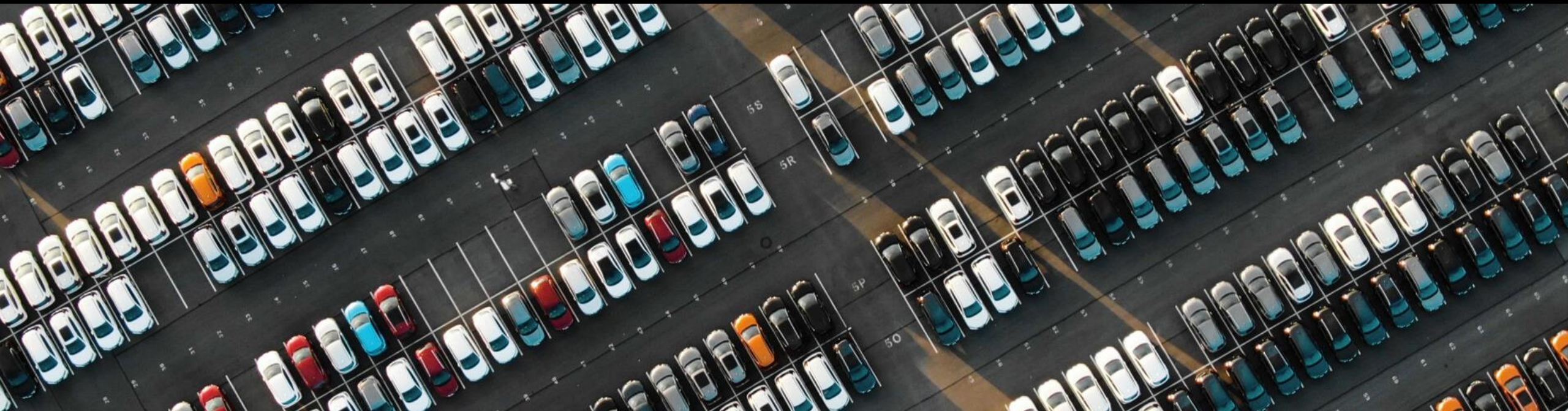


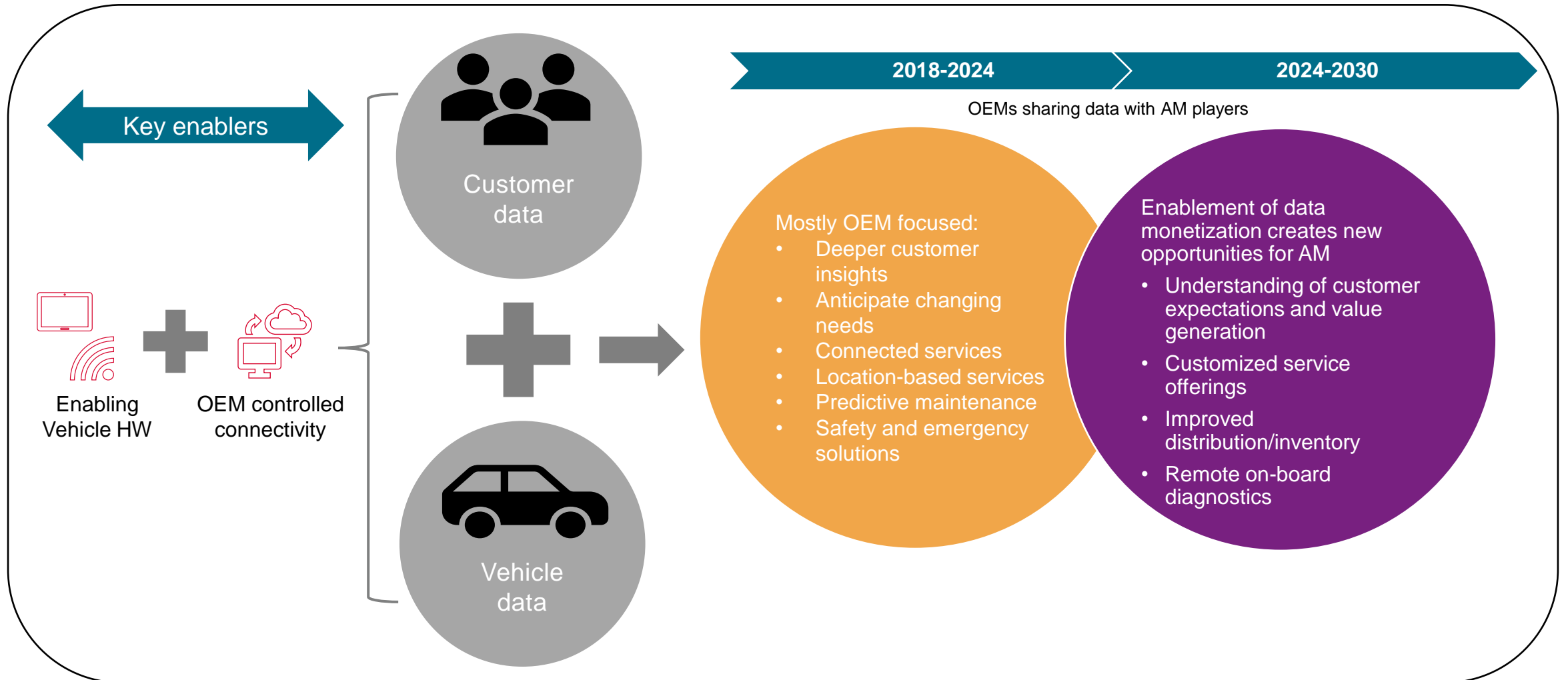
Digitalization of automotive aftermarket through connectivity

20 October 2022

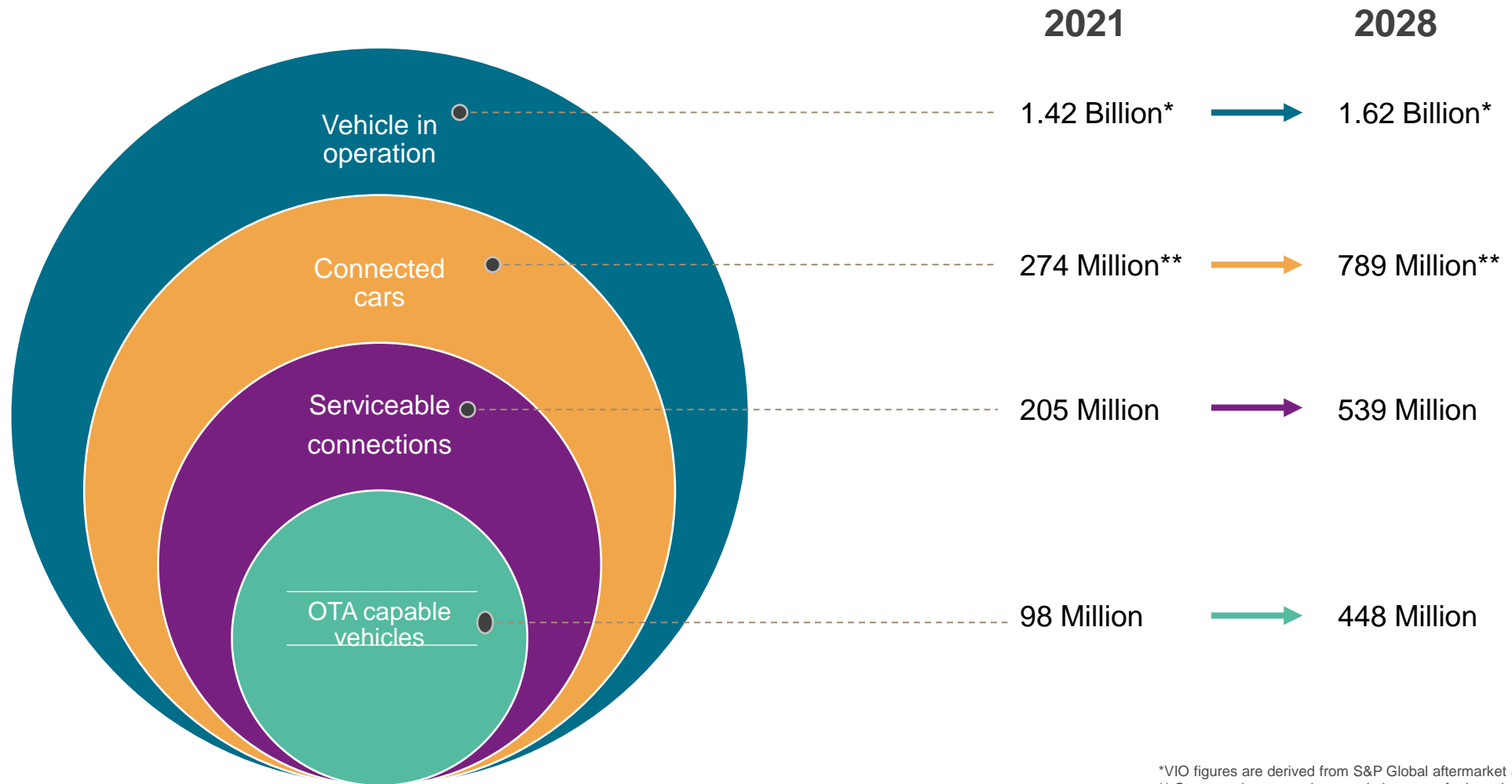


Connected car ecosystem

The industry has seen major improvements in vehicle connectivity resulting in extreme growth in vehicle data



How the connected car market landscape shifts between 2021 and 2028

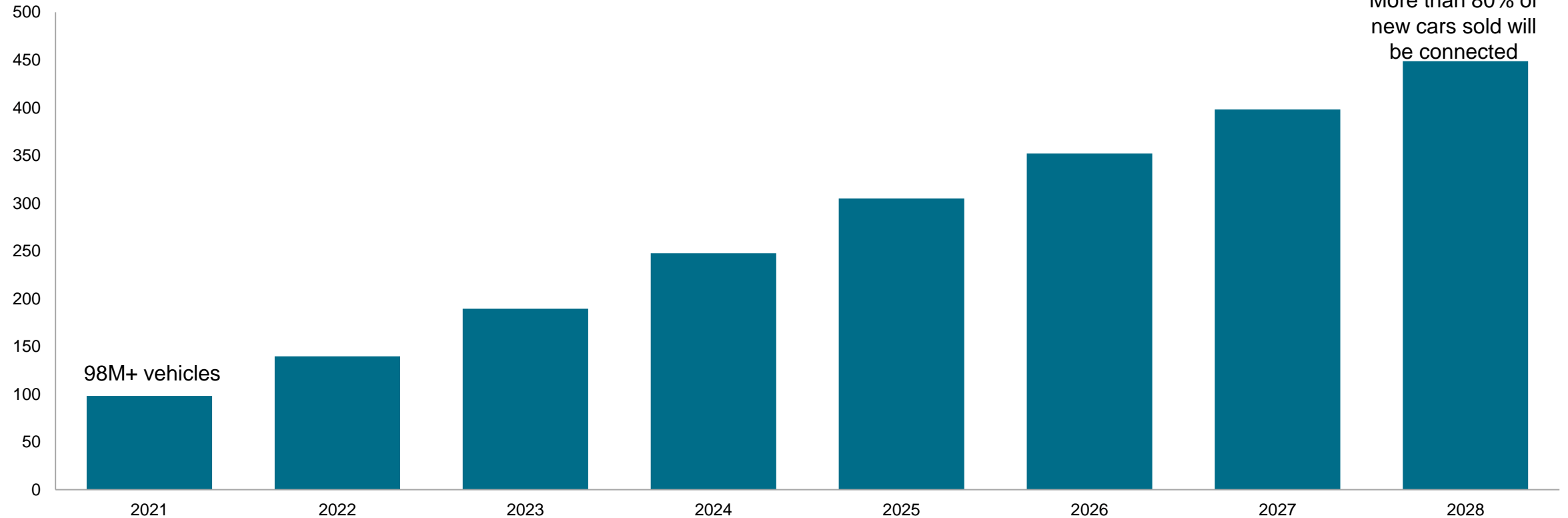


Source: S&P Global (IHS Markit) CVIO OTA forecast updated in September 2022

*VIO figures are derived from S&P Global aftermarket auto tech insight
 ** Connected cars are the cumulative sum of telematics forecast from 2017

More than 400M vehicles are expected to have over-the-air (OTA) capability in 2028

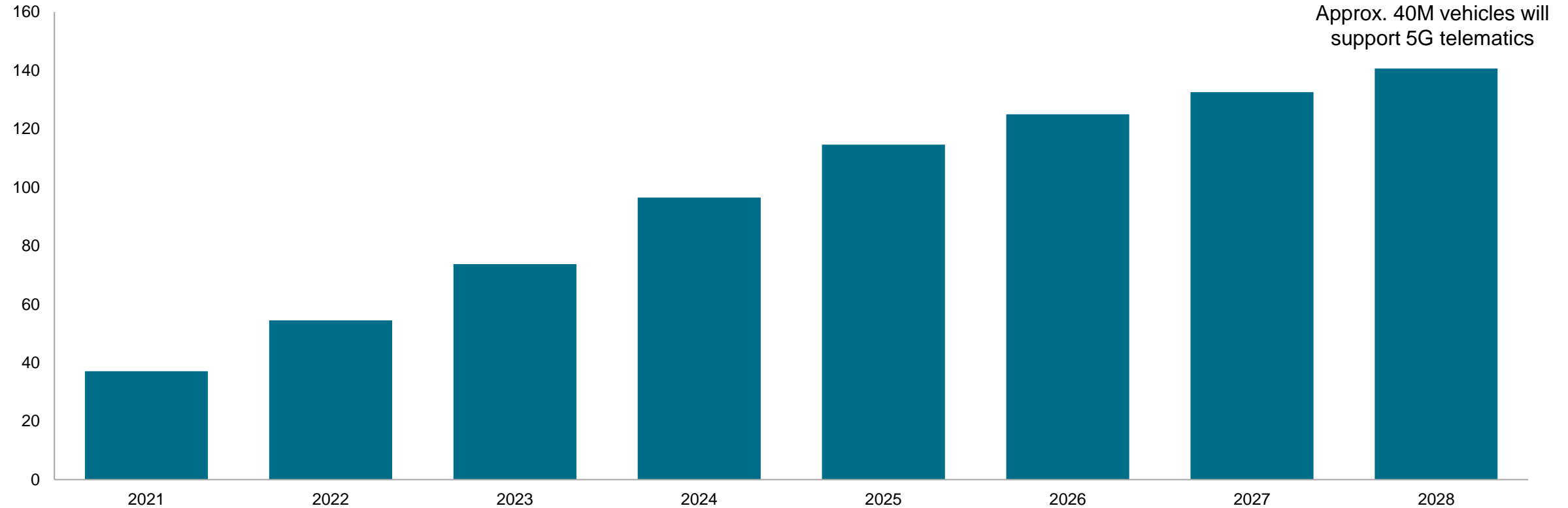
Number of OTA vehicles in operation globally 2021-2028 (millions)



Data from OTA (CVIO) September 2022
Source: S&P Global Mobility.
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North America is leading the market with 141M connected vehicles that are expected to have OTA capability in 2028

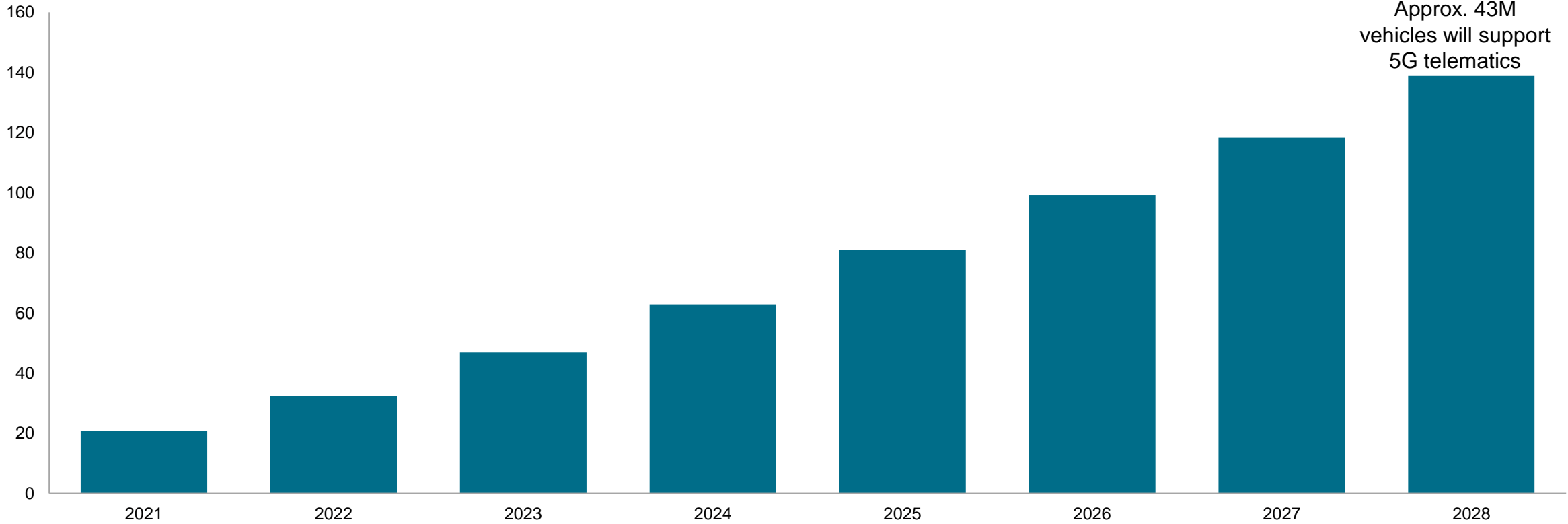
Number of OTA vehicles in operation in North America 2021-2028 (millions)



Data from OTA (CVIO) September 2022
Source: S&P Global Mobility.
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Greater China is expected to have 139M OTA-capable vehicles on the road in 2028, rising from 21M in 2021, at a CAGR of 31%

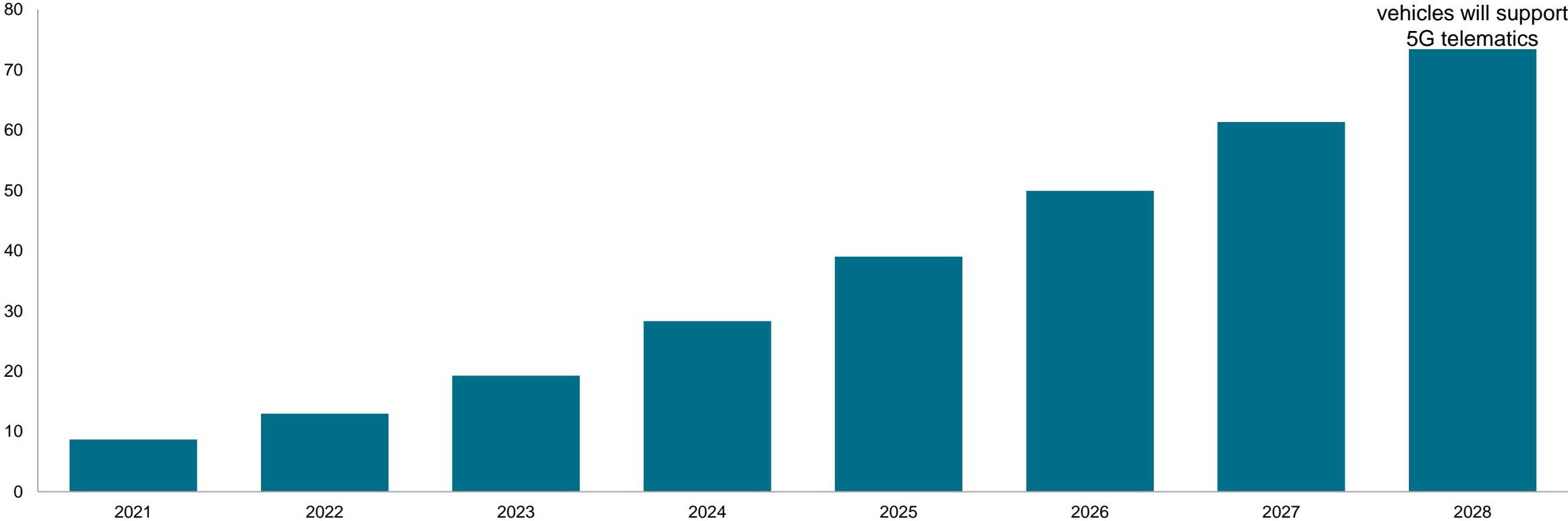
Number of OTA vehicles in operation in Mainland China 2021-2028 (millions)



Data from OTA (CVIO) September 2022
Source: S&P Global Mobility.
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Europe is expected to grow sharply at a CAGR of 35.7%, from just 8.7M cumulative volumes in 2021 to 73.5M in 2028

Number of OTA vehicles in operation in Europe 2021-2028 (millions)

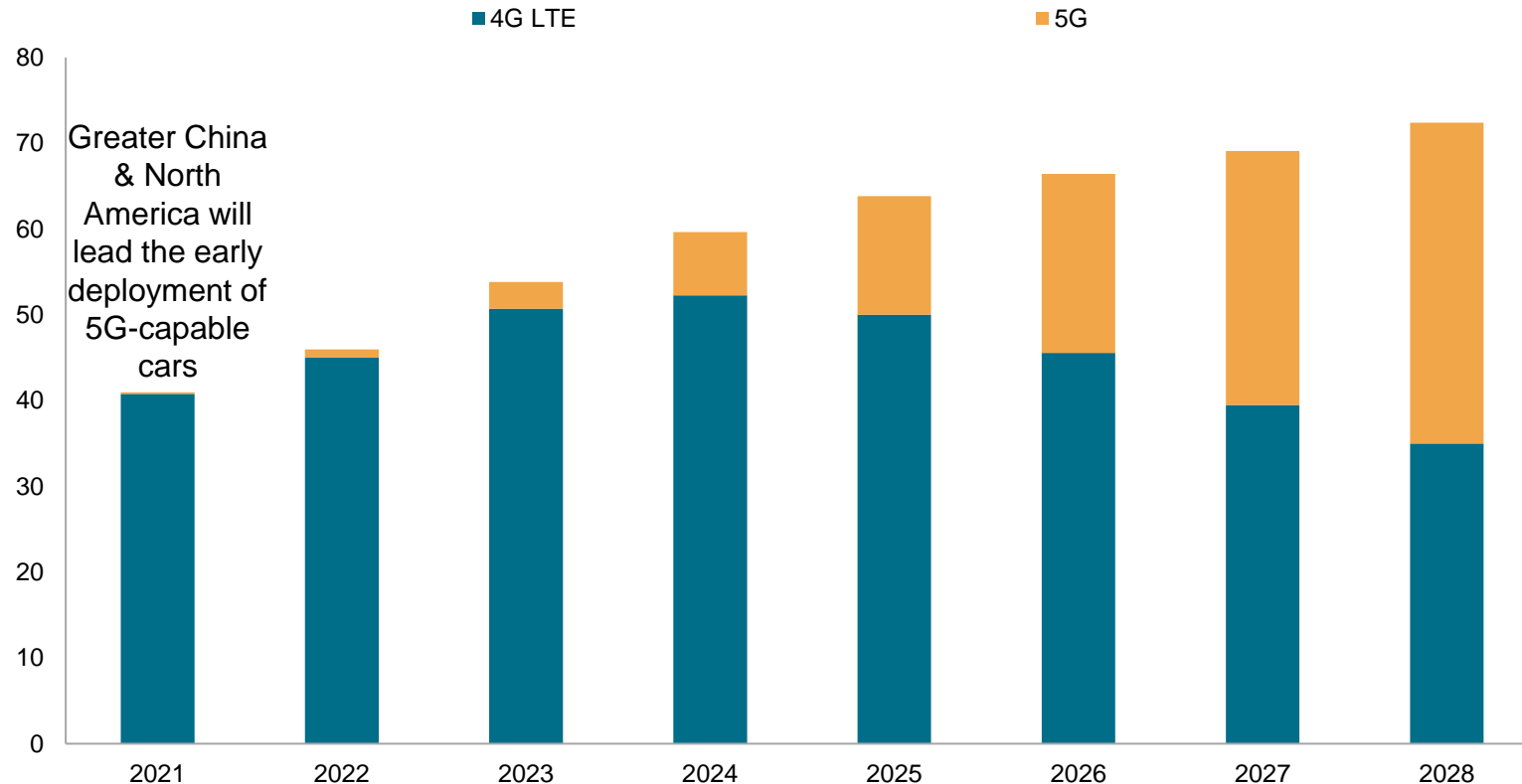


Data from OTA (CVIO) September 2022
Source: S&P Global Mobility.
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The rise in connected cars

100+ production brands are forecast to offer 5G-capable vehicles in 2028, up from only 12 in 2021

4G and 5G capable light vehicle sales 2021-2028



Source: S&P Global Mobility.
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Connectivity is no longer a luxury; it is an expectation.

The first factor is bandwidth penetration. The bandwidth available for telematics systems determines what connected services can be delivered to the customers in connected cars—the higher the bandwidth, the better the services that can be delivered.

Faster speeds opens a world of possibilities — video chats between drivers, real-time prediction engines that monitor where you drive, real-time navigation, vehicle diagnostics, or even HD video streaming to the rear entertainment system.

Presently, the leading technology is 4G LTE as the world has moved from 3G speeds in most region and it is rising on annual basis before peaking in 2024.

For car manufacturers, the data generated via 4G LTE-supported apps allows for better insight into which features are most popular, efficient, and useful to consumers. This will only empower them to advance the connected convenience of the driving experience.

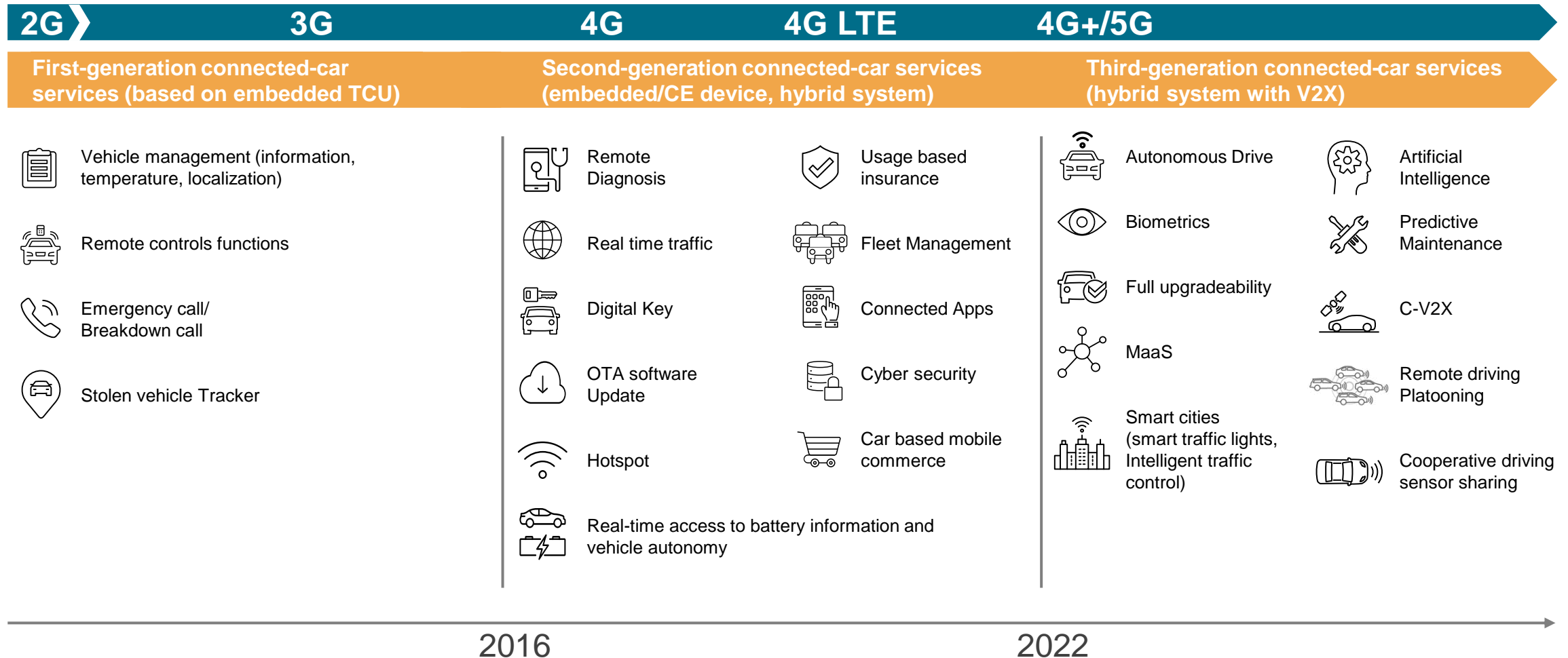
By 2024, we expect more than 51 million new vehicles sold will have 4G LTE connection.

Vehicle data and its importance in the aftermarket value chain



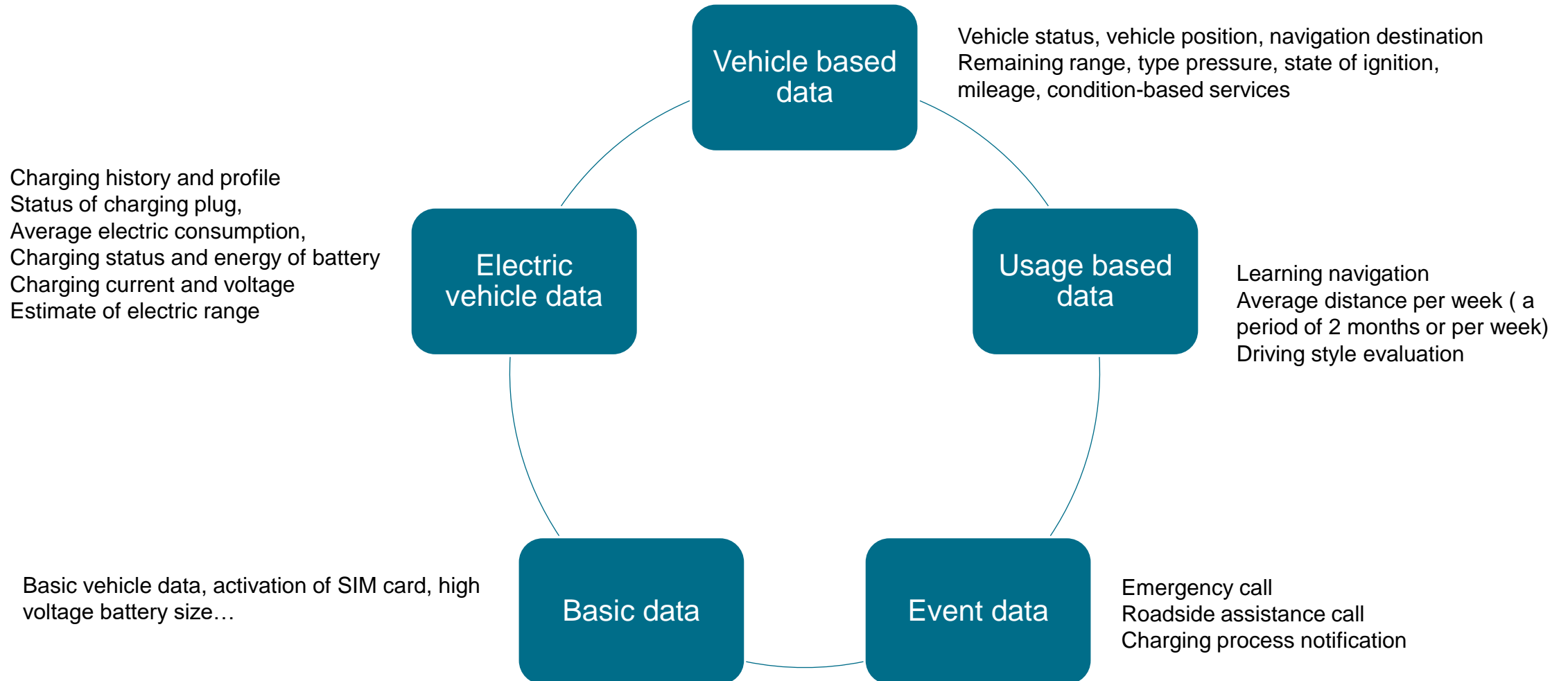
Global connected car market trends

Connectivity bandwidth unlocks advanced connected services



Importance of vehicle data

BMW Car Data : available for 30 EU countries

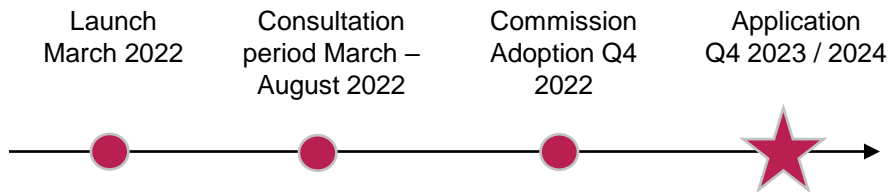


Europe Data Act

Propose new rules on how companies can use and access non-personal data



Data Act
Clarify who can create value from data and under which conditions



On 23 February 2022, the European Commission published the long-awaited “Data Act”, which is a proposal for regulation to establish a harmonized framework for industrial, non-personal data sharing in the European Union.

The European Data Act will make more data available for use and will set up rules on who can use and access what data, for which purposes across all economic sectors in the EU. According to the Commission, the new rules are expected to create €270 billion of additional GDP by 2028.

Objective

Ensure fairness in digital environment, stimulate a competitive data market, open opportunities for data driven innovation and make data accessible for all

Complete the Data Governance Regulation (proposed in November 2020) which creates the process and structures to facilitate data

3 possible policy options:

- Equal access rights to in-vehicle data for all parties, but with no regulation towards the data that can be collected
- A specified format for a minimum required list of available data, functions, and resources
- Builds on the former option, but also includes uniform data access governance rules

Initiative sets conditions for accessing and using such in-vehicle generated data

Impact on the automotive aftermarket

Telematics system and connected services become standard in new vehicles



Safety & Security

- Emergency call
- Break down call
- Stolen vehicle tracking
- Alerts



Maintenance

- Remote diagnostic / Prognostic
- Vehicle status monitoring



Navigation

- Online navigation (search POI, dynamic route planning)
- Real time traffic
- Send to Car



Entertainment

- Online media
- In car Wi-Fi



Convenience

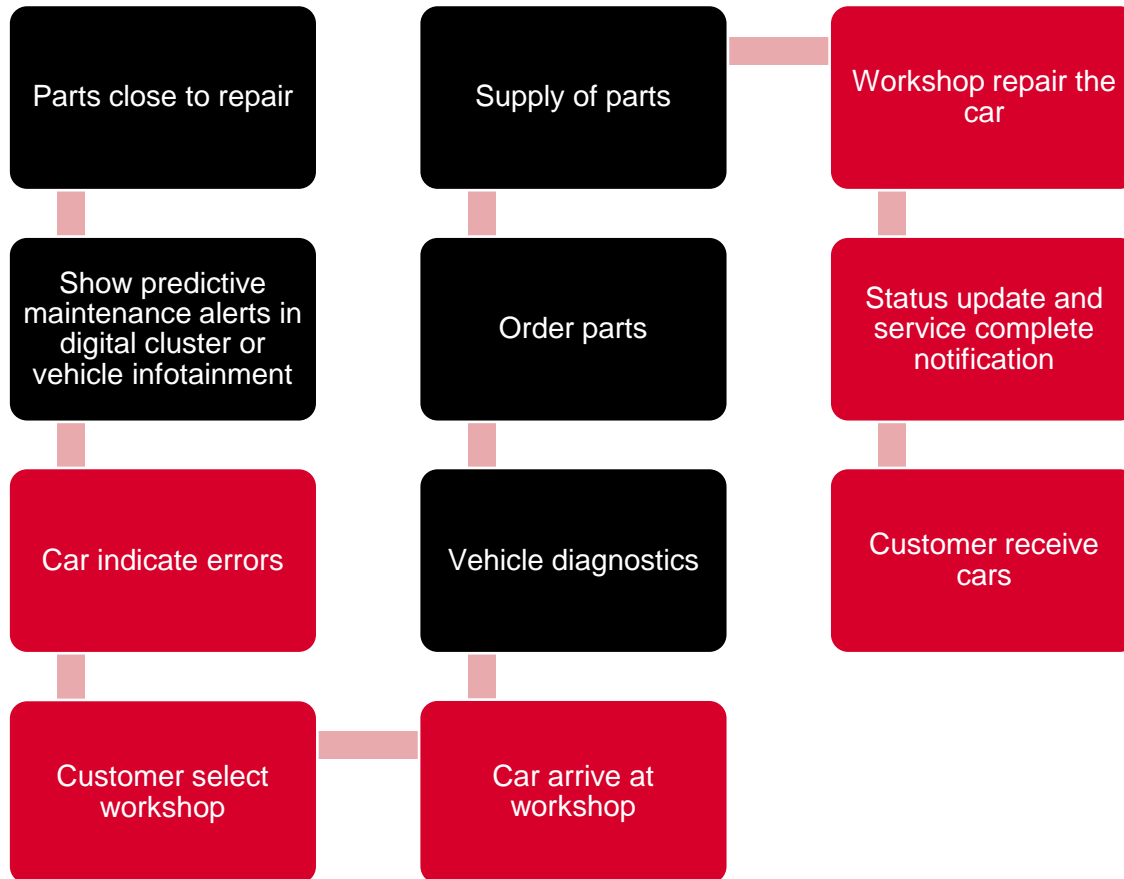
- Concierge services
- Voice assistant
- Remote control
- Remote charge & stop



Location based Commerce

- Search for fueling and charging status with price & availability
- Search for parking with price & availability

Connectivity enables remote diagnostic services



■ Impact by remote diagnostic

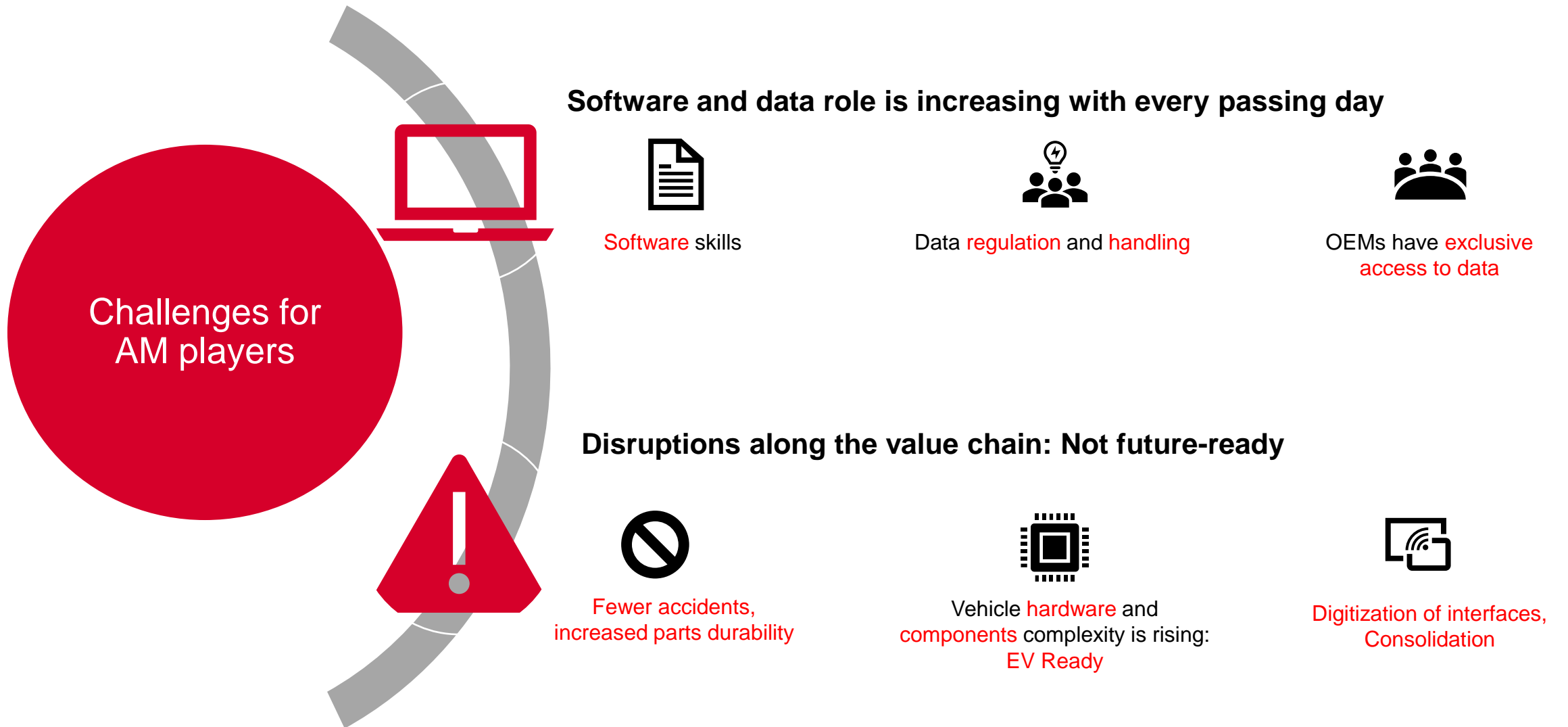


Increase customer satisfaction

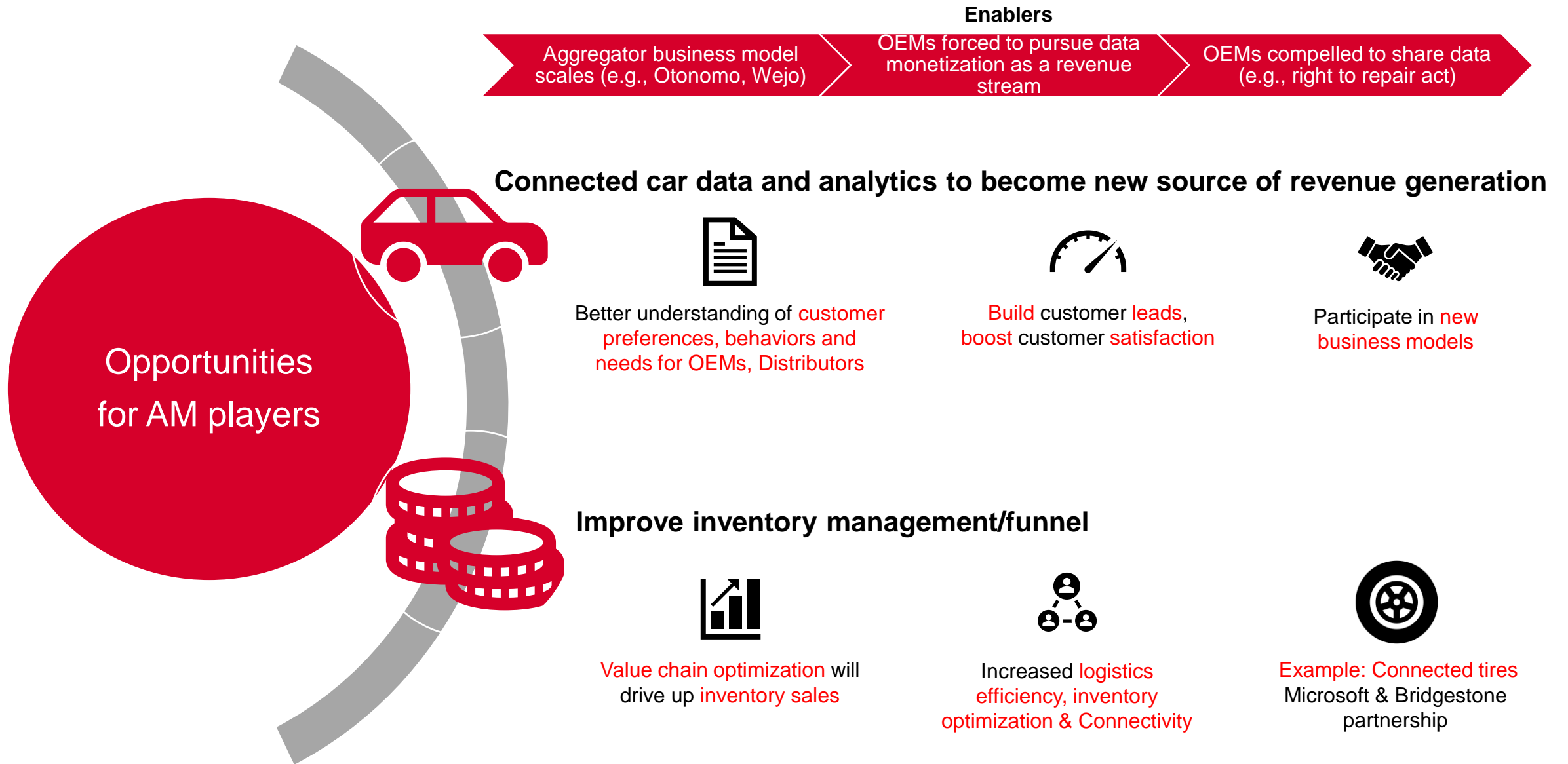


Increase return rate to OE dealers

Challenges for AM players



Opportunities for AM players



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