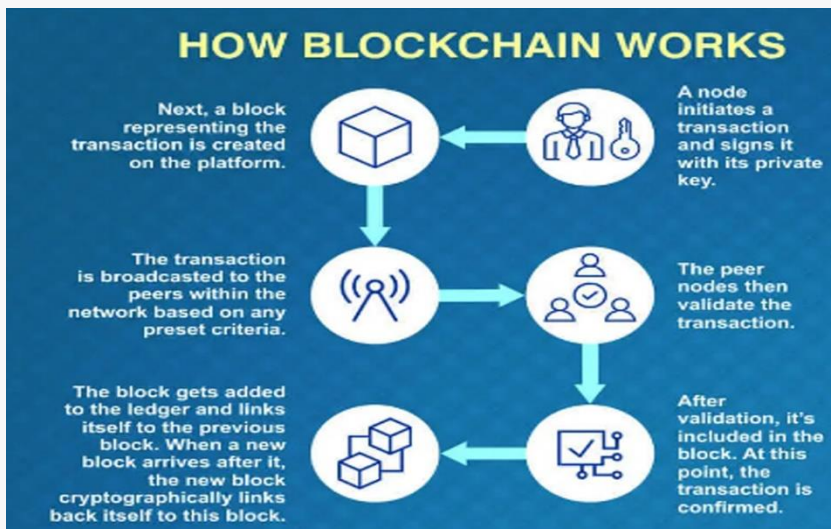"Allow me to show you another diagram for easier comprehension."

Figure 12.2: Blockchain Network

"In this image (Figure 12.2.), you can see how there are four participants in a blockchain network, also known as a public ledger. All of them have made one or more transactions in the village at some point, thereby becoming part of the blockchain network. Everyone on the network possesses an independent chain of blocks, with new blocks being added to each of their chains every time a transaction is conducted on the same network."

"How does this blockchain system work, Shankranna?" Simple Sudarshan queried.

"That's an excellent question, Sudarshan. This blockchain system comprises a network chain of blocks. As a new block is added, the preceding blocks are linked in the chain, and the chain continues. A transaction of an entity in this network starts with a transaction note. A network entity refers to a person who has joined/is joining this network. This person can make payments to another individual or organization, or they can sell their land to another person. A network transaction initiates like this. It must be conducted using their private key."

Hebbet Nanjamma asked, "What happens, Shankranna, when a person conducts their business in this manner?"

Me: "Thus, when a person initiates a transaction, a new block is created to represent or indicate this transaction. This transaction information is broadcasted to the network or other peer network units in the network, i.e., peer nodes. This means the blockchain in the image will be transmitted to these first three individuals in the network. All of them evaluate this transaction, meaning the person who proposed the transaction cannot later deny it, as four people are already aware of it."

Hebbet Nanjamma: Then what happens?

Me: After the peer nodes on the network validate it, this new block is added to the ledger. Transactions such as money transfers, sale of assets, etc., are integrated into the blockchain network, that is, the chain of blocks.

Sahukar Seenappa: Okay, Shankranna. Let's suppose I buy the land that was sold by that person. What happens next?

Me: "Seenappa, in simple terms, you will be added as a new block in the blockchain chain just like I previously explained. Then, whatever information is present in the block of the person who sold you the land, will be combined with your new block in the form of encryption. This means that all information regarding the land you acquired, including who was the previous owner and how you got it, will be included in your block via encryption. Moreover, the previous individuals in this chain will be informed that this land has been transferred to you through a new transaction."

Simple Sudarshan: What is the benefit of this, Shankranna?

Me: Firstly, this transaction is on a blockchain network, so no unauthorized person can access it. Secondly, you won't face any issue even if your transaction block is lost due to some reason, because this information is stored in previous blocks in the chain. Thirdly, you can access this transaction information instantly from any corner of the world.

Sudarshan: So, if I'm a non-resident Indian and I'm abroad, I can immediately know if any transaction related to my land occurs through this system. Also, if I conduct a transaction related to this land while I'm abroad, other people in the chain will also be aware of it. So, it means that the transaction process is transparent, right?

Me: "Yes, Sudarshan. As I mentioned earlier, even if the block containing the original transaction is destroyed or hacked but not overwritten and someone tampers with it – the worst-case scenario is that the record of the original transaction will remain with three other people on the network. If someone tampers with the information on one's computer, it won't affect the information on the others. So, it can be determined that someone has manually tried to steal or tamper with the information. This will confirm that someone attempted to interfere, and it will prove the displayed block is incorrect," I clarified Sudarshan's doubt.

"Oh, this is truly remarkable. We can certainly utilize this technology," Sudarshan exclaimed.

"Yes, Sudarshan. We aim for all our gram panchayats to implement such systems, which can significantly enhance civic services and all Gram Panchayat transactions." "Also, when an individual in the network conducts a new transaction, a block is distributed to all the other three participants. In this way, blockchain brings accountability and transparency into the system," I explained to them as everyone listened attentively.

12.3. Hash in Blockchain

"Blockchain is highly secure because of another function known as a cryptographic hash." I knew this was a complex term for them, but I was intrigued by their evident curiosity.

"What does that mean, Shankranna? The crypt...." Nanjamma asked me, her tone laced with confusion.

"It does sound like a daunting term, doesn't it? Allow me to explain how blockchain uses a hash to secure the chain of transactions as they occur." I began explaining to the people in the room. "When a new

transaction is made in the blockchain system, a block is created, right?"

"Yes, Shankranna. A new block is created with the details of the transaction." Nanjamma replied, evidently proud of her recollection.

"Correct. So, whenever a block is created, it receives a unique identification called a hash. A hash is denoted by a 32-bit, 64-bit, 128-bit, or 256-bit number. You don't need to worry about these numbers. All we need to know is that a unique code, which is impossible to hack, secures the block. This code is called a hash."

"Why is a hash important in blockchain?" Sudarshan asked.

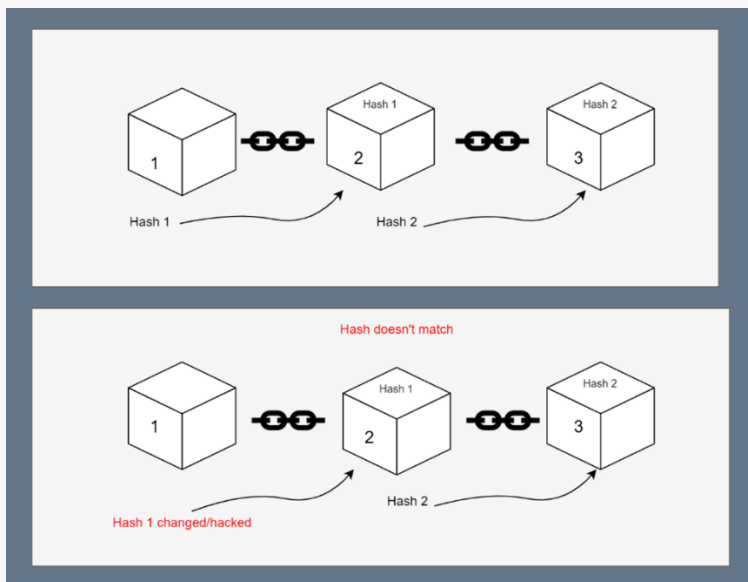"Let's take a look at this image (Figure 12.3)." I switched to the next slide on the projector.

Figure 12.3 Hash function in blockchain

"If ever a block is hacked or tampered with by a third party, it is easy to detect the changes. This is because when it's transferred to a new block, it will carry the hash information (hash of block 1) from the previous block (block 2). Thus, any alteration or mutation can be detected." "A hash makes each block unique and unhackable, as multiple combinations secure each block. That's why blockchain is considered the most secure technology today," I explained.

"We should certainly consider implementing Blockchain technology in our Gram Panchayats. How can we begin to use it?" Nanjamma inquired.

12.4. How Blockchain Technology can be applied in your Gram Panchayat

"In your Gram Panchayat office, numerous transactions take place every day. For example, funds for the development of your villages are credited to your Panchayat's account. Is that correct?" I asked them.

"Yes, Shankranna," replied Technology Tanveer.

"Currently, our citizens are unaware of the received amount or how it's spent. As there's no record of how the money is utilized within your Gram Panchayat, there's a lack of trust in the system. Transactions aren't just limited to monetary exchanges. Transactions also include all the activities carried out within the Panchayat such as received applications, issued certificates, addressed grievances, and collected taxes," I explained, providing examples of the transactions that occur in a Gram Panchayat office.

"You might be wondering why you would need Blockchain technology for a certificate issued in a Gram Panchayat." I observed the room as they nodded in agreement. "Your Gram Panchayat issues numerous documents every day that need to be authentic, and therefore, a record of all transactions is necessary. You need to ensure that the document issued by your Gram Panchayat office is verified. If any issue arises related to these documents in the future, this record created by Blockchain Technology acts as proof to confirm the authenticity of your transaction. In this way, your Gram

Panchayat can foster greater responsibility and accountability from all stakeholders."

"Suppose Kenchamma just moved back to the village from the city. She wants to live a peaceful and simple life in the village. Though she misses the city, she admires the development in the villages which makes everything accessible. Kenchamma must apply for a domicile certificate to prove that she is a permanent resident of the village. She is grateful that the Gram Panchayat has a portal where she can directly apply for a domicile certificate."

"Please explain in detail how we can use Blockchain for this process," Nanjamma requested for a thorough explanation.

"Absolutely, Nanjamma. Let's look at this Gram Panchayat to Citizen process to understand how Blockchain works. (Figure 12.4)" I displayed another image on the screen.

Application Process for Domicile Certificate:
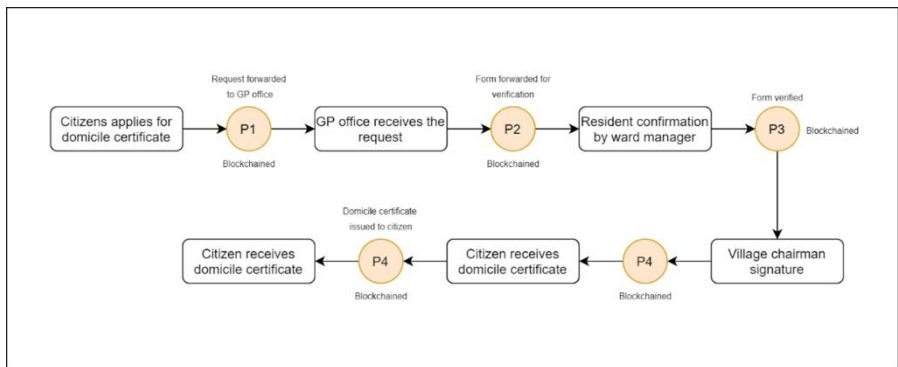

Figure 12.4 provides an example of how any process in a GP can be recorded using Blockchain Technology.

1. Kenchamma logs into the Gram Panchayat portal using her username and password. She then goes to "Services" under the menu and selects "Apply for Domicile Certificate".

2. After filling in the necessary details and uploading the required documents, her application is forwarded to the Gram Panchayat office. This step is then recorded on the blockchain, indicating that Kenchamma initiated a request for a domicile certificate.
3. The Gram Panchayat office receives notification of this application. Upon verifying the details, they forward it for address verification or proof from the resident's ward. This step is also recorded on the blockchain.
4. After confirming the address and other details, the application finally reaches the village's Adhyaksha, who signs the certificate. The signed document is sent back to the Gram Panchayat office and this step is recorded on the blockchain. Now we have proof that the Adhyaksha signed the document and sent it back.
5. Once the Gram Panchayat office receives the document, it is sent to Kenchamma's inbox where she can access her domicile certificate. This final step is also recorded on the blockchain.

"You might be wondering why we use blockchain for every step involved in this transaction. If any issue arises related to Kenchamma's certificate in the future, your Gram Panchayat will have a record of all transactions that occurred during the procurement of this certificate. Every individual involved in the process is held accountable and responsible for this document. No one can claim they didn't issue or verify the details because a blockchain record of each step is already created. This is how blockchain brings accountability to the system," I explained.

"Yes. In my previous company, we worked with blockchain technology and it really does have the potential to significantly improve operations if we can find a way to implement it, Shankranna." Technology Tanveer demonstrated great support and enthusiasm for the technology.

"Absolutely, Tanveer. Implementing blockchain in local governments helps build trust between the institution and the citizens. It introduces transparency and accountability at every step of a transaction. It allows all stakeholders to see and verify data," I added.

12.5. Smart Contracts using Blockchain Technology

"Smart Contract is another feature of blockchain that your Gram Panchayat can utilize. It's like a regular contract, but in digital format, and only gets executed or approved when all the terms of the contract are met," I introduced them to the concept of smart contracts.

"What does 'SMART' mean, Shankranna?" Nanjamma asked, intrigued.

"A common method for setting goals uses the SMART acronym, which stands for Specific, Measurable, Achievable, Realistic, and Timely," I explained.

"So, how can we use this?" Simple Sudarshan asked from the back. I was pleased that he was showing so much interest in the conversation.

"Let me give you an example of a Gram Panchayat function where you can use smart contracts," I began explaining.

"For instance, there are some issues today in the Public Distribution System (PDS), leading to the ration not reaching the right people or beneficiaries receiving less than their entitled amount. Let's suppose that the government promised 40 kilograms of grains, but you only receive 35 kilograms. This happens because of system leakages. So, the question is how can we use smart contracts in the PDS system?"

"The transactions in the PDS system occur between the center and the state, then between the state and the FPS outlets, and finally between

the FPS and the beneficiaries. Smart contracts can be used at all these stages. The contract will be executed only when the transactions are perfectly completed without any leakage or manipulation."

"But how do we create smart contracts? I'm still confused," Ration Rajanna asked.

"Don't worry too much about the technical details. I'll give you a brief idea of how it's prepared," I responded. "The terms are agreed upon between the two parties, such as the center and the state. Let's say the required amount of rice grains for the state is 1000 quintals. The contract will be coded in a way that only when the center delivers 1000 quintals of rice grains to the state, the smart contract will be executed."

"This ensures that the center has delivered the required amount without any leakage," I explained.

"So, we can trace leakage in the system using smart contracts?" Ration Rajanna quickly asked.

"Exactly, Rajanna. The same can be done from the state to FPS, and FPS to the beneficiary. Only when the receiving party confirms delivery as promised, the contract gets executed."

"This could indeed be very useful for our Panchayats!" Simple Sudarshan looked joyful as he began to understand the technology.

12.6. Use of Block Chain Technology to deal with land scam: an experiment in Andhra Pradesh and Karnataka

"Does any state in India already use Blockchain Technology?" Ration Rajanna asked.

"Yes, Andhra Pradesh and Karnataka have implemented it. There have been articles and reports published in newspapers about this," I explained.

"Andhra Pradesh was the first state in the country to introduce pilot projects for the departments of civil supplies and land records to protect data related to subsidies and land ownership from cyber-attacks."

"The land ownership system is grappling with fraudsters, and people often fear being deceived by counterfeit land certificates. Land records in most states date back to the colonial era, and disputes over titles often end up in courts. In fact, over 66 percent of civil cases in India are property-related disputes. To deal with this crisis, the state government of Andhra Pradesh decided to use blockchain technology in managing land records first. Implementing India's land records on blockchain could reduce fraud, increase efficiency, and consequently, boost economic growth."

Implementing blockchain will also reduce the administrative hassle of registration and title transfer. Once the data on lands or real estate transactions are on the blockchain, all parties involved can track the deal. The technology works by creating public ledgers of all transactions, replacing a mass of overlapping records with a simple, streamlined database. In collaboration with a Sweden-based startup ChromaWay, the Andhra Pradesh government is building a ledger system to track digital information, enabling people to secure their property.

"To enhance efficiency further, it has also partnered with a Visakhapatnam-based firm to manage land records. The state government has thus far secured over 1,00,000 land records through Zebi Data.

"We authenticate the credentials of users, allow them access to the records, and provide them with a certificate. No one can tamper with the database. The buyers, too, can access relevant information by registering with their credentials," Babu Munagala, the founder and CEO at Zebi Data India, explained.

I then provided a few more details about the implementation of Blockchain Technology in Andhra Pradesh.

Software Somu interjected, "Shankranna, you mentioned the implementation of Blockchain technology in Karnataka. Can you specify where it is implemented?"

I responded, "Yes. The State Registration and Stamps Department in Karnataka has implemented, on a pilot basis, Blockchain Technology linked to Kaveri Software for property registrations in the Sub-Registrar offices at Gubbi Taluk in Tumkur district and Jagalur in Davanagere district. It has been operational since December 2021, implemented in collaboration with the Center for e-Governance (CEG) and Center for Smart Governance of the Government of Karnataka under the National Blockchain Project of the Government of India."

Software Somu asked, "Who collaborated on this project?"

I clarified, "The Blockchain Software was developed in collaboration with IIT Kanpur."

Software Somu: Is it being implemented elsewhere in the state?

Me: Yes, blockchain-based registration has been implemented since March 2022 at the sub-registrar offices in Sirasi, Kundapur, Hosadurga, and Shidlaghatta.

Sahukar Seenappa: Kaveri Software is an online services website that provides asset-related services such as certificates, debentures, stamp duty and registration fee calculations, property valuation, and location of sub-registrar offices, right?

Me: That's correct. The e-Governance Department has developed blockchain technology in collaboration with IIT Kanpur. This technology is integrated into the online Kaveri software and is very effective in preventing illegal property dealings. Bogus records cannot be created, and government and private lands are safeguarded.

Software Somu: Shankranna, what else is blockchain applied for? Is it applied only for property registration? Or for any other registrations?

Me: Currently, Somu, the blockchain software is being implemented only for immovable assets such as land, buildings, and houses, including agricultural land, commercial, and residential properties. Several other registrations also occur in the Office of the Sub-Registrar, but blockchain is not applied to those registrations.

Software Somu: So, what's the difference between the present system of ledger and the blockchain?

Me: In the present system, individuals wishing to buy or sell immovable property visit the sub-registrar's office, where the sub-registrar records the signatures of both parties on the registration documents. Their photos are also taken. All these processes are recorded in the ledger. These records are also uploaded to the computers. That means that the records exist in both ledgers and computers.

In the Blockchain System, in addition to these steps, Property Registration is carried out using the Online Kaveri Software. The seller's identity is verified through their Aadhaar ID, and the property records are confirmed using eKYC on Kaveri Online Services. Then, all this information, along with the sales transaction details, is assembled into a smart card, named the "Kaveri Key" Card, which is given to both

the buyer and seller. Each party receives a unique password to access this smart card. The current Registration system contains only electronic signatures, but in the blockchain system, the Digital Smart Card includes complete property transaction details after verification of both the person (seller) and their property by Aadhaar biometric and Kaveri Key online services.

Software Somu: So, what is the process of registering assets under this system?

Me: The Aadhaar numbers of the sellers and buyers are obtained when they come to the Sub Registrar Offices for property registration, and a Kaveri Key Card is created for each of them. This card is similar to an ATM card and is issued to those intending to register a property or those who already own a property. The card is then confirmed at the Sub Registrar's office along with the e-KYC code process. In such cases, the person's Aadhaar number is checked, and their biometric data is recorded.

Software Somu: Then?

Me: The name of the owner, the person who sold the property, and the property identification number are printed on a smart card with a chip. In this case, both parties are given separate passwords. Confirmation is then achieved through e-KYC. Biometric data is obtained during the registration of documents to ensure that the rightful owner is involved.

Software Somu: Does the asset registration process and purchase sale information get recorded in the ledger at the Sub Registrar's Office as before, or is it now recorded on the Kaveri Key ID card as well?

Me: Yes, Somu. Every detail related to asset transfers is recorded on the card. This card is mandatory at sub-registrar offices for registration

of property sale or purchase documents. The registration process proceeds only when the property owner has entered their password. Otherwise, registration will not be possible.

Moreover, under the current system, property sale transactions used to be recorded only at the Sub Registrar's office. But in the Blockchain system, every detail regarding registration is reflected across five nodes - the Sub Registrar's office, State Data Centre (SDC), IIT Kanpur, STPI (Software Technology Parks of India), and the National Blockchain Project.

Sahukar Seenappa: What if there is a mortgage or a loan associated with the property?

Me: Those details are recorded on the Kaveri Key card as well. Owners of farmland, commercial, and residential properties will also be given a Kaveri Key card. Each property in the owner's name is recorded on the card. This includes about 48 types of transactions, including sales, purchases, leases, mortgages, gifts, debts, etc.

Sahukar Seenappa: Which departments (offices) are connected with the blockchain link of the Office of the Sub-Registrar? Does that mean it can be accessed by Gram Panchayats, Municipalities, Tehsildars' offices, District offices, courts, etc.?

Me: What's happening now is just a pilot project. As already mentioned, the project currently only involves the blockchain registration of fixed assets at the Sub Registrar's Office. At present, there is no blockchain link for Gram Panchayat, Municipal Council, Tahsildar Office, District Office, or Court. However, the government plans to gradually extend this system.

Ration Rajanna: How have people been responding to this technology, Shankranna? Me: According to statistics, this frontier

technology has received an unprecedented response in its pilot implementation. The Gubbi Sub Registrar's Office has so far registered over 700 documents using blockchain technology, and more than 1000 Kaveri Key cards have been distributed. In Jagalur, 500 Kaveri key cards have been distributed.

Simple Sudarshan: Can the blockchain system block land-laundering and counterfeit record transactions? If so, how?

Me: Yes. Its main purpose is to prevent fraudulent documents. Property records that are included in the blockchain are recorded and reflected simultaneously across five nodes, not just in one place, making it impossible to manipulate the property records fraudulently. Since the inclusion of registration in the blockchain will only be done after the biometric verification of a person's identity based on their Aadhar, and the ownership of the property is confirmed by eKYC verification, the records cannot be changed after they have been added to the blockchain. These records are then immediately recorded and reflected across the five nodes.

Me: The 'Kaveri Key' card offers safety to the property owner, similar to the key given to the safe locker by the bank. As you know, a bank safe locker requires two keys to open. One key stay with the bank and the other with the customer who deposits their valuables in the bank. Similarly, to transfer a real owner's property, it must be registered at the office of the sub-registrar. To do so, the owner of the Kaveri Key ID card must be present. Ownership of the property can only be confirmed when the owner provides their password. Otherwise, a person who comes for new registration won't be able to proceed.

Simple Sudarshan: What if the original owner loses the Kaveri Key card? Or if someone steals it? Can it be submitted to the Sub-Registrar's Office to sell the property to others?

Me: No. The person presenting the Kaveri Key card has to enter the PIN to open it. If someone were to steal the password and attempt to access the Kaveri Key card information to sell the property, it would be impossible. This is because the Aadhaar-based biometric information integrated into it would identify a fraudulent person who attempts land registration and thwart their plan.

Ration Rajanna: What if someone creates a duplicate document and inserts it into the blockchain system? What would be the effect? Is it possible to trace such a record? If so, how? Can such information be entered into the blockchain link?

Me: A property transaction registered once in a blockchain system cannot be changed afterward. For example, a person may provide their information and property information and include it on the blockchain, even adding a duplicate record. But when the real owner of the property comes forward with proof that the earlier record was fraudulent, their document cannot be added to the blockchain, as a property can be registered in one name at a time. Such cases of disputes involving fraudulent documents would fall under the court's jurisdiction. Once the case is settled, the court's decision can be uploaded to the blockchain.

Sahukar Seenappa: But, Sir, my doubt still hasn't been cleared. If a person creates a duplicate record and inserts it into an original document and gets it registered and recorded in the blockchain, won't that create a duplicate record in the system?

Me: That cannot happen. Let me explain why.

Let's take an example. Every person who adds records in the blockchain system is responsible for that process. Suppose a person registers a sale deed at the sub-registrar's office. Among the documents they attach to the Sale Deed is an 11E sketch, required

when land is to be divided and purchased. This sketch is issued by the Tehsildar's office.

In the blockchain setup, the sub-registrar is solely responsible for the sale deed. They can verify and confirm the authenticity of all the attached documents by checking the blockchain link. For instance, to check whether the 11E sketch is original or duplicated, they can inspect the records in the Tehsildar's office through the blockchain. In the Tehsildar's blockchain, the person who came to register the sale deed should have requested an 11E sketch for the partition of the land. The blockchain would contain a block in their name, along with related records of the process, from their request to the delivery of the document to them.

Me: Indeed, the sketch record should match the sketch that was submitted with the sale deed to the Sub Registrar's office. If it does not match, the sub-registrar can refuse to register the sale deed.

Sahukar Seenappa: So how can we prevent irregularities in the new system?

Me: As I mentioned before, document registration information and processes are recorded on the Kaveri Key card and on five separate computer servers. Therefore, unauthorized individuals can't access all these servers. It also becomes easier to track the property transfer process.

Sahukar Seenappa: That's truly impressive!

Software Somu: Will the blockchain system contain old records and registrations from the office? Or will it only upload newly registered documents? If it includes old documents, how far back do those records go?

Me: No, at the current pilot implementation stage, only newly registered documents of assets with current transactions are being included in the blockchain system. Older registries are not being included. However, there are plans to gradually incorporate old documents into the blockchain system.

Sahukar Seenappa: Are there any plans to incorporate court rulings on disputes, records of debts, claims, etc., that are relevant to the land?

Me: Currently, there are no plans to incorporate court rulings. However, plans are in place to include these in the future. Other registration records related to loans and land pledges are included.

Ration Rajanna: Are blockchain records available to the general public? How can they access them?

Me: In the Kaveri application (Kaveri 2.0), the public can access documents from the blockchain system just like they would with Kaveri online services, which provides various documents such as RTCs etc. Once added to the blockchain system, future transactions are simplified. You can obtain an Encumbrance Certificate (EC) etc., with the press of a button, whereas currently, you have to visit the office of the sub-registrar to obtain the EC. There is also a plan to make these available on individual's logins.

Ration Rajanna: So, in the future, there will be an end to fraudulent activities such as grabbing someone else's property through the creation of fake documents, selling other's property pretending to be the owner, or selling the same property to multiple people, isn't that right, Shankranna?

Me: Yes, Rajanna, most importantly, the blockchain system blocks fake deals. This provides peace of mind for property owners on one side

and property purchasers on the other. In the blockchain system, there's a combination of personal identity and property, verified by checking the PIN and fingerprint (biometric) for security on the Kaveri Key card. Thus, no one can steal a person's biometric identity. So, no one can steal or tamper with the land which is mapped with the owner's identity.

Ration Rajanna: Can this technology be used only for property registration, or can it be used for other purposes?

Me: You're asking the right question, Rajanna. This blockchain technology can be used not only for land records registration but also in many other fields. In the future, Blockchain Smart Cards could even be used as digital wallets. There are strong possibilities to incorporate Gas, BESCOM, BBMP and Gram Panchayats to the blockchain system. It can also be used for many other purposes, such as money transfer, identity card, copyright and royalty protection, digital voting, food security and medical record management etc.

Transfer of Money:

Sahukar Seenappa: Can it be used for money transfer? How does it work?

Me: One of the primary applications of blockchain technology is facilitating money transfers. It initially gained popularity through cryptocurrencies like Bitcoin. Now, even the Government of India has announced the launch of a Digital Currency through the Reserve Bank of India. In the financial year 2022-23, the Reserve Bank of India (RBI) introduced the digital rupee using blockchain technology and other advanced technologies. Currently, traditional bank transfers can take anywhere from 24 hours to 7 days, but with blockchain technology, money can be transferred within seconds.

Digital ID:

Software Somu: You mentioned a digital identity card. Can you explain how it works?

Me: Certainly, Somu. More than a billion people worldwide face identity-related challenges. With blockchain technology, it is possible to create a digital ID, which serves as a digital identity card. This digital ID offers numerous benefits, such as enabling individuals to prove their identity, cross borders, access financial services, and start their own businesses, among other things.

Copyright and Royalty Protection:

Software Somu: With the rise of the Internet, copyright infringement has become a major concern. Can blockchain help tackle this issue?

Me: Yes, Somu. Blockchain technology can address the problem of copyright infringement and ownership violations. With blockchain, it becomes possible to establish a transparent and immutable record of ownership and intellectual property rights. This helps in protecting copyrights and resolving royalty-related issues more effectively.

Digital Voting:

Simple Sudarshan: Recently, there have been allegations of cheating in voting, and concerns about the credibility of electronic voting systems. Can blockchain technology solve this problem?

Me: Absolutely, Sudarshan. Blockchain technology has the potential to significantly enhance the credibility and transparency of digital voting systems. By utilizing blockchain, it becomes feasible to create an immutable and auditable record of each vote. This can greatly

reduce the chances of tampering or fraud, ensuring a more trustworthy voting process.

Food Safety:

Ration Rajanna: I have doubts. Can blockchain technology really improve food security?

Me: Rajanna, many people question the connection between food security and blockchain technology, but it is indeed a valuable tool in ensuring food safety. Blockchain can be utilized to track and trace food products from the farms of our farmers directly to the supermarket shelves. It helps establish transparency in the food supply chain and aids in preventing irregularities and issues along the way.

Indeed, blockchain technology can be used to enhance food safety. Here's how it works:

Blockchain can offer transparency and traceability in the food supply chain, from the farm to the consumer's plate. It enables consumers to know exactly where their food comes from, what processes it has gone through, and the conditions in which it has been stored. This can lead to increased consumer trust and can even help identify problems in the event of a food safety issue.

In addition, blockchain technology can also support responsible sourcing and fair-trade practices by providing irrefutable proof of the origin of food products and the conditions in which they were produced. It can also facilitate swift and efficient recalls of food products when necessary.

Medical Record Management:

Nurse Nanjamma: Since blockchain technology offers so many benefits, can it also be applied in the medical field, Shankranna?

Me: Yes, Nanjamma. There are numerous opportunities to leverage blockchain technology in the medical field as well. Paper-based record-keeping has already been largely replaced in medicine, and blockchain technology can provide even greater security and convenience for managing personal health records. It ensures the integrity and privacy of sensitive medical data, making it easier to access and share information when needed.

Software Somu: Can this technology be applied in the healthcare sector? Me: Absolutely, Somu. Blockchain technology has significant potential in the healthcare sector, especially in managing patient medical records. With blockchain, a patient's medical history can be stored securely and in a way that it's easily accessible to authorized medical professionals. The data on the blockchain is immutable, which ensures the accuracy of medical records. It also enables interoperability among different healthcare providers, thereby enabling seamless sharing of patient information, which can be extremely beneficial in emergency situations or when the patient is seeing multiple doctors.

So, you see, blockchain has a wide range of applications beyond property transactions. Its potential is immense and we're only beginning to scratch the surface.

12.7. Your Role in Creating Trust in Your Gram Panchayat System

Sahukar Seenappa: So, Shankranna, what is our role in establishing trust in the Gram Panchayat system? Me: In a significant institution like your Gram Panchayat, which provides services to millions of Indian

citizens, it's essential to build trust with your constituents. It's also crucial to establish trust with all other stakeholders that you engage with in order to build a strong Gram Panchayat. Only when you earn the trust of the citizens, will your Gram Panchayat flourish as intended.

Tanveer then chimed in, voicing his support for implementing blockchain technology in our panchayats. He acknowledged that, similar to how Andhra Pradesh and Karnataka utilized blockchain technology for land registry, they could also apply it to solve security issues not only for land disputes but for many other functions that require authenticity and accountability. This approach could enable complete tracking of resource movement from one point to another, fostering accountability among stakeholders.

I continued, "You've equipped yourselves with all this knowledge on how to digitally transform your villages. You are also ensuring that all your Gram Panchayat processes will be secured using blockchain technology. Old man no longer has to worry about not having physical proof of his property, because now all the transaction information is recorded on the blockchain. Isn't that remarkable?"

"The Prime Minister of India said, 'Transparency is the key to good governance and e-governance is the only effective way towards transparent governance.' If you take the initiative to plan and implement all the technologies and processes, we have discussed so far, you will be on your way to achieving transparent e-governance, which is what the world is gravitating towards today. Remember, you are the driving force behind the digital transformation of your villages," I concluded my talk.

12.8. What happens if there is no traceability of transactions?

"Let's consider the e-khata story of the Channhalli village Panchayat. It demonstrates the importance of traceability and transparency in any system. The incident that took place at the Channahalli Gram Panchayat in Devanahalli Taluk, Bangalore (as reported in Prajavani, Vijaya Karnataka and other newspapers on 09/03/2022), serves as a prime example of the consequences of a system lacking these attributes."

In the Channahalli Gram Panchayat, 36 E-Khatas were issued to two individuals. Officers lodged a complaint with the police, alleging that the act was committed without their knowledge. The police investigation unearthed a similar incident in another district, which had been executed using an Internet dongle card registered in the name of the former president of the Harohalli Gram Panchayat (now a Town Panchayat). It was found that a computer operator there had perpetrated the crime. A similar case was later discovered in the Bhairamangala Grama Panchayat. Data collected from computers revealed that e-khata irregularities had occurred in these village panchayats, and e-khatas had been created outside the district as well.

The Source of Deception in Devanahalli:

Between September 17 and 20, 2021, the E-Swattu login of the PDO (Panchayat Development Officer) of the Channahalli Gram Panchayat in Devanahalli Taluk, Bangalore Rural District, was misused. 36 E-Khatas were registered in the names of Tirupati Reddy and Ajay Narain. The login IDs of the PDO & Devanahalli EO were compromised.

A dongle card registered in the name of HN Guruprasad was hacked. EO HD Vasantha Kumar, who lodged a complaint, said that they were unaware of the e-khata issue. Bangalore Northeast Division Cyber Station Police registered a case on December 4, 2021, under the Information Technology Act 2008.

Upon investigating the Harohalli GP, the police found the name of the Adhyaksha. Cyber policemen issued a notice to the accused and intensified the investigation.

The investigation revealed that the e-Swattu software had been hacked. The Adhyaksha and staff of the Harohalli Gram Panchayat in Ramanagara District had unofficially opened accounts in two districts. Officials accused Guruprasad, then Adhyaksha of Harohalli GP, which had since become a town panchayat, of committing this crime.

Irregularities in Kumbalagodu!

A fraudulent case was reported from the Kumbalagodu Grama Panchayat of Bangalore South Taluk. It involved the misuse of the login ID of the Grama Panchayat Development Officer (PDO) and the Taluk Panchayat Executive Officer. A complaint was lodged at the Bangalore South Taluk Cyber Crime Station by the Bangalore South Taluk Panchayat Executive Officer. An unidentified individual had illegally accessed the e-Swattu software using the stolen login ID and created fake e-Swattus, causing financial loss to the government.

A fraudulent e-Swattu was detected during the e-asset inspection of Kyada village within the limits of Kumbalagodu village panchayat. Several other Gram Panchayat jurisdictions were suspected of

having fake e-assets, as reported by the police. (Ref: Report in Prajavani)

What we should understand from this?

The critical takeaway from these cases is that any software in use should have traceability to prevent such irregularities. If the E-Khata process was incorporated into a blockchain system, every step of the process would have been documented in the system. From the day of applying for the E-Khata to the issuance of the certificate, the progress of the file could be tracked, showing its movement through the concerned departments. Therefore, within a blockchain system, no individual would have the opportunity to engage in illegal activities at any stage.

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