

Intro

INTRO

BLOCKCHAIN IN AUTOMOTIVE IS STILL EMERGING

The tremendous hype surrounding Distributed-Ledger-Technologies (DLT) such as blockchain tends to thinly veil that they are still immature within a market that is just emerging. The majority of executives are still looking for clear concepts for success and a detailed understanding of the relevance and value of applications.

Despite many uncertainties, blockchain is bound to impact every vertical and domain of the industry and the digital transformation that is on its way.

The automotive industry has always influenced technological advances and has conversely been influenced by these developments. DLT offers car manufacturers, suppliers and adjacent service providers across the automotive ecosystem, a range of opportunities and potential benefits. DLT is perceived as the enabler for vehicles to receive and carry out all manner of instructions and transactions autonomously, and across multiple constituencies.

TYPE AND LEVEL OF TRANSACTIONS:

P2P: Person-to-Person (e.g. car sharing – how people use their cars)
P2M: Person-to-Machine (e.g. connected car – how people interact with their cars)
M2M: Machine-to-Machine (e.g. autonomous driving – how cars interact with other cars and traffic elements, machines communicate with each other).

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THE BLOCKCHAIN VALUE AT STAKE ACROSS INDUSTRIES





Source : McKinsey & Company

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FEASIBILTY FACTORS **OF BLOCKCHAIN BY INDUSTRY**

CHALLENGES

WHAT ARE THE MAIN CHALLENGES FOR BLOCKCHAIN IN AUTOMOTIVE?

The primary impediments to commercial blockchain adaption in automotive are:

SCALABILITY

A widespread adaption and scaling of blockchain requires the willing participation and consent of many different parties. This is a difficult and time consuming process and an ambitious undertaking in a fragmented and siloed industry. Furthermore the dynamic and geographically variable regulatory regimes are impeding this process. The components and conditions that have to be met are: network platform, industry standardization, suitable applications, participants.

SECURITY AND PRIVACY

The more connected a vehicle is, the more susceptible it becomes to potentially deadly/dangerous cyber attacks. Also, most of the potential applications require smart transactions and contracts to be indisputably linked to known identities. Security and privacy concerning the storing, sharing and accessing of the data are hence of vital importance. Public perception and acceptance regarding the concepts of value, security and trust will have to be proactively discussed and (re-)framed.

O LOW STANDARDIZATION ACROSS THE INDUSTRY AND LACKING INTEROPERABILITY

DLT requires interoperability, compatible platforms, standardized protocols that dictate communication methods, data definitions and formats, and procedures for applying and maintaining that data.

REALIZED USE CASES IN AUTOMOTIVE

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REALIZED USE CASES IN AUTOMOTIVE I

USE CASE I

USE CASE 2

DIGITALIZED CAR MAINTENANCE

(RENAULT)

Pilot which uses blockchain as a shared ledger to log all car repair and maintenance history in one place. The next pilot will focus on vehicle-based microtransactions – essential to integrating the loT with the exchange of value.

BLOCKCHAIN ENABLED TOLLBOOTH

(OAKEN INNOVATION)

Idea/test in which Tesla cars automatically pay as they pass through toll booths, as both nodes (car and tollbooth) have ethereum nodes, which use smart contracts to trigger a machine-to-machine (M2M) transaction.

USE CASE 3

AUTOMOTIVE FINANCING

(MAHINDRA)

The Indian based OEM created a blockchain incubator focused specifically on the automotive financing portfolio.The pruducts are aimed at small- and mid-sized enterprises that are clients with Mahindra Finance in the Indian market.

REALIZED USE CASES IN AUTOMOTIVE II

USE CASE 4

USE CASE 5

CARPASS (BIGCHAINDB)

Conceptualized in a hackathon by BigChainDB, Innogy, and Volkswagen Financial Services (VWFS). An effort to centralize all information about a car (including title, service providers, prior damage, maintenance, and inspection history) as well as telemetry and sensor data to a shared immutable and transparent database.

CAReWALLET

(IBM, ZF FRIEDRICHSHAFEN, INNOGY INNOVATION HUB, UBS)

An automotive transaction platform for mobility-related payments to simplify technical services, digital trade and cashless payments (e.g. payment for refueling, re-charging electric cars, tolls, parking fees, car sharing etc.).

USE CASE 6

BC Mobility & Logistics

(BLOCKCHAIN SOLUTIONS GMBH)

BC-based transportation smart-key solution built on data generated by smart devices. Record driving data, manage car-share transactions (incl.

transactional access rights), monitoring vehicle information for car related business cases (insurance, DOOH advertisement, car rental, car reports) on integrated infrastructure.

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OPPORTUNITIES

WHAT ARE THE OPPORTUNITIES FOR BLOCKCHAIN IN AUTOMOTIVE?

Sensors within and around cars gather tremendous amounts of data. Connected cars today are producing about 25 gigabytes of data an hour and that figure is expected to further increase in the future. This leads to various problems as well as opportunities shared by all parties involved:



SECURITY

A decentralized ledger is virtual impossibility to be hacked. The records on a blockchain are secured through cryptography. The data-blocks may not be changed, corrupted, manipulated.



ACCESS BY **MULTIPLE PARTIES**

Link data held by different businesses and parties across the industry including manufacturers, dealers, auto financeproviders and insurers to allow for the new business models to function efficiently.



TRUST AND TRANSPARENCY

The necessary trust and transparency may not be established by control over the data by one central party/entity due to potential divergence of interests.

CURRENTLY NO ESTABLISHED TECHNOLOGY AND CENTRAL DATABASE IS AVAILABLE WHICH PROVIDES THE UNDERLYING INFRASTRUCTURE TO MEET THESE DEMANDS AND NEEDS

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INTERDEPENDENCE

In the automotive industry, the interactions and transaction of various different stakeholders and participants in the market depend on accessing and sharing information in order to provide their services and goods.

BENEFITS

THE VALUE AND BENEFITS OF **BLOCKCHAIN IN AUTOMOTIVE**

In the distributed database architecture, the record and verification of a transaction or event relies on multiple parties agreeing on the validity of that transaction, rather than relying on a single centralized authority. In the automotive industry this is particularly valuable and useful to:



COMPLEXITY AND SPEED

As 'millions or billions' of devices will have to communicate with each other efficiently, requiring versatility, execution speed, redundancy and management of high volumes of transactions.



DEFINE TRUST

Trust is the building block of any transaction. In a datadriven society the possibility to engage in transactions is constantly increasing. Established institutions do not meet the market needs and demands any more. The DLT creates programmable trust, readily available and at a lower price per transaction.



PROVIDE SECURITY

All interactions and transactions exist on an immutable database of shared, secure, and highly permissioned access. DLT is an inherently secure means of storing and sharing data, immune to fraud or tampering and with the ability to audit records.



ALLOW FOR COST **REDUCTION**

Through decentralization, one party does not bear the burden and expense of maintaining the database, backup servers, remote storage.

USE CASE GROUPS IN AUTOMOTIVE

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USE CASE GROUPS IN AUTOMOTIVE I

USE CASE GROUP I

AUTOMOTIVE IOT INTERACTIONS

A shared ledger between OEMs, parts distributors, dealerships, service mechanics, insurance providers, and others: to allow the car parts/equipment to autonomously sense its own needs, advise the driver about the need for repair, contact remote users for updates/suppliers for replacement parts, negotiate pricing and appointments for service and repairs, authenticate the proper technician, process the respective payment for services.

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USE CASE GROUP 2

AUTOMOTIVE TITLE TRANSFER

To streamline the process of transferring ownership from buyer to seller by digitizing and securing titles, expediting the time needed to authenticate, validate, and transfer ownership of specific assets.

USE CASE GROUPS IN AUTOMOTIVE II

USE CASE GROUP 3

USE CASE GROUP 4

SUPPLY CHAIN MANAGEMENT

Ever-growing and evolving networks of products, people and counterparties. DLT can be applied to monitor and authenticate transactions and interactions between the parties involved: product inception, development, distribution, traceability, trade financing, retail and use, recycling/ aftermarket.

SMART MANUFACTURING

Blockchain may be utilized for ondemand manufacturing, smart prognostics, inventory management, resolving ownership issues.



USE CASE GROUPS IN AUTOMOTIVE III

USE CASE GROUP 5

INSURANCE & INSURANCE CLAIM PROCESSING

To provide bespoken insurance offers and premiums as well as to streamline both claims processing (documentation, submission, review resources, verification) as well as subsequent pay-outs and service contracts associated with financing and executing repairs.

USE CASE GROUP 6

LOYALTY BASED MICRO-TRANSACTIONS/ INFOTAINMENT

Reward programs to drive customer engagement, retention, and additional revenue across a variety of sectors. Provide a valuable add-on to infotainment technology by making sure that in-car payments for movies, apps, and other services are kept secure.

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USE CASE GROUP 7

AUTOMOTIVE FINANCING PROCESS

To streamline the loans and financing process (customer bank validation along the transaction setup and execution, issuing letters of credit, review of multiple documents sourced from different locations, scoring and classifying risk, archiving of reviewed documents).

OUTLOOK

INDUSTRY CONSORTIA AS DLT CATALYSTS

The broader the network adoption, the greater the value and efficiency. Emerging industry consortia proof critical catalysts in the blockchain space:

MOBILITY OPEN BLOCKCHAIN INITIATIVE (MOBI)"

MOBI (i.a. BMW, Ford, General Motors, Renault, CarBlock, BigChainDB, Hyperledger, Bosch, ZF, Accenture, IBM) aims to create common standards and APIs to enable payments and data-sharing between cars – driving forward a new digital mobility ecosystem.

⊘ "R3 CEV CONSORTIUM"

an enterprise blockchain software firm (i.a. Toyota – in addition, Toyota plans to build its own consortium).

D "HYPERLEDGER PROJECT"

an open source collaborative effort to advance cross-industry blockchain technologies. Founded and led by the Linux Foundation, includes leaders in finance, banking, Internet of Things, supply chains, manufacturing and technology, (i.a. Daimler AG).

D, BLOCKCHAIN IOT CONSORTIUM"

coordinating the universe of IoT suppliers around new blockchain-powered use cases.

D, **TRUSTED IOT ALLIANCE**"

an open source software foundation to support the creation of a secure, scalable, interoperable, and trusted IoT ecosystem.

③ "BLOCKCHAIN IN TRUCKING ALLIANCE"

a forum for the development of blockchain standards and education for the freight industry.

OUTLOOK

ASSESSING BLOCKCHAIN OPPORTUNITIES AND ACT

O ASSESSING BLOCKCHAIN OPPORTUNITIES

The complexity and value to be derived from blockchain solutions inherently differ depending on the defined impact level as well as the strategic business objectives.

Companies need to thoroughly assess which blockchain applications and solutions are most suitable for them to address critical business issues, as well as when, where and how to invest.

⊘ ACT

Whilst the industry trailblazers are enhancing existing blockchain applications to realise the full potential and value of the technology, businesses that discard blockchain are at risk of falling behind and losing out on potential growth and value generating opportunities.

ONE LAST THING...

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Data

DATA BATTLEFIELD

THE CAR IS THE NEXT DATA BATTLEFIELD

The data gathered by cars (via build-in sensors, aftermarket retrofit solutions) are holding tremendous potential for social and economic progress as well as new business models, mobility concepts, solutions and offers. Technologies such as AI, Big Data, IoT combined with blockchain are set to generate huge impact and growth opportunities in the automotive industry.

> "The car is the fourth screen and the next big data battleground. It's a trillion-dollar prize." Chris Ballinger, CEO of MOBI

In accordance with the GDPR, the driver or holder of the vehicle has a right of self-determination and disposal of the personal data generated in the car.

In the past, OEMs have mainly taken the stand that the data stored in and transmitted by the vehicle into their systems concerns only the vehicle and not driver related data, precluding the driver from any right related to the data. In spite of or rather because of the GDPR, uncertainty and lack of clarity result in a legal grey area difficult to navigate.

THERE IS A NEED FOR

- manufacturer-independent standards and platforms for a general and regulated access to the data and the data formats
- a data-storage system that is transparent, immutable, secure and permissioned

GET IN TOUCH

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