Guide to the Impact of Blockchain in the Automotive Industry

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By Analysts Pedro Pacheco, David Furlonger

Initiatives: Manufacturing Digital Transformation and Innovation

Privacy and confidentiality are growing obstacles to the success of digital services and data analytics in the automotive sector by restricting data availability. Blockchain is emerging as a solution that automotive CIOs should bring into production, focusing on high-ROI use cases.

Overview

Impacts

- Automotive companies are beginning to be impacted by growing concerns with privacy from governments, activists and the public, but their present low investment in blockchain provides limited chances of mitigation.

- Automotive CIOs want to boost the Internet of Things (IoT) and analytics but have yet to develop blockchain capabilities, which may hamper their efforts, due to the confidentiality barriers to data collection and exchange across the automotive value chain.

- Blockchain has the power to enable new business models through easier collection and exchange of data between the automotive ecosystem and third parties — for example, when companies want to sell to vehicle users or even governments.

Recommendations

CIOs driving digital transformation and innovation in the automotive industry:

- Protect against possible consumer backlash and potential regulatory compliance suspicion by incorporating blockchain by default in digital services and platforms that handle personal data.

- Develop blockchain capabilities to guarantee a greater success of your data analytics program. Work with internal stakeholders to identify critical processes where blockchain can remove confidentiality obstacles to data sharing.

- Join forces with business innovation partners in your organization to develop new business models that can connect the automotive ecosystem with third-party companies.
Analysis

Blockchain is arising as a possible solution to growing concerns about data protection in relation to consumer-oriented processes. Blockchain is also seen as a possible solution to confidentiality and trust obstacles to data collection from third-party companies associated with the automotive company’s value chain, which often pertain to suppliers or dealers.

To tackle these obstacles, blockchain uses a distributed digital ledger that creates and links records of transactions using a one-way encryption process called “hashing,” which cannot be reverse-engineered. The secure records are stored in a decentralized manner, which makes it harder to tamper with. Each record contains a time stamp and reference links to previous transactions.

There are common sets of rules for what data can be recorded and how, so participants can verify and audit transactions independently. Each set of data transactions is stored into blocks. Blockchain’s high level of security also lies in the fact that each data block has its own cryptographic mark. It also relies heavily on a consensus protocol — when a transaction takes place, this needs to be confirmed by all nodes of the system. This makes tampering a lot harder, since one would have to influence most of the system nodes at once.

Blockchain is not infallible. However, the combination of three features makes it extremely hard to corrupt: immutability, decentralization and consensus.

These aspects allow blockchain to offer benefits in the following areas of the automotive value chain:

- **Supply chain management.** Blockchain’s distributed ledger can track highly complex automotive supply chains at a more granular level than otherwise, by overcoming concerns related to suppliers’ business confidentiality and privacy or when requiring a trustworthy system of records. This can be used to improve efficiency through analytics to detect theft, fraud or even tax evasion. Some companies — like Volvo Cars and Daimler — are already using blockchain to assess carbon footprint or to ensure that the cobalt used in their batteries comes from ethical sources.

- **Safer and cheaper electronic payments.** Blockchain enables a broad range of automotive-related payments, including payments for services and digital upgrades bought from the car or from a phone app, and for shared mobility services like car sharing and ride hailing. Blockchain can work as a payment enabler for other recurring online payment services, as well, like insurance, financing or leasing. Blockchain’s high level of security and data protection means payments can safely be done via a token wallet directly to the provider’s bank account, avoiding intermediaries’ fees. ZF’s Car eWallet is an example of an initiative designed to achieve both these goals.

- **High-privacy, fast and secure data exchange.** Connected car platforms can benefit from blockchain’s ability to collect vehicle data with limited risk to driver privacy. Blockchain can also enable other models, like customer incentive programs. Loyyal, for example, uses blockchain tokens to integrate with several companies’ loyalty programs. Blockchain can also reduce the latency and slow response time that result when commands requiring security-critical verification and authentication...
are exchanged between the car and other platforms. One common example: unlocking the car from the driver’s mobile phone.

- **Vehicle history record.** A blockchain-enabled platform can store a great deal of a vehicle’s history, like miles driven, maintenance history and accidents, and do it without compromising its owners’ privacy. This allows a more accurate valuation of the vehicle’s residual value and helps to avoid fraud. One example of an initiative in this area is the nonprofit Mobility Open Blockchain Initiative’s (MOBI’s) collaboration with leading auto manufacturers and other blockchain players to create a vehicle identity standard.  

Table 1 sets out the impacts and top recommendations for CIOs seeking to use blockchain in the automotive industry.

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Top Recommendations</th>
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<tr>
<td>Governments, activists and the public express growing concerns with privacy, but there is a gap in the application of mitigation technologies.</td>
<td>■ Incorporate blockchain by default in digital services and platforms that handle personal data.</td>
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| Automotive CIOs boost IoT and analytics but fall behind in blockchain capabilities, a gap that hampers data collection due to confidentiality barriers. | ■ Develop blockchain capabilities to guarantee a greater success of your data analytics program.  
  ■ Work with internal stakeholders to identify critical processes where blockchain can remove confidentiality obstacles. |
| Blockchain has the power to enable new business models through easier collection and exchange of data. | ■ Join forces with business innovation partners to develop new business models beyond the automotive ecosystem. |

Source: Gartner (December 2020)

**Impacts and Recommendations**

**Growing Concerns With Privacy Begin to Impact Automotive Companies**
Automotive CIOs should take consumers’ concern about privacy as a wake-up call. A 2019 Pew Research Center study, for example, showed that most Americans see data collection as more of a risk than a benefit. Drivers could eventually come to reject digital services, if they don’t have clear guarantees that their data is being protected and used properly. And the rollout of more-stringent data protection laws inspired by the European Union General Data Protection Regulation further heightens privacy as an area of risk for automotive CIOs. This is the case, for example, with the California Consumer Privacy Act.

The 2021 Gartner CIO Survey reveals that only 5% of automotive CIOs have already invested in blockchain, despite seeing it as one of the disruptive technologies (see 2021 CIO Agenda: An Automotive Perspective). This means automotive companies not investing in this technology are exposing themselves to a potential future backlash in terms of privacy activism, which consequently impacts the success of connected car programs.

Blockchain’s distributed ledger concept can distribute consumer data across different parties with access to that ledger, while keeping private data safe, encrypted and protected from these other parties.

Recommendations for CIOs:

- Protect against possible consumer backlash and potential regulatory compliance suspicion by incorporating blockchain by default in digital services and platforms that handle personal data. This will also strengthen your company’s credibility in the eyes of legislators and privacy activists.

- Look for success stories related to the use of blockchain in the financial sector. Given the high level of security associated with financial applications, these use cases can accelerate the adoption of blockchain in your organization.

Confidentiality Barriers Across the Automotive Value Chain Hamper IoT and Analytics Efforts

The proliferation of IoT devices and sensors in supply chains opens up opportunities for automotive companies to optimize their efficiency — reducing costs, increasing speed and improving resiliency. Carbon footprint reduction is also a must, as the transportation sector is one of the main contributors to greenhouse gas emissions. Raw materials and components that are sourced need to obey strict ethical criteria. Detection of theft, fraud or tax evasion are also concerns. Automotive respondents to the 2021 Gartner CIO Survey see a 67% investment increase in data analytics for 2021, as well as a 48% investment increase in IoT for the same period.

Despite the growing bet on IoT and analytics to improve process efficiency, collecting this level of data detail and accuracy often conflicts with suppliers’ confidentiality requirements. Suppliers may, for example, be expected to provide access to internal databases, potentially exposing other customers’ confidential information. This means a big roadblock to an ambitious data analytics program. However, a blockchain architecture allows suppliers to share with OEMs only what’s strictly necessary, as well as making sure the information is trustworthy.
The technology’s distributed ledger will also reassure OEMs that the information is legitimate. For instance, Gartner’s research shows companies that have already implemented blockchain see their level of IoT maturity 2.3 times higher than that of other companies. However, the level of in-house blockchain capabilities is generally low across automotive companies, as only 5% have already deployed some sort of blockchain application. This means a gap to be covered by automotive CIOs.

Confidentiality and data protection concerns also cause problems in the areas of sales and after-sales. For instance, OEMs and their dealers often can’t exchange customer information openly, because of data protection laws or dealers’ fears that OEMs will bypass them in terms of sales opportunities. However, blockchain could solve these issues, improving customer satisfaction and sales lead conversion. For instance, the technology can enable OEMs to run a token-based customer loyalty program, where dealers add customer data but without sharing it with OEMs.

Vehicle parts traceability is also an important matter, in avoiding counterfeiting and in ensuring compliant end-of-life disposal, to make sure these are adequately recycled. A blockchain-powered distribution and disposal system could track each car part from beginning to end without threatening customer privacy or the commercial position of parts resellers.

**Recommendations for CIOs:**

- Work with stakeholders from other business areas in your company to identify critical processes where blockchain presents opportunities to remove confidentiality obstacles to data sharing. This is a key step to formulate a business case that will enable you to build blockchain capabilities, with the purpose of triggering a widespread use of the technology. This approach will amplify the success of IoT and data analytics programs spanning the automotive value chain by mitigating possible roadblocks related to confidentiality.

- Establish a blockchain lab. Companies like Toyota and Volkswagen have already established their own blockchain labs. Funding may be an obstacle in some cases, but it’s important to have a blockchain program head who will work with other internal functional areas to define and implement use cases. Ensure support for this program leader from a team that defines the “make or buy” approach according to project constraints. As such, this also implies establishing cooperation with the leading tech vendors in the area of blockchain.

**Blockchain Has the Power to Enable New Business Models**

As privacy regulations and fears block private data exchange between companies, blockchain enables selective data sharing, while preserving private information. This opens opportunities for the creation of new business models, where OEMs can partner with companies from other sectors with the purpose of maximizing revenue per customer. For instance, blockchain can enable financial models like crowdfunding of electric vehicle (EV) chargers. It can also allow companies to offer vehicle users several products and services according to their preferences, together with a system of tokens representing
loyalty points with monetary value. Moreover, these same tokens can be easily transferred to other beneficiaries without having to store their personal details.

Recommendation for CIOs:

- Join forces with business innovation partners in your organization to develop new business models that can connect the automotive ecosystem with third-party companies. Blockchain should be used as a vehicle that enables an easy exchange of nonsensitive data, as well as the exchange of value between OEMs, their customers and other affiliated companies.

Acronym Key and Glossary Terms

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<th>Key and Glossary Terms</th>
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<tbody>
<tr>
<td>IoT</td>
<td>Internet of Things</td>
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<tr>
<td>MOBI</td>
<td>Mobility Open Blockchain Initiative</td>
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<tr>
<td>OEM</td>
<td>Original equipment manufacturer</td>
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<td>ROI</td>
<td>Return on investment</td>
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Evidence


Volvo plans to use blockchain technology to become the first auto manufacturer to implement end-to-end tracing of the cobalt used in its vehicles.

3. ZF Spins Off Car eWallet as a Start-up, ZF press release. ZF's Car eWallet spinoff connects vehicles with facilities and service providers like gas stations and parking garages for seamless blockchain-enabled transactions.

4. The Loyyal platform uses blockchain and smart contract technology to manage a broad range of customer rewards and loyalty programs.

6 Americans and Privacy: Concerned, Confused and Feeling Lack of Control Over Their Personal Information, Pew Research Center. A nationwide survey shows widespread concern among Americans about the privacy of their personal information.

7 Gartner IoT Survey. Gartner conducted a survey designed to help companies better understand the business benefits of the IoT, how to organize IoT to deliver those benefits and how to overcome the technical challenges of implementing complex IoT projects. The survey included 511 U.S. IoT decision makers, conducted online from 15 May through 27 June 2020. Qualified respondents were required to have primary responsibility for IoT implementation decisions, have completed or planned at least one IoT use case or project, and represent companies with annual revenues of less than $100 million. The study was developed collaboratively by Gartner analysts and the Research Data and Analytics team.

Recommended by the Authors

How to Become the Digital Automaker of the Future
Hype Cycle for Connected Vehicles and Smart Mobility, 2020
Hype Cycle for Blockchain Technologies, 2020
Understanding the Gartner Blockchain Spectrum and the Evolution of Technology Solutions
Video: How Lenovo Uses Blockchain to Take Supply Chain Excellence to the Next Level