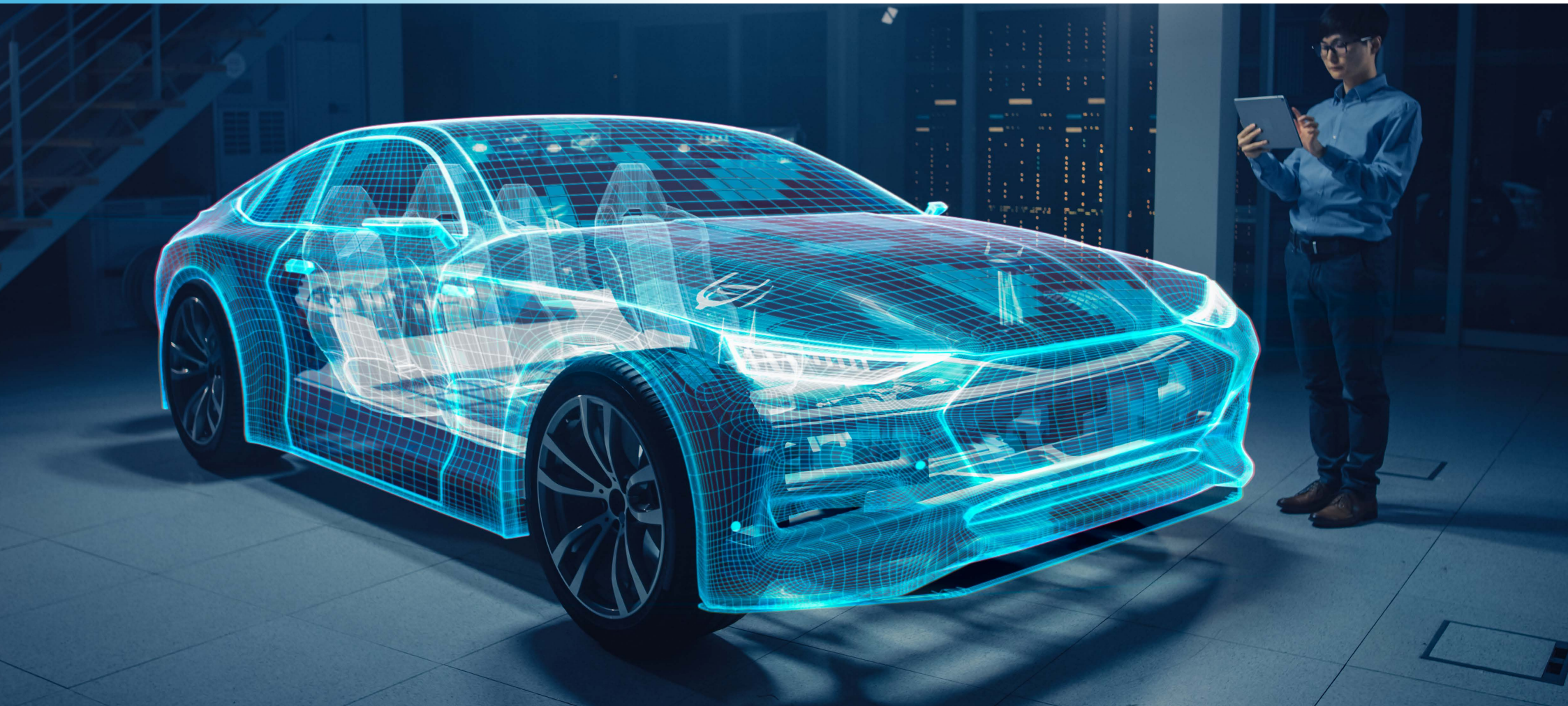# bics

Managing the lifecycle of connected parts and applications in the global automotive industry
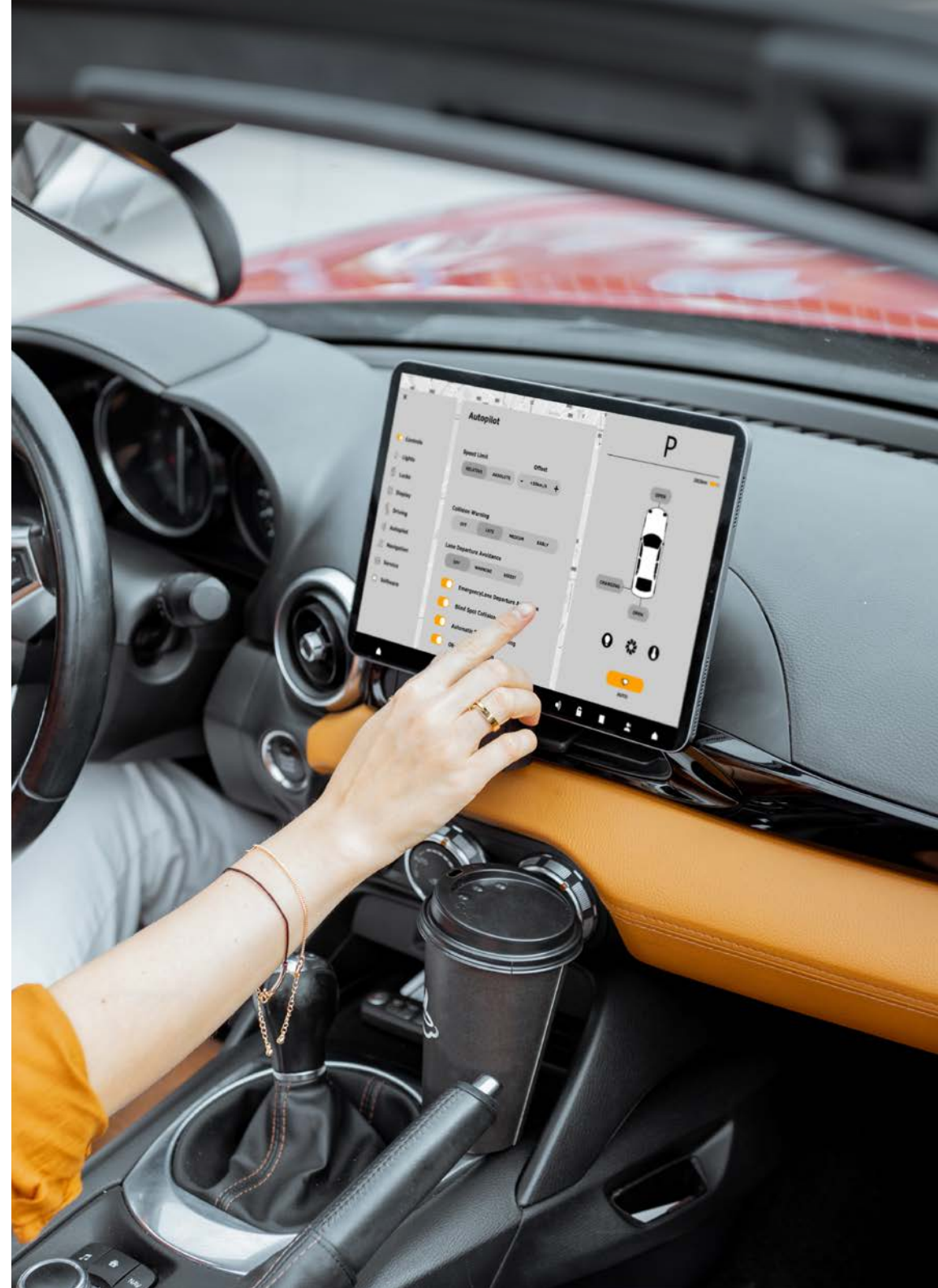
Introduction

Globally connected vehicles are moving the automotive industry into a new era. Vehicles are being deployed with extensive sensor platforms that generate vast amounts of data from different systems (such as LIDAR, telematics control units, or OBD-II interfaces). At the same time, the advent of 5G and underlying low latency, high bandwidth V2X technology is enabling dozens of new, automotive use cases.

Together, these technological developments will revolutionize the globally connected vehicle market starting from the earliest stages of the manufacturing process to how people drive on the road. It should be no surprise then that the automotive IoT market is estimated to be worth $541.73 billion by 2025, growing at a CAGR of 16.4%.[1] But with all these opportunities arising, is the industry equipped for this brave new world of connectivity?

This whitepaper looks at the readiness of the automotive industry for the future of IoT, how it will affect all the key stakeholders, and how they can make the most of this opportunity.

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[1] https://www.globenewswire.com/en/news-release/2020/01/15/1970769/0/en/Automotive-IoT-Market-Worth-541-73-Billion-by-2025-Exclusive-Report-by-Meticulous-Research.html

How are IoT solutions transforming the automotive industry?

This new world of connected vehicles will benefit four key players:

1. Automotive manufacturers and retailers

Automotive manufacturers and retailers will be able to reduce the cost of operations, streamline supply chains and inventory management, innovate and monetize. Rather than just purely selling vehicles to consumers, they can provide on-demand subscription services and resell partner services through onboard marketplaces.

Optimize current cost models
• Worldwide supply chain optimization
• Build anywhere to sell anywhere

Open new revenue streams
• On-demand, subscription-based services
• Partner enablement (e.g., insurance and law enforcement)
• Robo-taxi
• Onboard marketplace

2. Original equipment manufacturers (OEMs) and system integrators

OEMs and system integrators will have greater connectivity in the manufacturing process.
This will simplify their global operations and allow them to manufacture and sell vehicles wherever they need.
This gives them complete flexibility in the build, test, deployment, and monitoring stages of manufacturing.
It also opens the possibility of real time feedback from the vehicle, down to the individual component.

Improve vehicle/ component performance
• Over the air updates (OTA)
• Live telemetry data on component performance
• Predictive repair and maintenance
• Anomaly detection and alerting

Full self-driving vehicles will be built upon IoT networks. To operate they must communicate all the information captured on board through their cameras and sensors with back-end systems. This information must then be processed by an artificial intelligence-based system which will then direct the vehicle's onboard systems.
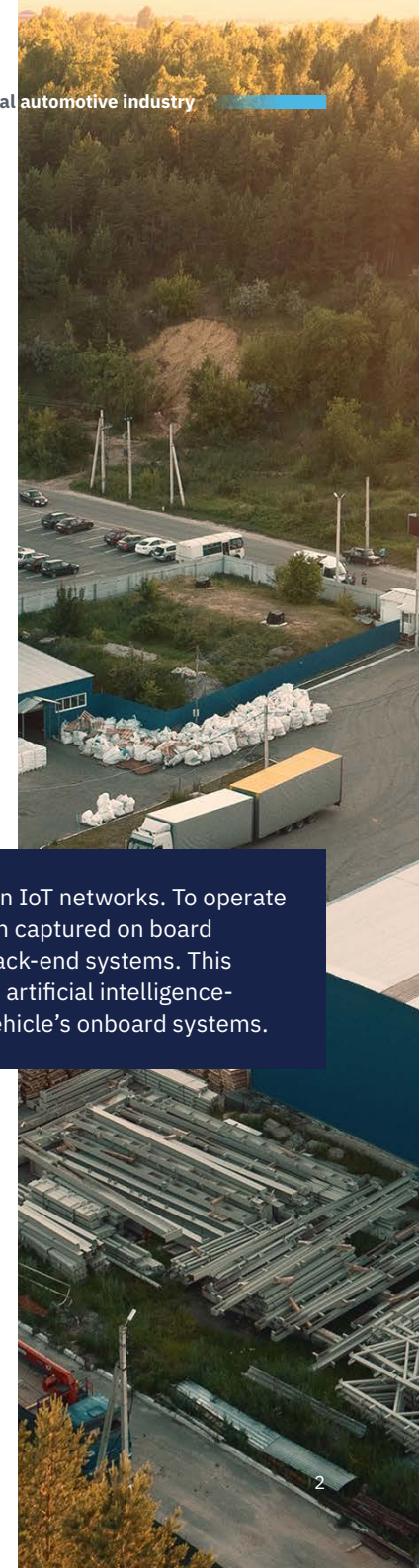
3. Fleet managers

Fleet managers can improve productivity with standardized configuration of their fleet. This reduces both training time for new staff and potential vehicle downtime on the road. New connected services like immersive maps, live traffic updates, smart route planning, and tire pressure control can optimize fleet uptime and returns on deployed assets.

Increase productivity
• Optimization of asset ROI
• Driver safety score
• Asset library

Reduce vehicle downtime
• Location-based services
• Notifications (e.g., tire pressure monitoring)
• Smart route planning
• Trip aggregation

4. End users

For end-users, having IoT connectivity integrated with their vehicles will make them part of a connected ecosystem of services. This augments their experience of driving, making vehicle ownership easier, safer, and more customized to their needs.

On-demand features
• Autonomous driving / advanced driver-assistance systems
• Vehicle as a marketplace and subscription services
• In vehicle hotspot for internet access
• Usage or driving style-based vehicle insurance
• Real-time route planning and guidance
• Automated SOS and roadside assistance

To achieve this, however, the automotive industry needs to manage several partners and resellers throughout the value chain and across regions. This creates a lot of complexity in managing the connectivity services and connected devices within fleets of vehicles. A robust global IoT solution can provide seamless global connectivity, easy lifecycle management, and business model flexibility throughout the deployment process.

Automotive IoT connectivity requirements

To make the most of this automotive IoT opportunity, Vehicle retailers, OEMs, and system integrators need several features from the global IoT connectivity provider.

Global presence to ensure seamless connectivity as devices and components cross international borders

Local connectivity for a consistent quality of service for customers and optimized cost for manufacturers

Independence from MNOs to avoid the need for individual contracts and agreements on a local basis

Highly secure infrastructure to safely deliver your vehicle data to you and your partners' data centres around the world

Multiple services managed via one SIM so that all functionalities can be enabled through one connectivity module

Vehicle and device lifecycle management for optimizing the global manufacturing and logistics supply chain

Flexible business model and tools for managing a globally available product while still maintaining local partners and resellers

What are the challenges?

To fully realize the benefits of IoT connectivity for automobiles, many of these key players need infrastructure, systems, and platforms that are custom built for IoT use cases. Legacy systems, more often than not, are unable to support the connectivity they need. In this respect, there are three main issues:

1. Device lifecycle and automation of the manufacturing process

2. The diversity of manufacturers' vehicle portfolios

3. Managing partners and resellers for in-car services across all geographies where vehicles are sold

Managing the connected device lifecycle – from factory to road

New IoT capabilities are rarely aligned with the device lifecycle, which is surprising given the average device only spends 14% of its lifetime in the hands of manufacturers. Yet, during this period, the complexities of automotive supply chains are not accounted for which causes unnecessary (and expensive) costs to system integrators and OEMs, and an unreliable customer experience.

The main obstacle for all these use cases is the complexity introduced by the global nature and long lead times of automotive manufacture. Taking an average of 18 months, components and vehicles are moved around the globe for the entire duration. Yet IoT connectivity needs to work at all stages of the process. Ideally, connectivity modules should function 'out of the box' and through every step of the manufacturing and transportation process.

This becomes more complicated due to several other factors:

Complex, international regulations. Even when the vehicle is with the customer, the connectivity module must be able to offer different connected services depending on the regulatory framework of the country it is deployed in. This in itself is a considerable ask as there are varying regulations across markets for IoT that system integrators and OEMs must account for.

Distributed manufacturing supply chains. Vehicle components are not all produced in one location. Typically, they're built across numerous, separate manufacturing plants that are rarely in the same country. For IoT connectivity specifically, this inefficiency is expensive as it draws out the duration of the manufacturing process and requires the manufacturer to pay for connectivity throughout.

For most cars, the cost of such a connection is approximately €0.5 a month. Given that the average time-to-market is 18 months and manufacturers have millions of devices, this is millions of euros every year. Secondly, it requires manual activation for IoT connectivity, which is an administrative burden and can affect reliability.

Scale of fleet. Vehicle manufacturers produce millions of vehicles a year. This makes manual management of connectivity modules a timely (and therefore expensive) process.

Enabling connected applications for all varieties of vehicles

While it is tempting to think of 'automotive' as a homogenous sector, it is in reality highly diverse. Ranging from small cars to larger trucks and buses, standalone to self-driving vehicles, and from diesel to electric. Each of these vehicle types has unique connectivity functionalities, requirements, and use cases. As a result, they all have unique connectivity requirements that manufacturers must facilitate.

This means that automotive manufacturers must be able to manage a wide range of connectivity use cases in parallel. However, doing this in a centralized and cost-efficient manner across a global fleet, creates significant complexity that manufacturers may lack the expertise or infrastructure to manage.

A self-driving vehicle, for example, needs low-latency, high-bandwidth connectivity so that data from on-board sensors can be exchanged with vehicle management platforms near-instantaneously. Electric vehicles, on the other hand, may only require periodic updates on the location and occupancy of nearby charging stations.

Innovate and monetize with third party applications and services

Today's vehicles include hundreds of sensors which collect a significant amount of data. This includes real-time GPS location and fuel consumption, a breakdown of individual component performance, the quality of the road surface, traffic density and road closures, and the driver's entertainment preferences - just to name a few.

All this data can generate value, especially for third-party vendors who can use this information to develop new, personalized services for drivers. For automotive manufacturers, this presents an opportunity to create new services for their customers, enhancing the in-car experience and develop new recurring revenue streams beyond the sale of the vehicle itself. To enable these new services, automotive manufacturers usually need to create an ecosystem of partners bringing technology and know-how from outside of the car industry.

To cater to these new in-car applications and revenue streams, however, automotive manufactures need the tools to segregate, route, and collect data securely. This requires:

Multi-APN support
This allows for the manufacturer to create multiple, separate networking paths through a single SIM card. Given that manufacturers may be sharing data with multiple vendors, this is essential. It also allows for new configurations such as segregating public and private traffic or creating separate billing structures.

Secure backend connectivity
To ensure that sensitive driver data is only accessed by the manufacturer and authorized third-party vendors, there must be an end-to-end secure transport channel between the vehicle and the manufacture or their partner's data center. By ensuring security at this layer, manufacturers can mitigate any risk in other parts of the network infrastructure.

For example, telematics data about vehicle location, average speeds, engine diagnostics, and vehicle activity can help third-party insurance providers distinguish low-risk drivers from high-risk ones. As a result, the insurance provider can create tailored offerings that reflect how drivers use their vehicles.
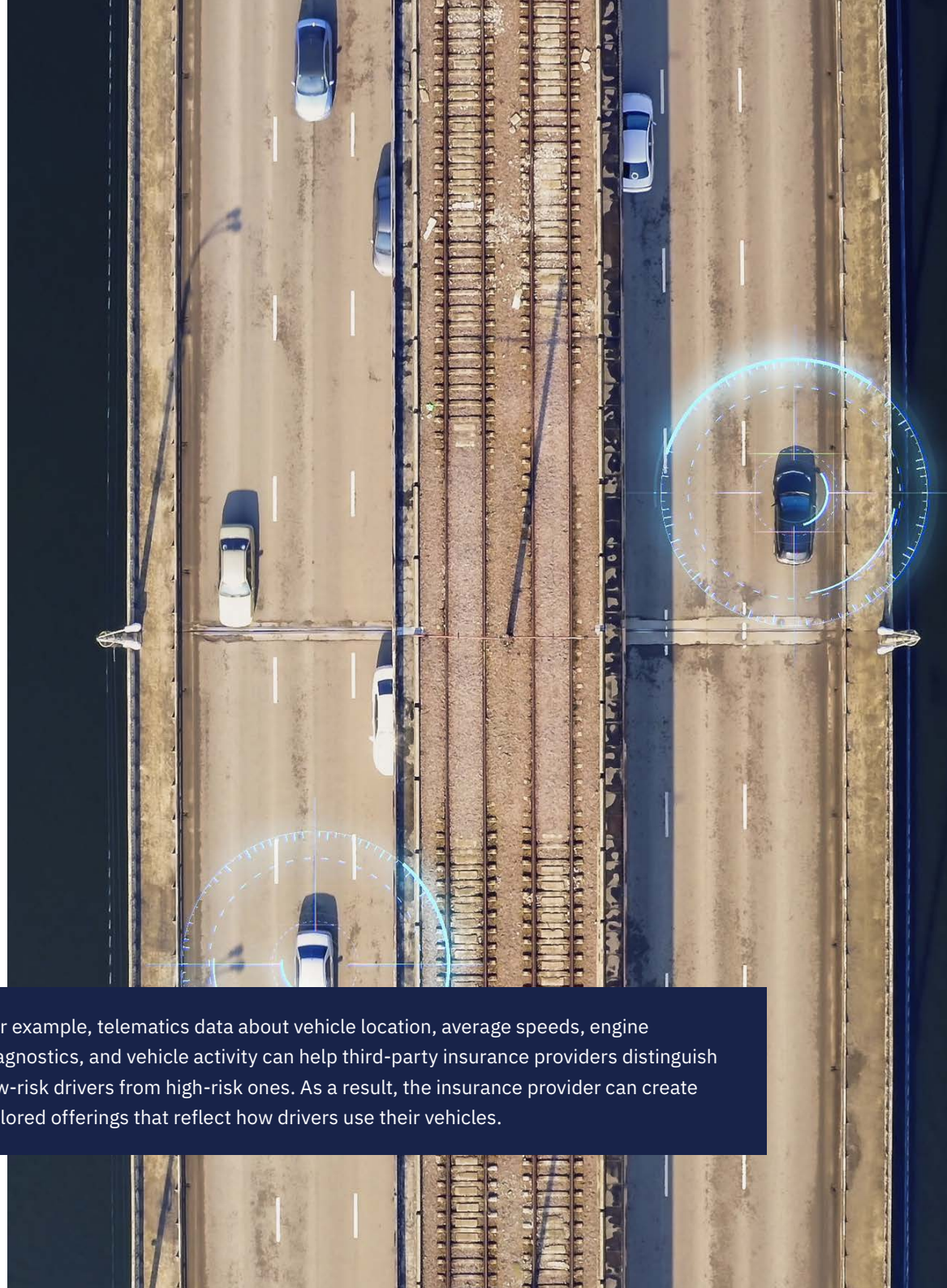
Make the world your supply chain - produce and sell globally with BICS

One SIM – one platform – one partner
Easily access global, multi-network IoT for vehicles, with reliable connectivity in every continent.

Global deployment with automated lifecycle
Automated end-to-end SIM lifecycle management across different countries and regions.

Flexible business models
Easily support different services and partners through our dedicated platform.

Advanced functionalities to split in-vehicle services
Differentiate and simplify billing, reporting, and management for new IoT features in vehicles.

Highly secure infrastructure
Protect your customers and partners from fraud with extensive security features.

Global MVNO/E infrastructure
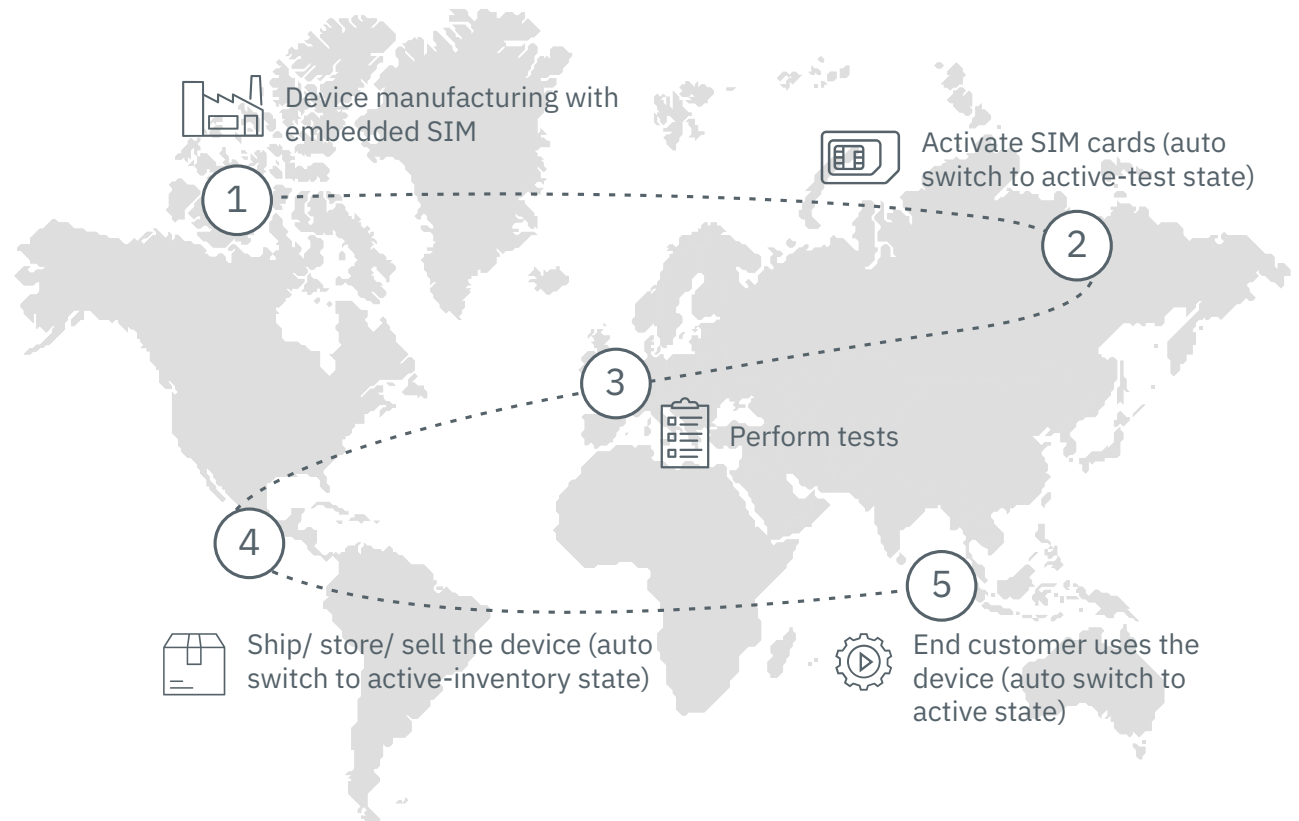Seamless support for light and full MVNOs.

Manufacture

Reduce unnecessary cost for unused connectivity during production and distribution

BICS SIM For Things (SFT) provides seamless global IoT connectivity in more than 200 countries that is perfectly suited to the needs of OEMs and vehicle manufacturers.

Introducing device lifecycle

If OEMs and system integrators want to optimize the device lifecycle for its entire duration, they need to automate the connectivity element. Simply put, automation eliminates the need for manual administration and simplifies the device lifecycle through zero-touch provisioning.

This new lifecycle eliminates unnecessary costs for unused connectivity by providing a seamless customer experience that doesn't require manual intervention.

1. Device manufacturing with embedded SIM

2. Activate SIM cards (auto switch to active-test state)

3. Perform tests

4. Ship/ store/ sell the device (auto switch to active-inventory state)

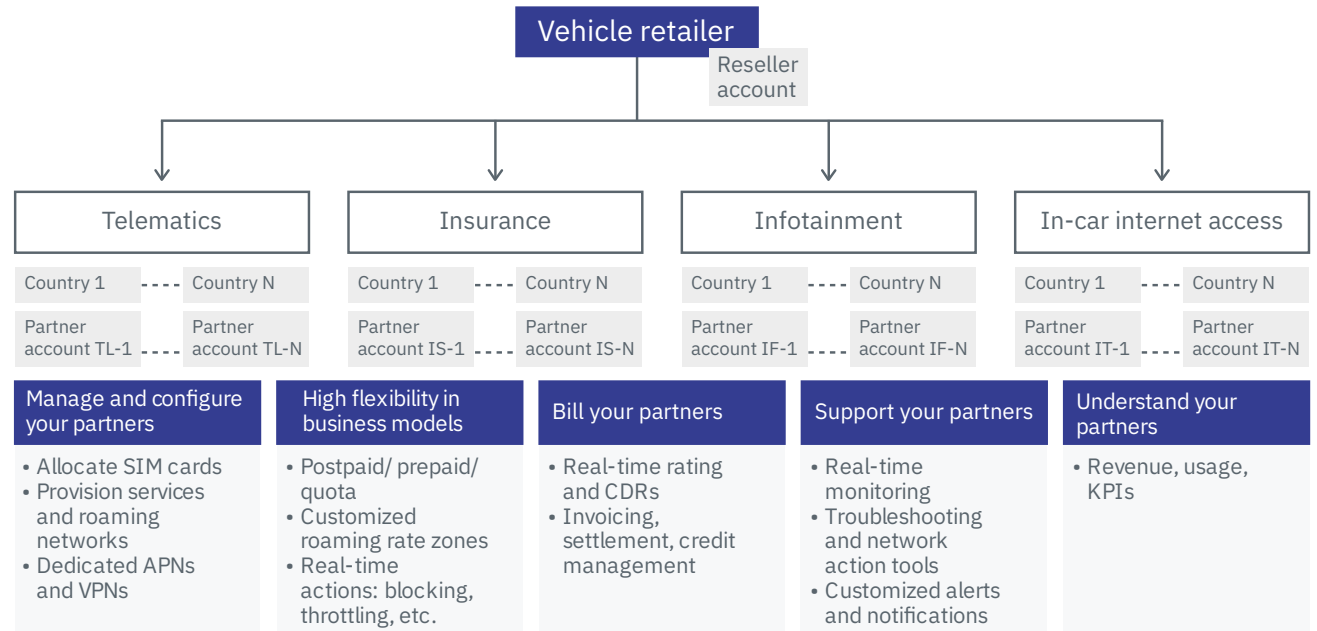5. End customer uses the device (auto switch to active state)

Manage
Manage and sell globally with an ecosystem of local partners

To accommodate the diversity of in-car applications and their different connectivity needs, BICS offers a reseller module with highly flexible business management capabilities. This reseller module provides the possibility to individually manage the connectivity needs of any application partner and customize the business model, between the car manufacturer and these partners, without hassle.

BICS' reseller module can be fully customized based on the diverse requirements of the connected automotive industry. Each in-car application partner can seamlessly manage their customers with tailored business models and usage reports by their end-users. In addition, BICS' global 5G, NB-IoT, and LTE-M connectivity ensures that these business needs can be met anywhere in the world.

Vehicle retailer

Reseller account

Telematics	Insurance	Infotainment	In-car internet access
Country 1 ---- Country N	Country 1 ---- Country N	Country 1 ---- Country N	Country 1 ---- Country N
Partner account TL-1 ---- Partner account TL-N	Partner account IS-1 ---- Partner account IS-N	Partner account IF-1 ---- Partner account IF-N	Partner account IT-1 ---- Partner account IT-N

Manage and configure your partners
- Allocate SIM cards
- Provision services and roaming networks
- Dedicated APNs and VPNs

High flexibility in business models
- Postpaid/ prepaid/ quota
- Customized roaming rate zones
- Real-time actions: blocking, throttling, etc.

Bill your partners
- Real-time rating and CDRs
- Invoicing, settlement, credit management

Support your partners
- Real-time monitoring
- Troubleshooting and network action tools
- Customized alerts and notifications

Understand your partners
- Revenue, usage, KPIs

Monetize
Enable new in-car applications and new revenue streams

BICS also enables automotive manufacturers to turn vehicle data into new revenue streams. Through the use of multi-APN with differentiated routing and end-to-end secure data transfer capabilities, BICS can provide third-party vendors with the critical data they need to create tailored offerings and services for drivers. This makes automotive manufacturing profitable for the entire vehicle lifespan, and not just at the point of sale.

Partnering with a global IoT connectivity supplier like BICS increases the profitability of automotive IoT. It allows manufacturers to manage varying use cases and in-vehicle third party applications to generate new revenue streams through their partners.
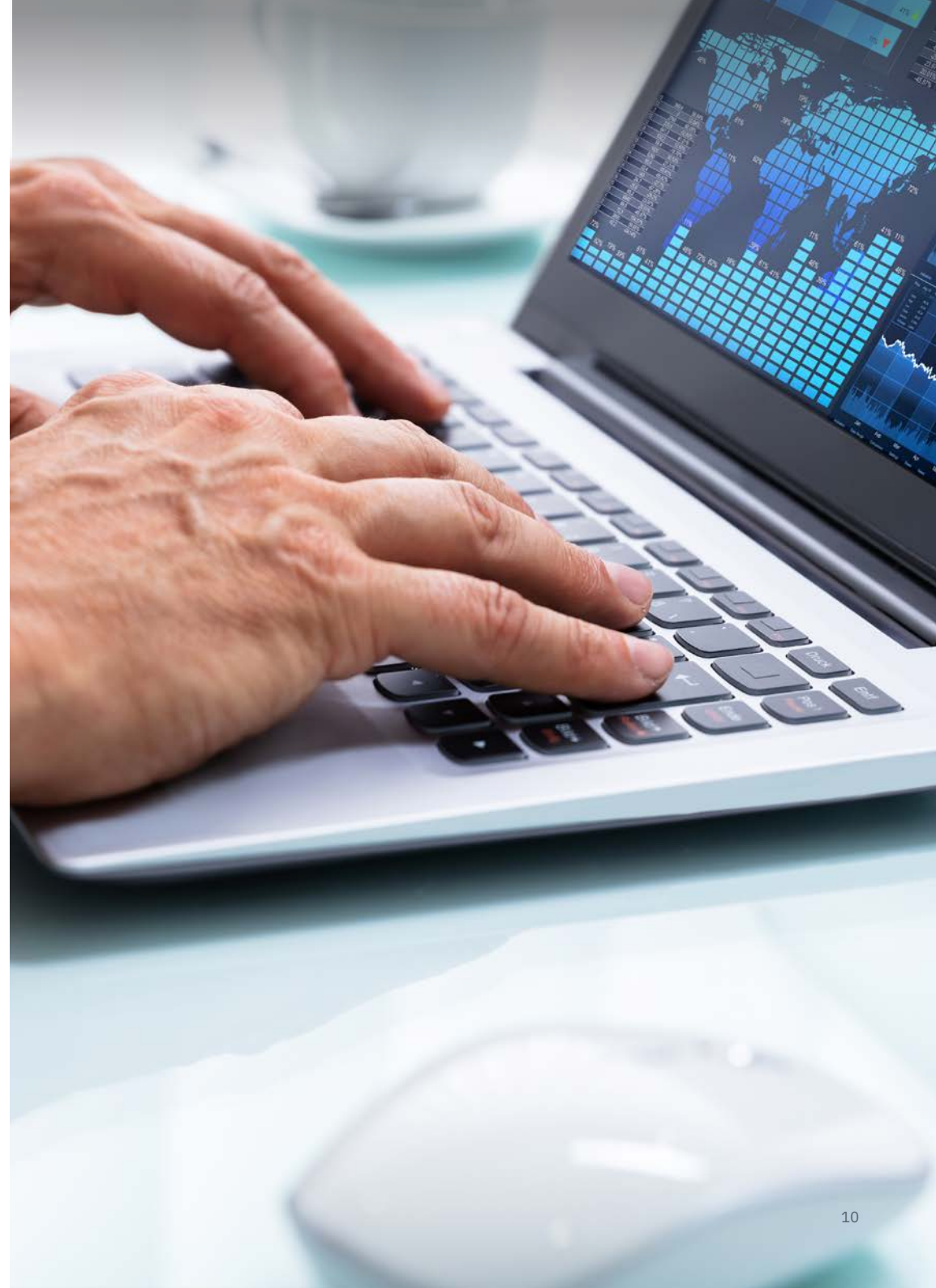
Conclusion

Growing demand for IoT connectivity in vehicles is creating significant revenue opportunities for automotive retailers, system integrators, and OEMs. IoT-enabled use cases promise to improve the driver experience by making it more safe, reliable, and tailored to their individual needs. However, if automotive manufacturers are to deliver the connectivity needed to support these new capabilities, it must be done within a cost-effective framework.

One of the key challenges is integrating IoT connectivity into the device lifecycle. The current lifecycle does not account for the length of production for vehicles or the size of automotive manufacturers' inventories. This leads to extensive costs and difficult management of IoT-enabled connected vehicles. These challenges are easily addressed by bringing automation into the fold with a global SIM provided by BICS SIM for Things. This drastically reduces costs and increases efficiency for manufacturers, thereby creating a more seamless, reliable experience for drivers.

Another key challenge is the need to manage extensive portfolios of vehicles, the diversity of automotive use cases, and the rapid rise of in-car applications. To sell a global product that integrates local partners with these new applications, vehicle manufacturers need tools with the right flexibility and functionality to manage the ever growing diversity of connectivity needs and business models. The BICS SIM for Things reseller module - with multi-APN support, and secure end-to-end worldwide connectivity - provides this business model flexibility and technical functionality.

A global connectivity provider is crucial for automotive manufacturers to realize the full potential of their IoT product in a highly complex global supply chain.

For more information, please visit:
www.bics.com

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