

INTERNATIONAL JOURNAL OF LAW
MANAGEMENT & HUMANITIES
[ISSN 2581-5369]

Volume 9 | Issue 3

2026

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Verified used Car History using Blockchain

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ABSTRACT

The Indian used car market has grown significantly with the rise of online marketplaces such as Spinny, yet issues relating to trust, transparency, and authenticity of vehicle history continue to persist. Buyers often rely on information provided by sellers or intermediaries, which may be incomplete, manipulated, or misleading. Common problems include odometer tampering, concealment of accident history, fragmented service records, and the inherent conflict of interest in platform-controlled verification systems. This article examines how blockchain technology, particularly a shared permissioned blockchain ecosystem, can address these challenges by creating a secure, decentralized, and tamper-proof Digital Vehicle Passport linked to each vehicle's identification number.

The study proposes a consortium-based blockchain model involving government authorities, insurers, service centres, manufacturers, and used car marketplaces, where verified stakeholders collectively maintain immutable vehicle records. Through cryptographic authentication, time-stamped entries, and distributed verification, the system enhances transparency, traceability, and buyer confidence while reducing fraud. The paper further outlines a phased roadmap for implementation, including consortium governance, stakeholder onboarding, real-time data capture, and buyer verification interfaces.

Additionally, the article critically evaluates practical and legal challenges such as stakeholder coordination, incomplete offline data capture, regulatory recognition under the Motor Vehicles Act, compliance concerns with the Digital Personal Data Protection Act, 2023, and high implementation costs. The paper concludes that a shared blockchain ecosystem has the potential to transform trust in the used car industry from a platform-dependent assurance into a verifiable cryptographic guarantee, thereby strengthening transparency and accountability in vehicle transactions.

I. INTRODUCTION

The used car market in India is rapidly developing, especially after the rise of online platforms such as Spinny that have made buying and selling second-hand vehicles easier through online listings, standardized inspections, and home delivery. Yet, even with these innovations, the market is still facing a serious issues like lack of trust and transparency in vehicle history data. Buyers have mainly to depend on the information provided by sellers or middlemen which is

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quite often incomplete, dishonest, or phony. There is a big and urgent call for a method by which original, authenticated, and unaltered vehicle records can be made available.

This paper shows that the way to solve this issue is not for any one platform to develop and control a proprietary blockchain. Rather, in favor of a shared, permissioned blockchain ecosystem managed by a consortium of neutral stakeholders - including government insurers service providers and marketplaces like Spinny - so that trust in the data does not require trusting any single party.

II. THE EXISTING PROBLEM

The main problem in the used car market is that sellers generally know a lot more about the cars they are selling than buyers do. This gives the seller not only a great advantage but also a strong temptation to cheat the buyer. The following are five major issues that have been identified:

1. Odometer Tampering

Sellers often try to change the mileage of a car to make it look newer and less used, so they can ask for a higher price. Because mileage is the main factor that decides how good a car is and how much it is worth, such changes result in direct monetary loss to buyers who cannot check the number by themselves.

2. Concealment of Accident History

Cars that have encountered serious structural impacts are often fixed and sold again without informing the buyer. Although these vehicles might look fine externally, concealed damages can drastically affect the safety and efficacy of the car in the long run. In the absence of a unified and trustworthy record, purchasers are helpless in identifying such cases.

3. Incomplete Service and Maintenance Records

Service records are not only scattered among various garages but most of them are also in the paper form. No vehicle history log in a digital, integrated format thoroughly maintained so that buyers can evaluate the level and quality of vehicle maintenance.

4. Platform Controlled Trust: The Inherent Limitation

For example, Spinny performs a 200-point check and gives out their own certificates. Spinny inspects, certifies, and even sells the used cars. So, you have to put your trust in Spinny fully. On the other hand, Spinny is also interested in getting sales. This obviously leads to a conflict of interest. The inspection can be genuine, but the problem is that you have no way of verifying it on your own. You can't look at the data separately. The whole system is quite opaque. Trust,

in this case, is not something earned but simply imposed.

III. HOW BLOCKCHAIN CAN HELP SOLVE THE PROBLEM

Blockchain, a type of Distributed Ledger Technology (DLT), makes it possible to record data in a secure, decentralized and tamper-proof manner. Data once recorded on a blockchain is immutable it cannot be changed or removed which makes it a very reliable source of truth.

In the used car industry, a shared permissioned blockchain could be used to generate a unique Digital Vehicle Passport for each car, which would be linked to its Vehicle Identification Number (VIN) or chassis number. All major lifecycle events could be logged on this ledger by the authorized participants, such as:

- Odometer readings at each verified service visit
- Accident reports and insurance claim data
- Repair and maintenance history
- Ownership transfers and RTO registration changes

The difference from a proprietary platform solution is that in a shared ecosystem, entries in the data ledger are made by multiple independent parties certified garages, insurance companies, RTOs, and Spinny's inspection teams all with their own cryptographic credentials. No single entity controls the ledger or can hide the records. Every entry is time-stamped and protected by cryptography.

Such a technical arrangement results in three fundamental features that platform-controlled systems cannot offer:

- Immutability (effectively eliminating fraud like odometer rollback)
- Transparency (giving buyers the ability to independently access verified data)
- Traceability (offering the entire vehicle's history from the first registration)

Once Spinny cross-checks a car with this shared ledger prior to putting it up for sale, the buyer is not solely relying on Spinny they are relying on an unalterable record that is the joint creation of several impartial parties.

IV. ROADMAP FOR IMPLEMENTATION

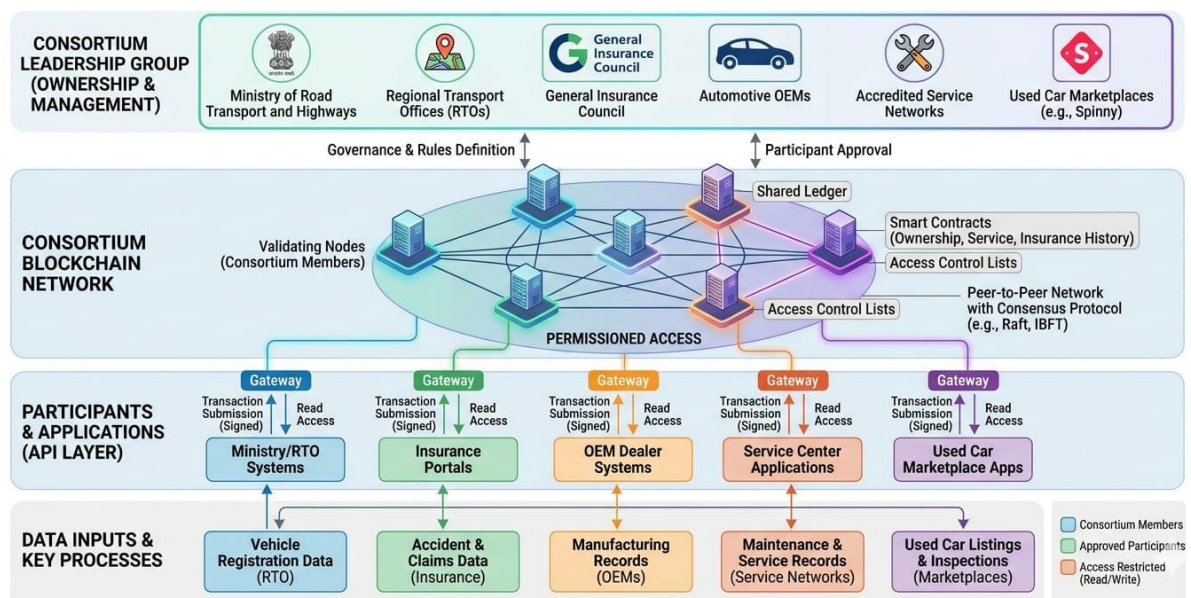
Phase 1: Consortium Formation and Governance

A consortium blockchain is a specific, popular type of permissioned blockchain where access is restricted to a pre-approved group of known entities, rather than being open to the public. it

is to form a neutral leadership group responsible for the ownership and management of the blockchain community. Making it as semi-decentralized solution to the used car industry. This group should combine the Ministry of Road Transport and Highways, Regional Transport Offices (RTOs), General Insurance Council (as the representative of insurers), leading automotive Original Equipment Manufacturers (OEMs), accredited service networks, and used car marketplaces like Spinny.

For this, a permissioned blockchain is the best choice since it enables a consortium to specify exactly who can see the data and who can make changes to it, therefore ensuring openness together with accountability and compliance with regulations.

ARCHITECTURAL BLUEPRINT: CONSORTIUM BLOCKCHAIN FOR USED CAR INDUSTRY



Phase 2: Digital Vehicle Passport and Stakeholder Onboarding

Each vehicle gets a Digital Vehicle Passport on the blockchain as soon as it is manufactured or first registered with the vehicle registration office, and it is connected to its VIN. Historical records where verification is done independently are also brought to the ledger. All consortium members (garages, insurers, RTOs) are given cryptographic credentials that enable them to submit verified, signed data entries. Spinny, being a participant in the marketplace, is allowed to read all records and also to add its own vehicle inspection reports to the blockchain as a timestamped entry.

Phase 3: Real Time Data Capture

Each partner garage service event is digitally documented on blockchain with time, garage ID, and a digital signature. Vehicle mileage data is collected through either OBD-II port scanning

method or photo-assisted manual entry, which constitutes a verifiable path. In case of filing insurance claims, the insurance companies deposit the accident details into blockchain, making a permanent record of the motor vehicle accident along with the vehicle repairs. Changes in ownership lead smart contracts to update the title records automatically.

Phase 4: Spinny's Role in Verification and Buyer Trust Interface

Within this common ecosystem, the objective of Spinny changes dramatically. Now, Spinny is not considered as a simple data owner only but as trusted verifier and buyer-facing interface. They get the complete vehicle history data from the shared blockchain before offering it to the customers. In case of any inconsistencies such as a mileage gap, missing service records, or an undisclosed insurance claim, Spinny will issue standardized flags: a Mileage Tampering Flag, a Missing Record Flag, or a Damage Flag. These indicators are shown to buyers on the listing page, which offers them a chance to make decisions based on the facts even if some off-chain servicing has occurred.

More importantly, a buyer who acquires a vehicle through Spinny can also independently access the same blockchain through a public Buyer Verification Portal no need for Spinny as intermediary and retrieve the same record. As a result, Spinny becomes a platform that no longer asks for your trust but instead, a platform that equips the buyers to verify the trust themselves.

V. IMPLEMENTATION CHALLENGES

The shared permissioned blockchain ecosystem, despite being the future, must overcome a few critical issues when put to a real test.

1. Stakeholder Coordination

Stakeholder Coordination is the biggest barrier at the moment. It is difficult to unite RTOs insurers OEMs, garages, and marketplaces like Spinny under one governance framework since these parties have different commercial interests and data policies. It will really take time to agree on protocol rules and dispute settlement.

2. Offline Data Problem

The Offline Data Problem restricts blockchain fundamentally. A blockchain only keeps a record of what is put into it. Cars coming for servicing at unregistered garages, or those being privately repaired after a minor accident, will never be reflected on the chain, so gaps in vehicle history that break down the system's reliability, are inevitable.

3. Legal Recognition Challenges

Legal Recognition is another major obstacle. According to the Motor Vehicles Act 1988 physical RTO registration is necessary for ownership transfer. Title transfers recorded on the blockchain presently do not have any official legal status in India. Therefore, the system's meaningful operation would require legislative changes or state-level pilot approval.

4. Conflict with the DPDP Act, 2023

Conflict with the DPDP Act, 2023 results in a direct legal issue. The Act gives individuals a right to have their personal data erased, which is in direct opposition to one of the fundamental characteristics of a blockchain - immutability. It is very hard from an implementation perspective to consistently do anonymizing owner data or storing it off-chain through a multi-party consortium with varying technical standards.

5. High Implementation Cost

The system must support secure infrastructure, large-scale data storage, interoperability between stakeholders, and continuous maintenance. Smaller garages, local service centres, and regional stakeholders may find it difficult to afford participation, which can reduce ecosystem adoption and limit the effectiveness of the network.

VI. CONCLUSION

The problem in the used car market isn't that there aren't adequate inspection technologies, but rather it's the deep-rooted mistrust of data provenance. Spinny's current inspection procedure, for instance, only verifies the car's present condition and doesn't allow for the vehicle's history to be authenticated retroactively. A shared permissioned blockchain, by contrast, can fill this void by creating a multi-party verified, tamper-proof record starting from the vehicle's first registration which means in principle that odometer tampering becomes impossible and that the history of accidents is always open.

Importantly, the proposed framework does not make Spinny the only one to design or control this system. Spinny remains one of the trusted parties in a consortium-modeled ecosystem, offering its knowledge of inspections and acting as the front-end to the buyers. With this model, the problem of the conflict of interest in platform-controlled solutions is removed and the buyer trust is placed in independently verifiable, multi-party data rather than relying on a single commercial entity.

In a situation where trust is the most precious thing that is also the least available, a common blockchain platform will give the whole second-hand car industry the opportunity to transform trust from just a marketing promise of a brand to a cryptographic assurance.

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