

**OPPORTUNITIES, IMPLEMENTATION,
CHALLENGES AND ROLE OF IP -
BLOCKCHAIN IN AUTOMOTIVE INDUSTRY**



Introduction

The automotive industry is witnessing a giant leap in the use of technology. The services offered are more integrated, personalized, connected with the infrastructure. Conventional technologies cannot fulfill the increasing needs of the automotive industry. Blockchain has the potential to play a significant role in the automotive industry transformation.

Intellectual property related to blockchain use in the automotive industry can help understand the solutions and use cases blockchain can provide in achieving technological transformation.

What is Blockchain?

Blockchain technology is a decentralized, distributed ledger that records the provenance of a digital asset. By inherent design, the data on a blockchain cannot be modified, making it a legitimate disruptor for industries like payments, cybersecurity, and healthcare. It is a structure that stores transactional records, also known as the block, of the public in several databases, known as the "chain," in a network connected through peer-to-peer nodes. Typically, this storage is referred to as a 'digital ledger.'

Timeline of Use of Blockchain in Automotive Industry

2009

January, 2009

Bitcoin is released, debuting blockchain technology

2015

April, 2015

Everledger founds the first company to track diamonds on blockchain

2017

February, 2017

Blockchainfirst announces a working "car wallet" that can be used for car-sharing and paying tolls

February, 2017

Daimler becomes a premium member of the Hyperledger project, a blockchain development effort across several industries

March, 2017

Reply announces its That's mine program, which allows users to transfer ownership of cars by smartphone using the Vehicle Identification Number

2018

May, 2018

Launch of the Mobility Open Blockchain Initiative (MOBI), a consortium founded by leading automakers (BMW, Ford, GM, IBM) to develop blockchain solutions for the industry

March, 2018

Daimler presents its own digital currency running on blockchain, MobiCoin, which rewards drivers for environmentally friendly driving habits

June, 2017

Porsche announces its collaboration with XAIN to develop car blockchain technology

May, 2017

Toyota announces various blockchain initiatives at Consensus 2017

Forecasting of Use of Blockchain in Automotive Industry

Automotive Blockchain Market is projected to grow from USD 0.35 billion in 2020 to USD 5.29 billion by 2030, at a CAGR of 31.19% during the forecast period. Increasing focus on reducing data manipulation, better quality control, and the need for faster business transactions have triggered the growth of the automotive blockchain market.

Crypto-currency, BaaS, and Initial Coin Offering (ICO) will propel the growth of the automotive blockchain market, thereby simplifying business processes and creating transparency and immutability in the distributed ledger technology with benefits such as faster transactions and reduced total cost of ownership. The market will see the emergence of a new breed of programmable blockchain technology platforms.

According to a report by the IBM institute for business value, it was estimated that 62% of the automotive industry is set to utilize blockchain technology for various use-cases by 2021. Some of the most renowned and beloved car brands are tapping into DLT as blockchain writes a new chapter for the industry, with evangelists confident that the Automotive industry will be next in line to be disrupted by this new nascent technology.

Opportunities for Blockchain in Automotive Industry

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With the growth in investments in autonomous and connected vehicles and various types of mobility services, such as vehicle rental, leasing, hailing, sharing, pooling, etc., the automotive blockchain market has great potential. Blockchain would allow car companies to manage their fleet by monitoring the maintenance, cleaning, etc., of registered vehicles.

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Blockchain technology will play a major role in car manufacturing by enhancing supply chain management. Blockchain technology helps keep the complete record and information of the parts and components, which eventually helps the OEMs during vehicle recall and service.

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With the rise in vehicle accidents, primarily in India, blockchain technology could help eliminate redundant steps that a customer goes through while claiming insurance. Blockchain technology will see growth owing to the increasing demand for smart finance solutions.

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Blockchain offers many benefits to the automotive industry by increasing the efficiency of the supply chain and reducing unnecessary costs. However, building a blockchain infrastructure follows a complex development process and requires heavy investment. Nearly 95% of OEMs are willing to do moderate to significant investments, and most consider not investing only for the basic offerings of blockchain technology.

Practical Applications of Blockchain Within Automotive Industry

Some major areas of blockchain in automotive industry are:



Blockchain Applications in Automotive Industry

1. Blockchain in Automobile Manufacturing

A. Automobile Supply Chain:

Blockchain would allow the manufacturer to follow up and track automobile parts lost in delivery, stolen, replaced, or damaged. Blockchain would also facilitate the recall procedures: since it carries the information on the origin of the piece, we could control if any modifications have been made to it or if a manufacturing defect occurred.

B. Automobile Manufacturing:

Blockchain technology can provide numerous advantages throughout the automotive manufacturing process. Blockchain can store data from bills of lading for vehicle components and quality inspection records created during the manufacturing process.

C. Finance and Auto Insurance:

Blockchain can streamline and automate all processes that require manual data insertion, include transactions or transaction costs, as well as revisions, among other things. The blockchain can bring significant benefits to insurance companies. Both the technology's immutability principle and proof of provenance concept will help businesses to effectively leverage their operating activities. As per a report, Toyota will partner with various technology companies, such as MIT, BigchainDB, and Oaken Innovations, to create blockchain-based applications for insurance purposes.

D. Data Immutability and Data Safety:

Blockchain's strong cryptographic roots cannot be reverse-engineered and perfect for storing data since it cannot be changed.

E. Telematics:

In the connected car space, telematics includes software-based navigation, vehicle-to-vehicle (V2V) communications, and a host of other services that can affect vehicle safety and passenger security. We can use blockchain to keep safe the data sent and received by telematics systems. The heightened level of encryption prevents hackers from viewing or using this data.

2. Blockchain for Automobile Owners

A. Buying/Selling an Automobile:

Blockchain-based registries would provide easier verification of the vehicle's history, allowing major transparency when purchasing and selling an automobile. Thanks to a smart contract and Non-Fungible token (NFTs), the seller and buyer could enforce the transaction of goods using crypto-currencies.

B. Loyalty Programs:

On a blockchain-based loyalty program, on initiation of a loyalty transaction such as the issuance, redemption, or exchange of a reward, the system creates a computer-generated loyalty token, which is a base for all types of rewards, including points.

3. Blockchain Use Cases in the Mobility Sector

A. Automobile Financing:

Thanks to blockchain-based smart contracts, we could optimize and automate various vehicle leasing and financing sections. For example, if a car's leasing rate hasn't been paid yet, it is possible to prevent it from being used by deactivating the unlocking system.

B. Automobile Sharing:

Blockchain technology could enable a secure digital identity at carsharing. With blockchain, personal settings and preferences could be saved in the car safely, avoiding exposure to unnecessary parties. It could also enable P2P carsharing. Meanwhile, blockchain could facilitate the carsharing procedure for users as a single registration in the blockchain ecosystem is suitable for all carsharing offers from different service providers in the ecosystem.

C. Auto Rental Company:

Blockchain can be a potential disruptor in the auto rental sector. It would be easier to know what is happening, have a follow-up and decide whether to count on that particular car or not. In the peer-to-peer (P2P) car rental (or car sharing) model, infrastructure or staff is not required to perform the task of renting, thus reducing the overhead costs.

Top Blockchain Startups Disrupting the Automotive Industry

1. Amo:

A blockchain platform connecting cars, people and service providers through an integrated database. With just a click, users can monetize their weekend drives or other trips.

2. Autoblock:

Gives users a new way to buy and sell cars via its ecosystem built on the blockchain.

3. Axt:

A single solution for dealers and lenders through which a more robust vehicle history report is created and being offered to consumers at a fraction of the cost.

4. BigChainDB:

Develops an ownership transfer service called CarPass to centralize all information about a vehicle to fight fraud. The pass includes title, service providers, prior damage, maintenance, and inspection history.

5. carVertical:

A startup working on a blockchain-based solution solving the problem of nonexisting transparency about car usage histories.

6. DAV:

Develops a blockchain-based transportation protocol enabling a decentralized, peer-to-peer transportation network.

7. GEM:

Creates a personalized experience where customers are charged based not only on distance but driving behavior, time of day, geolocation, and additional data points.

8. Loyyal:

Leverages blockchain and innovative contract technology to provide loyalty and rewards network infrastructure solutions.

9. One Car Payment:

Develops a blockchain-driven algorithm that helps consumers save money on the long-term costs of owning a vehicle by providing a payment service that combines all vehicle payments into one single monthly fee.

10.VLB:

Provides a range of services for producers and distributors of spare parts, insurance companies, and fleet management companies. Among these, VLB increases the transparency of spare parts, handles claim management efficiently, and reduces costs for vehicle maintenance and repairs.



Formation of Mobility Open Blockchain Initiative (MOBI)

In the US, many automotive companies are adopting blockchain technology, followed by Germany and other countries. Tech vendors such as Ford, BMW, General Motors, and Renault are presently in partnership in exploring Blockchain Technology. Their participation is what now the largest automobile blockchain collaboration ever. Mobility Open Blockchain Initiative (MOBI) has a partnership with the tech vendors mentioned above. The MOBI consortium will be set to explore many ways of blockchain to bring in effective use. The MOBI blockchain development will cover the vital issues in the broader tech world: suitable data usage, the rise in IoT adoption, and blockchain solutions to protect data against immutability. Blockchain implementation in automotive can also bring forward various benefits for logistics companies. The setup of organizations such as MOBI will drive the market for blockchain as the adoption will continue to be driven.

Recent Solutions in the Automotive Industry

1. Ford has launched a blockchain pilot on the IBM platform to ensure ethical sourcing of cobalt.

- Ford has launched a blockchain pilot on the IBM platform to ensure ethical sourcing of cobalt. By tracking the cobalt supply chain on the blockchain, Ford hopes to ensure that companies are not using child-mined cobalt in lithium-ion batteries.

2. Volkswagen is building a blockchain-based tracking system to prevent odometer fraud.

- Volkswagen is building a blockchain-based tracking system to prevent odometer fraud that is widespread in the automotive industry. Making sure that dishonest car sellers can't manipulate odometers to produce deceptive mileage values will help the buyers to save money.
- IOTA and Volkswagen have successfully presented their proof of concept for IOTA's new tangle technology. Volkswagen eventually hopes to use the tangled system to update their autonomous vehicles.

3. Daimler partnered with a European blockchain Start-up RIDDLE&CODE.

- The parent company of Mercedes has partnered with a European blockchain Start-up RIDDLE&CODE to provide a hardware car wallet solution known as Mobility Blockchain Platform (MBP), in essence, a digital wallet for cryptocurrency, to give the vehicle a network identity that enables it to handle transactions automatically.

4. Hyundai has announced a new partnership with IBM to advance the use of blockchain technology.

- Hyundai has announced a new partnership with IBM to advance the use of blockchain technology and cloud-based AI. IBM will focus on creating a new supply chain financing ecosystem using open-source Hyperledger Fabric. The project aims to automate manual processes, reducing cost and lead time, and, through that, improving customer experience.

5. General Motors and BMW are backing blockchain tech to share self-driving car.

- General Motors and BMW are backing blockchain tech through the MOBI initiative to share self-driving car data among themselves and other automakers. The blockchain standardization efforts made by MOBI also take us a step further a wider blockchain adoption in the industry.

6. Formation of Toyota Blockchain Lab.

- Toyota Blockchain Lab was formed in April 2019. It comprises six partner firms – Toyota Motor Corporation, Toyota Financial Services Corporation, Toyota Finance Corporation, Toyota Systems Corporation, Denso Corporation, and Toyota Central R&D Labs – and these are working to decide how and where blockchain technologies can be applied across the Group.

7. Recalls and Vehicle History

• South Korean startup AMO is developing a blockchain platform that collects all types of automotive data and makes it available to any stakeholder. The idea behind the initiative is maximizing data collection and dissemination for the world's app builders, with one topic being improving the accuracy and efficiency of how recalls are managed. AMO is also a member of MOBI.

8. Temper-proof data traceability by BMW

• The BMW Group uses blockchain technology to enable tamper-proof data sharing with potential applications throughout the entire automotive value chain in purchasing to ensure the traceability of components and raw materials in multi-stage international supply chains.

9. Hyundai AutoEver's formal partnership with Blocko

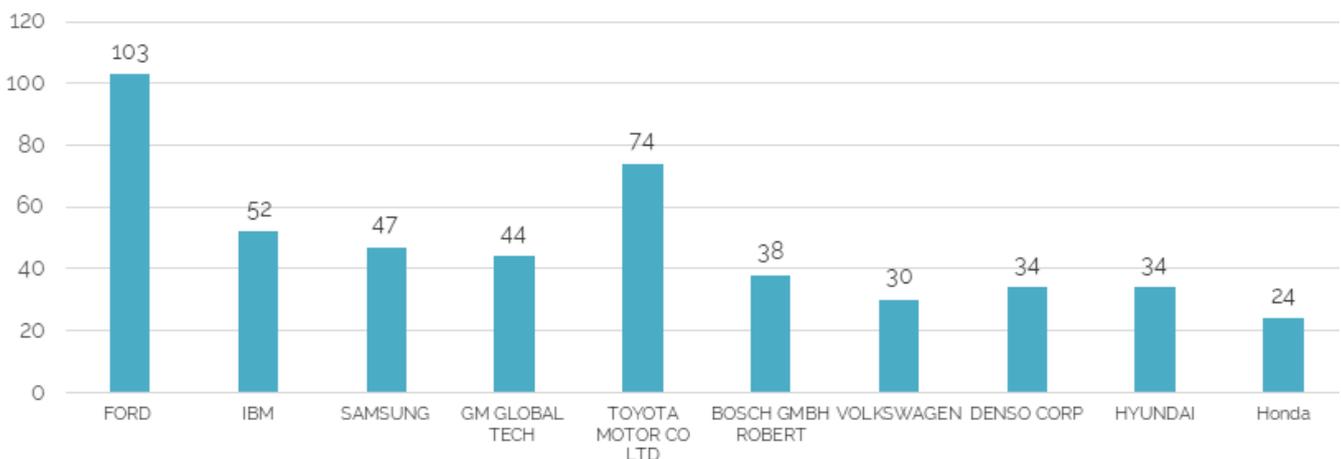
• Hyundai Motor Group's subsidiary has partnered with the South Korean firm specializing in Blockchain-as-a-Service (BaaS) provider. Blocko has signed an MoU with Hyundai Motor Group's ICT platform, intending to team up to develop an in-house platform for the Automotive giant. With the help of Blocko, Hyundai is applying blockchain to safeguarding vehicle ownership, allowing the tracking of confidential vehicle information such as mileage, service history, and age.

IP Implications

With technology becoming complicated, information exchange and cooperation are needed to guarantee that the technologies grow and evolve effectively. Patents can actively encourage it since they help to ensure that the ideas described in the patent are properly owned. Patents and patent applications, therefore, contribute to sharing firms' trust and legal certainty. Without patents, the attempt to safeguard innovations must be based on trade secrets and non-divulgence agreements.

Not only does the publishing of a patent give society knowledge, but it also helps to avoid competition patenting the same concept. If a rival submits a patent application for the concept you keep a secret, patent systems always promote the first to file and may generate complications. These concerns can be avoided by the applicant while filing the patent application.

From the patent analysis, it is identified that major automobile players such as FORD, GM, Toyota, Volkswagen, Denso, and Honda have a handful of Blockchain patents related to the automotive industry.



US Patent Count - Major Patent Filers

FORD has a patent that envisions a system that uses blockchain technology, digital assets, and smart contracts to enable autonomous vehicles to communicate and transact with each other.

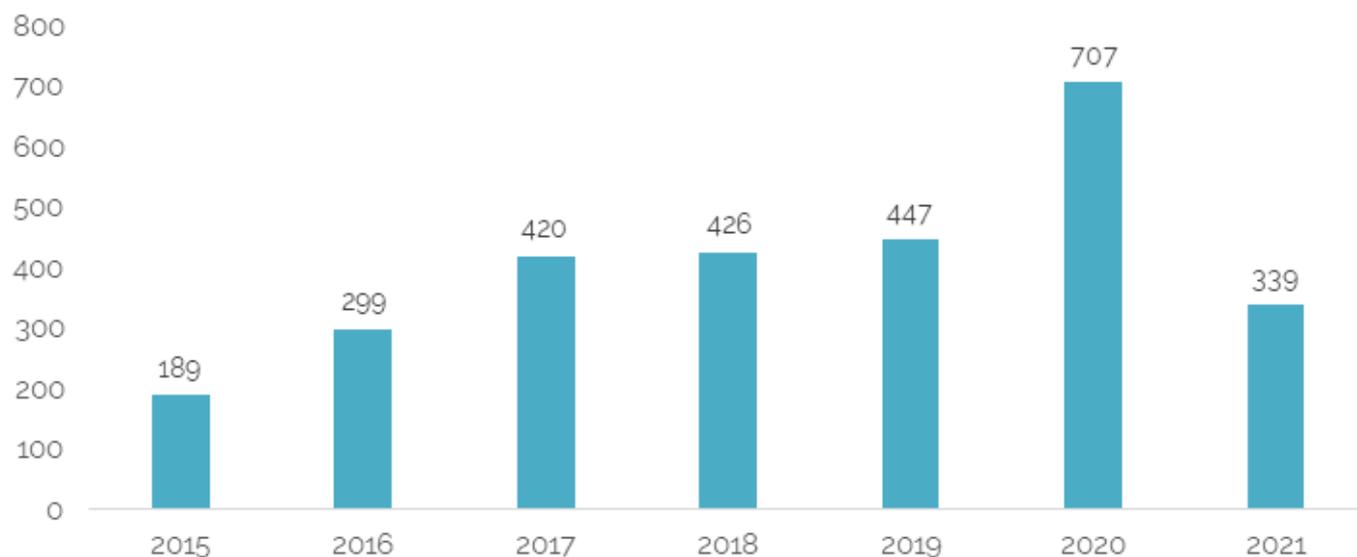
FORD has also filed patents related to a vehicle-to-vehicle communication module that uses cryptocurrencies. The inventions intend to ease congestion by synchronizing the speeds of individual vehicles in a traffic roadblock.

TOYOTA has patents for storing vehicle information on a blockchain ledger. Toyota wishes to use this method to provide its automobile users with a vehicle customer service platform. The blockchain ledger will store vehicle information, communication circuitry, and a blockchain processor.

TOYOTA also has patents for the cross-linked distributed ledger. The ledger can link a vehicle identification number (VIN) and a user identifier (ID).

General Motors has filed blockchain patents for a system that aims to provide secure and robust data distribution and interoperable exchanges between multiple AVs and other entities. Such entities include municipalities, regional authorities, and public facilities.

Count of US published automotive blockchain patents/applications



With time, the number of patents/pending applications will increase as the technology is getting developed and challenges are being solved. Major automotive players and technology companies are collaborating to implement blockchain in the automotive industry.

Challenges in Blockchain Technology Adoption by Automotive Industry

Though blockchain is backed by various success factors and has various automotive use cases, and blockchain is likely to become indispensable for the automotive industry in the years to come. However, its application still faces major external challenges like lack of experience, knowledge, hands-on training, and scalability.

1. Regulations

The first challenge facing commercial blockchain in the automotive sector is dynamic and geographically regulatory regimes. The amalgamation of blockchain applications to work within existing regulatory structures is a challenge, and an understanding of its impact on automotive industry regulations needs to be understood.

2. Adoption and Culture

The second challenge is adopting a decentralized network across various parties and processes of the Automotive industry. The blockchain represents a total shift away from the traditional ways of doing things and thus becomes a challenge to implement across parties.

3. Lack of Privacy

Protection of sensitive information of users in a blockchain network poses a challenge. Blockchain technology may not be able to work with sensitive information.

4. Scalability

To process transactions at a higher speed and large volumes, blockchain can pose scalability issues with higher costs.

5. Energy Consumption

The technology works on the Proof-of-Work mechanism to validate transactions and ensure trust to add them to the network. This mechanism requires a lot of computational power to solve complex mathematical puzzles to process, verify, and, most importantly, secure the entire network.

Conclusion

A great revolution is shown across Blockchain technology and, more specifically, in research and implementation in the automotive industry. Automotive Blockchain Market is projected to grow from USD 0.35 billion in 2020 to USD 5.29 billion by 2030, at a CAGR of 31.19%. Patents filing have been increased considerably in the last few years. Patent litigation has started in the domain of Blockchain, indicating that patent trolls are now seeking to take this space. Our existing paradigm on intellectual property has started to take Blockchain into account. The time is now ripe for automotive manufacturers, OEMs, ODMs, cloud companies, governments, research agencies, and markets to develop regulatory and intellectual property strategies that will strike the right equilibrium between safeguarding our democratic values, fundamental rights, and freedoms and pursue policy objectives that include rapid development in the field of Blockchain in the automotive industry

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