PTOLEMUS Consulting Group

The Autonomous Vehicle Global Study

The most thorough analysis of driverless vehicles ever published

The consulting & research firm for the connected world

Consulting services

- **Strategy definition**
- **Investment assistance**
- **Procurement strategy**
- **Innovation management**
- **Business development**
- **Deployment**

Research services

Fields of expertise

Mobility services	Car pooling Car sharing Smart parking	Multimodal mobility Ride hailing	Road side assistance Tax refund
Vehicle services & telematics	bCall eCall FMS SVT / SVR	Tracking VRM In-car Wi-Fi Fuel cards	Parking Navigation Speed cameras Traffic information
Usage-based charging	Car As A Service Electronic Toll Collection	Mobility-as-a-Service Road charging	UBI / PAYD Vehicle rental Vehicle leasing
Vehicle data & analytics	AI CAN-bus Crowd-sourcing Data protection	Driving behaviour OBD Predictive analytics	Remote diagnostics xFCD
Vehicle automation	ADAS	Autonomous cars	Autonomous trucks
Enabling technologies	Positioning (GNSS / WiFi / cellular)	M2M / connectivity Smartphones	Telematic devices V2X

Clients across the mobility ecosystem…

Analytics providers

AAA, Cognizant, Google, here, LexisNexis, SAS, Towers Watson, Verisk Analytics, RMS, Wunelli

Applications providers

BMJ Group, censio, CCC Information Services Inc., Commedi, Coyote, TomTom, ESRI, MOVELO, td, RoadPilot, wejo

Device / location suppliers

Andrew, cnes, gmv, Deveryware, Huawei, Navizon, Location Smart, Nokia Connecting People, Samsung, ThalesAlenia Space, Telespazio, SYSNAV, TruePosition, VIZIO

Automotive manufacturers & suppliers

Agero, Airbiquity, Bosch, Bridgestone, Continental, Cox Automotive, Daimler, Delphi, Directed, intel, Ford, Harman, Meta System, Michelin, Pioneer, QOROS, Qualcomm, Sierra Wireless, Telit, Toyota

Telematics solution providers

ARKAN, Danlaw, DigiCore, FleetComplete, arvento Mobile Systems, cobra, drivefactor, drust, OCTO, Fleetmatics, IMS, LoJack, Lysanda, mobile devices, ORION, HIMEX, Quartix, SafeFleet, Scope Technologies, SISTEMA, Queclink, smobil, Xee, VIASAT, Watchstone.

Insurers, aggregators & assistance providers

AAA Insurance, Admiral, Aioi Nissay Dowa Insurance, MS&AD Insurance Group, Allianz Global Assistance, Allstate, AXA, Baloise Insurance, carrot, covea, Crédit Agricole Assurances, Desjardins, europ assistance, Generali, The Hartford, IAG, Inter Mutuelles Assistance, Ингосстрах Ingosstrakh, Liberty Mutual, MACIF, Matmut, HUK, MENORAMIVTACHIM, Mondial Assistance, Munich RE, PROMUTUEL, OUT Surance, RAC, RSA, SOMPO JAPAN, Swiss Re, smile direct, telesure, TOKIO MARINE, youi, ZURICH

Mobile telecom operators

AT&T, SFR, Sprint, SK telecom, Telefónica, Telekom Austria Group, verizon, vodafone

ITS operators, regulators & fleets

ARVAL BNP Paribas Group, autostrade per l'italia, Brisa, CGI, DKV, Edenred, Efkon, egis, EUROMASTER, European Commission, FLEETCOR, kapsch, mouchel, Nomad Digital, NORBIT, SICK, SOFICO, TELEPASS, T-Systems, TOLL COLLECT, UTA, VITRONIC, THALES

Banks & private equity investors

Amadeus Capital, Bain Capital, Bank of America Merrill Lynch, Barclays, The Baupost Group, Cinven, citigroup, Hellman & Friedman, Investcorp, Disruptive, Goldman Sachs, Intek Group, Hutton Collins, J.P.Morgan, Montezemolo & Partners, Nomura, Leonardo & Co., New Amsterdam Growth Capital LLC, Pamplona Capital Management, Renova Group, SilverLake, Thoma Bravo

Automation will reshape the automotive industry…

"I believe the auto industry will change more in the next 5 to 10 years than it has in the last 50."

Mary Barra
CEO

GM

"We have a clear objective: to be the technology and innovation leader for individual mobility in the digital age.

Harald Krueger,
CEO

BMW

"We're thinking bigger than a particular vehicle, … What we are bringing to market is a self-driving technology platform."

John Krafcik
CEO

WAYMO

"Non autonomous cars will be like owning a horse: for sentimental reasons"

Elon Musk
CEO

TESLA

… It will also completely transform the mobility ecosystem

- **Autonomy is a technology revolution…**
  - More sensors, software code and processing power than ever
  - Faster connectivity and more accurate positioning than ever
  - More (artificial) intelligence than ever

- **… but it could also be a tornado wiping out the ecosystem:**
  - **OEMs** being reduced to hardware providers for Silicon Valley?
  - **Tier-1 suppliers** losing out to electronic players such as Samsung and Intel?
  - **Dealers and workshops** losing much of the repair business?
  - **Insurers, brokers and reinsurers** losing on claims and premiums?
  - **Roadside assistance companies and auto clubs** made redundant?
  - **Public transport operators** and **the taxi industry** becoming useless as a result of automated Mobility-as-a-Service (MaaS)?
  - **Telematics Service Providers (TSPs)** becoming dis-intermediated?
  - **Car rental and leasing operators** losing independence from OEMs?
  - **Road operators and toll chargers** being forced to move to free flow tolling?

In the long term, the generalisation of autonomous vehicle means that 80 to 90% of the motor insurance business could disappear, along with claims management.

Pascal Demurger
General Director
MAIF Insurance

The AV Global Study responds to all major questions

When will L3, L4 AVs & Driverless emerge?

Which OEMs are the most advanced?

Who will bear the liability?

What is the path between current ADAS and level 5 vehicles?

Are AVs going to become mass market?

Will regulators delay the emergence of AVs?

Which technologies will enable L3, L4 & L5?

What will be the impact of autonomy & ADAS on claims cost?

Which players will lose out?

Will accidents disappear?

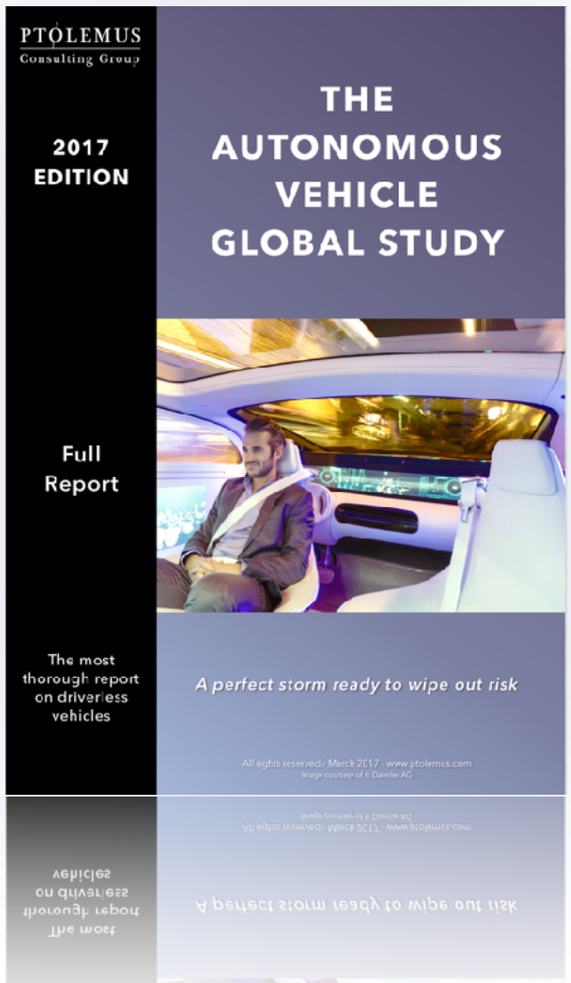
Will aftermarket service providers access to AV data?

Why did Intel pay $15 billion for Mobileye?

Which countries / states will lead the revolution?

What external data will AVs require to operate?

Will OEMs skip L3?



No less than 10 experts conducted our research and analysis

Frederic Bruneteau, Managing Director, Brussels

Mr. Bruneteau has accumulated 20 years of experience including 17 years of experience of the mobility domain and 8 years of strategic and financial advisory for company such as **Arthur D. Little**, **BNP Paribas, SFR Vodafone** and **TomTom.**

He has become **one of the world's foremost experts in the field of telematics,** quoted by numerous publications such as *The Economist* and *the Financial Times*. He has spoken at more than 40 international conferences on the subject.

Within PTOLEMUS, he has **led 70 assignments related to connected & autonomous vehicles** for leaders such as Aioi Nissay Dowa, Allianz, AXA, Bridgestone, CNES, Generali, HERE, Kapsch, Liberty Mutual, Michelin, Octo Telematics, Pioneer, Qualcomm, Telit, Thales Alenia Space and Toyota.

Frederic performed a complete review of this report.

Thomas Hallauer, Research Director, London

Thomas Hallauer has gained 15 years of strategy, research and marketing experience in the domain of telematics and location-based services from companies such as **Admiral, DriveFactor, Liberty Mutual, Michelin, Mobile Devices, Octo Telematics and Wunelli.**

Thomas is the lead author of the ETC Global Study, the most thorough review of the Electronic Toll Collection and Road Charging market published in May 2015.

Thomas also published the **UBI Global Study 2016 and reviewed the Connected Insurance Analytics Report,** interviewing dozens of insurance companies.

Thomas led the research, writing and publishing of this report.

Matthieu Noël, Manager, Paris

An automotive engineer, Matthieu Noël has gained **6 years of consulting experience in the automotive sector** primarily helping car manufacturers such as **BMW, PSA Peugeot-Citroën, Renault-Nissan** and **Faurecia**.

Within PTOLEMUS, he has advised numerous clients such as **Admiral, Airbiquity, Allianz, Bridgestone, HERE, Kapsch, Michelin, Octo Telematics** or **Vodafone Automotive** in defining and implementing their strategy.

He holds expert knowledge of domains such as connected vehicle data & analytics, OBD dongles, vehicle repair and maintenance, fleet telematics, fuel card services, ETC, UBI, autonomous vehicles, etc.

Matthieu performed a complete review of this report.

Justin Hamilton, Senior Business Analyst, London

Justin has more than 4 years of experience within the transportation, mobility and road user charging market. He conducts quantitative and qualitative analysis of global trends and developments in mobility, electronic road pricing and intelligent transport solutions.

Before joining PTOLEMUS, Justin launched Road User Charging Magazine and is frequently published in journals such as *Thinking Highways*, *Tolling Review* and *Tolltrans*.

For this report, **Justin explored the relationship between autonomous cars and mobility and evaluated the factors driving the timeline of autonomy.**

No less than 10 experts conducted our research and analysis

Alberto Lodieu
Senior Consultant, Paris

Alberto has gained 7 years of experience in strategic and operations consulting, helping organisations such as **CNES, Danlaw, Europ Assistance, the European Commission and Liberty Mutual.**

Alberto has participated in more than 20 projects to help organisations identify, define and implement the initiatives needed to achieve or preserve their leadership position.

Alberto recently helped a client understand the impact of AVs for the space industry.

For this report, Alberto analysed the **evolution of the relationship between drivers and cars and the acceptance of AVs by customers.**

Claire Elnécavé
Senior Expert, Brussels

Claire has gained 12 years of experience for companies such as **Accor, Arthur Andersen, Baloise Insurance, Baupost Group, Carrefour, CIC Securities, Coyote System, Pioneer, Sara Lee and Solvay**.

She is expert at auditing and developing business models, financial statements, business plans, financial models and market models.

She is also **leading the creation of the Autonomous Club**, a think tank focused on industry and regulatory evolutions driven by the emergence of autonomous vehicles.

For this report, Claire contributed to our analysis of major AV technology suppliers.

Sahand Malek
Consultant, Brussels

A PhD in Automotive Engineering, Sahand has gained almost 5 years of experience in automotive research and development projects on vehicle On-Board Diagnostics (OBD), data management and analytics and **Advanced Driving Assistance Systems (ADAS).**

He has in-depth knowledge about many aspects of traffic and transportation science, as well as automotive engineering.

Sahand led the writing of our recently published Connected Insurance Analytics Report.

For this report, Sahand **built our bottom-up market forecasts and scenarios of the ADAS and AV markets globally.**

Philippe Brousse
Senior Business Analyst, Brussels

Philippe has gained 3 years of experience in strategy and market research for companies such as **Danlaw, Europ Assistance, the European Commission, Kapsch, Liberty Mutual, Octo Telematics** and **Safran Morpho.**

For our Connected Mobility Forecast, he conducted the analysis and 5-year forecasts of the markets for bCall, UBI, fleet management, and in-vehicle WiFi hotspots worldwide.

Philippe recently helped a client detect possible satellite communications technologies for AVs.

For this report, **Philippe contributed to the building of our bottom-up market forecasts of the ADAS and AV markets globally.**

Yaron Steinfeld
Business Analyst, Paris

Yaron has gained experience in strategy and market research for organisations such as **Cleia, CNES, HERE, LafargeHolcim and Octo Telematics**.

Yaron has worked on several connected mobility projects related to vehicle data, UBI, roadside assistance, car pooling.

For one of our clients, Yaron recently analysed possible positioning technologies to locate AVs.

For this report, **Yaron led our analysis of the impact of ADAS and AV technologies on the number of accidents and their severity**.

Matthew Cobbold
Business Analyst, London

Matthew has gained 2 years of strategy and research experience for companies such Strategy& (PWC group), Ernst & Young and WS Atkins.

Matthew has **performed several research and market modelling projects** for construction, pharmaceutical and telecommunication industries.

He recently participated to the commercial due diligence of a cyber security solution provider. Matthew led researches and interviewed experts to size the hardware security modules market.

For this report, Matthew contributed to **modelling the impact of AVs on insurance claims and premiums and analysing the technology suppliers.**

This report builds on 18 months of analysis of technology, supply & demand and the regulatory environment

BUILDING BLOCKS

- Environment
- Methodology
- Supply & demand
- Technology

- Country-by-country regulatory analysis
- Country-by-country market readiness analysis
- Global safety rating landscape analysis
- Value chain definition
- Map of M&A and partnerships

- 60 interviews of the key players
- 2000 hours of desk research and analysis
- 3 adoption scenarios
- ADAS impact on claims model
- ADAS impact on premium components model
- ADAS impact on driving score model

- ADAS features supply database
- Customer ROI per level
- Timeline of launch by country by level
- Strategic analysis of 14 car manufacturers

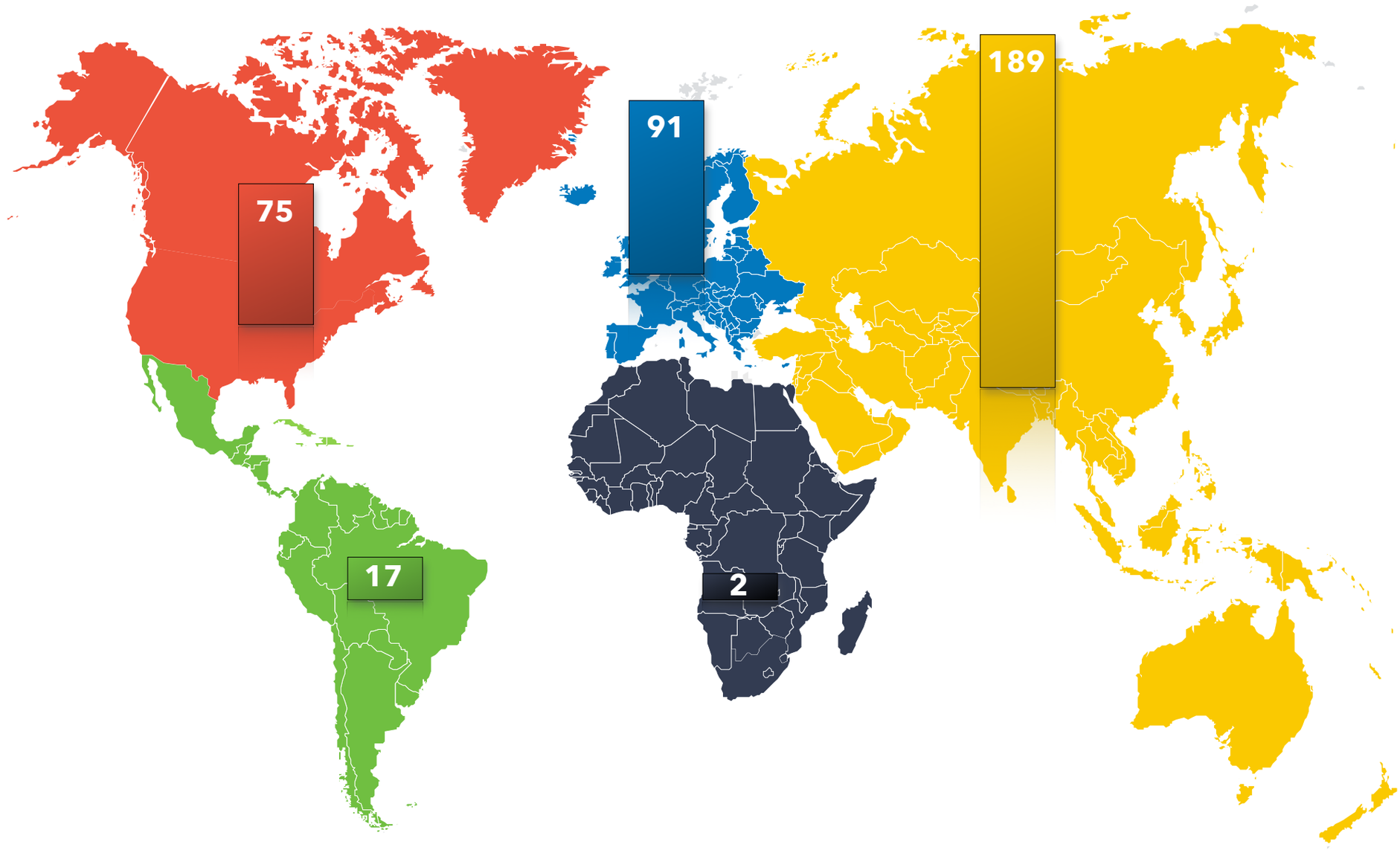
- ADAS features examination
- Technical building block analysis
- Technology cost model
- Global supplier database

KEY OUTPUTS

1. Assessment of core technologies required for automation
2. Timeline of the key market triggers from 2015 to 2030
3. Route-to-market analysis
4. Analysis of the key trends
5. AV adoption scenarios by level
6. AV market forecasts by level
7. Accident reduction forecast
8. Impact of automation on the automotive market
9. Claims reduction forecast
10. Insurance premium forecast by level

370 million cars will have some form of assistance by 2030

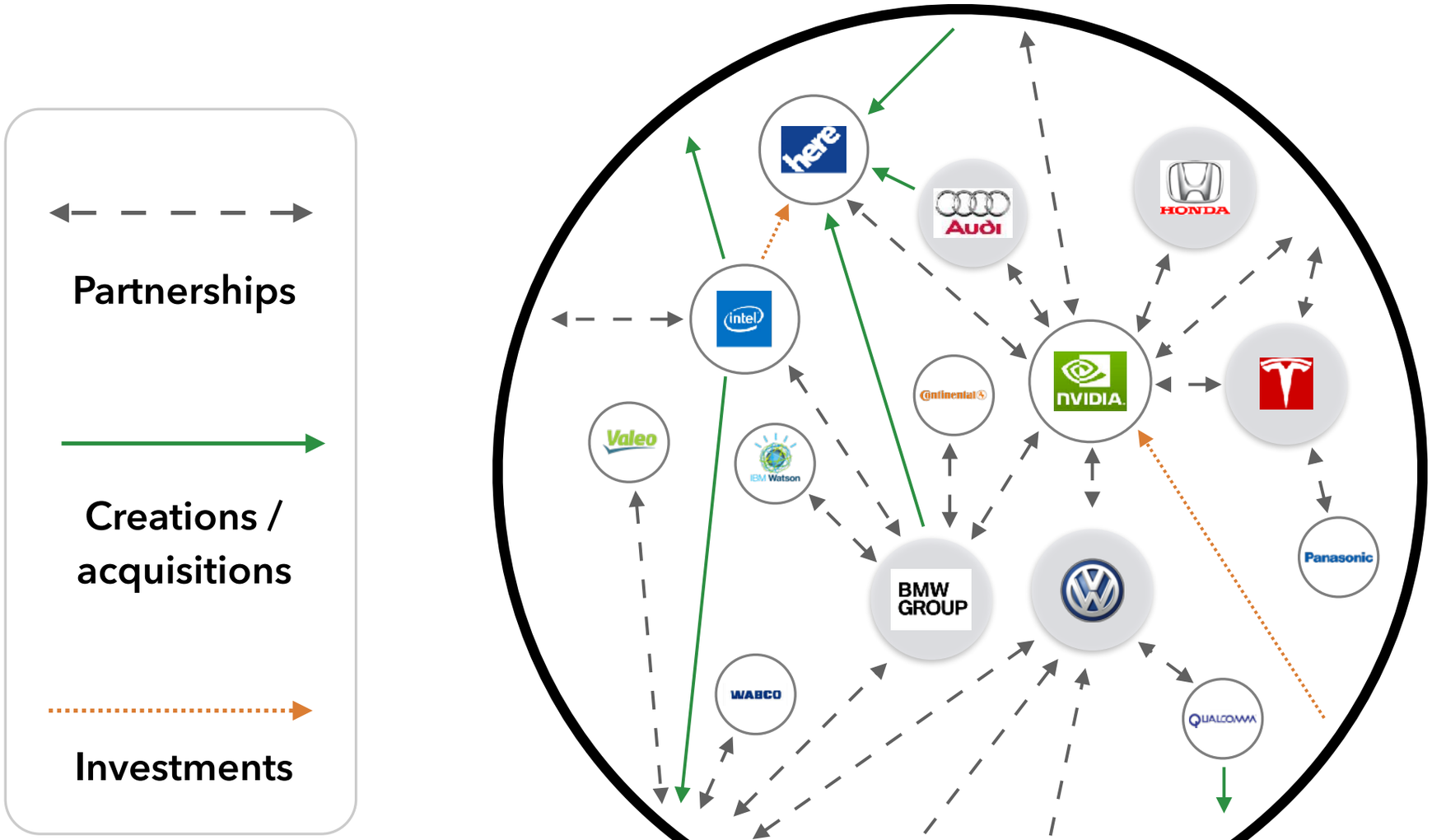
Level 2-5 passenger cars on the road in 2030 (million)



Source: PTOLEMUS

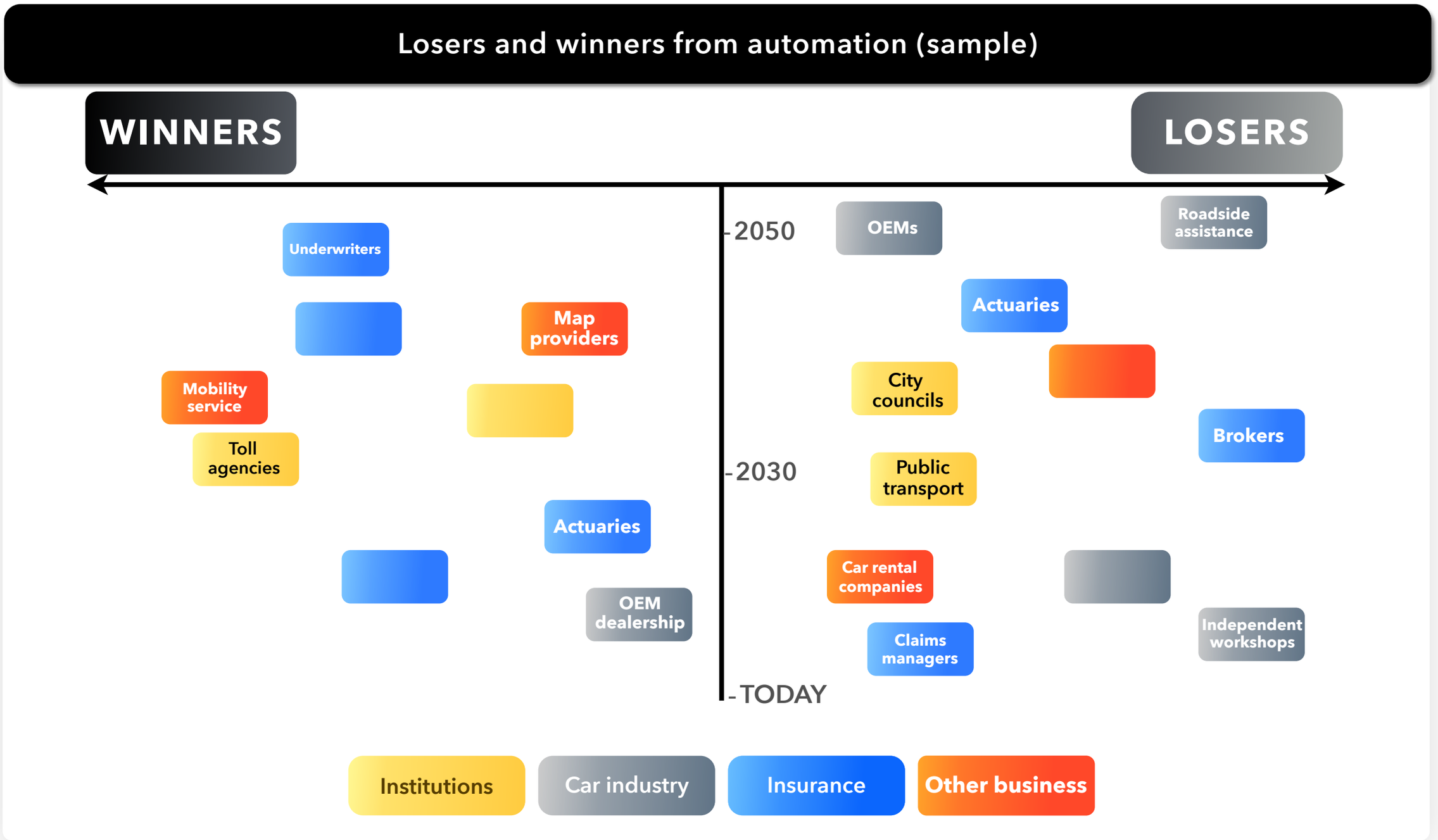
The automotive industry is reshaping as we speak

Key strategic moves across the autonomous car value chain (sample)



Source: PTOLEMUS

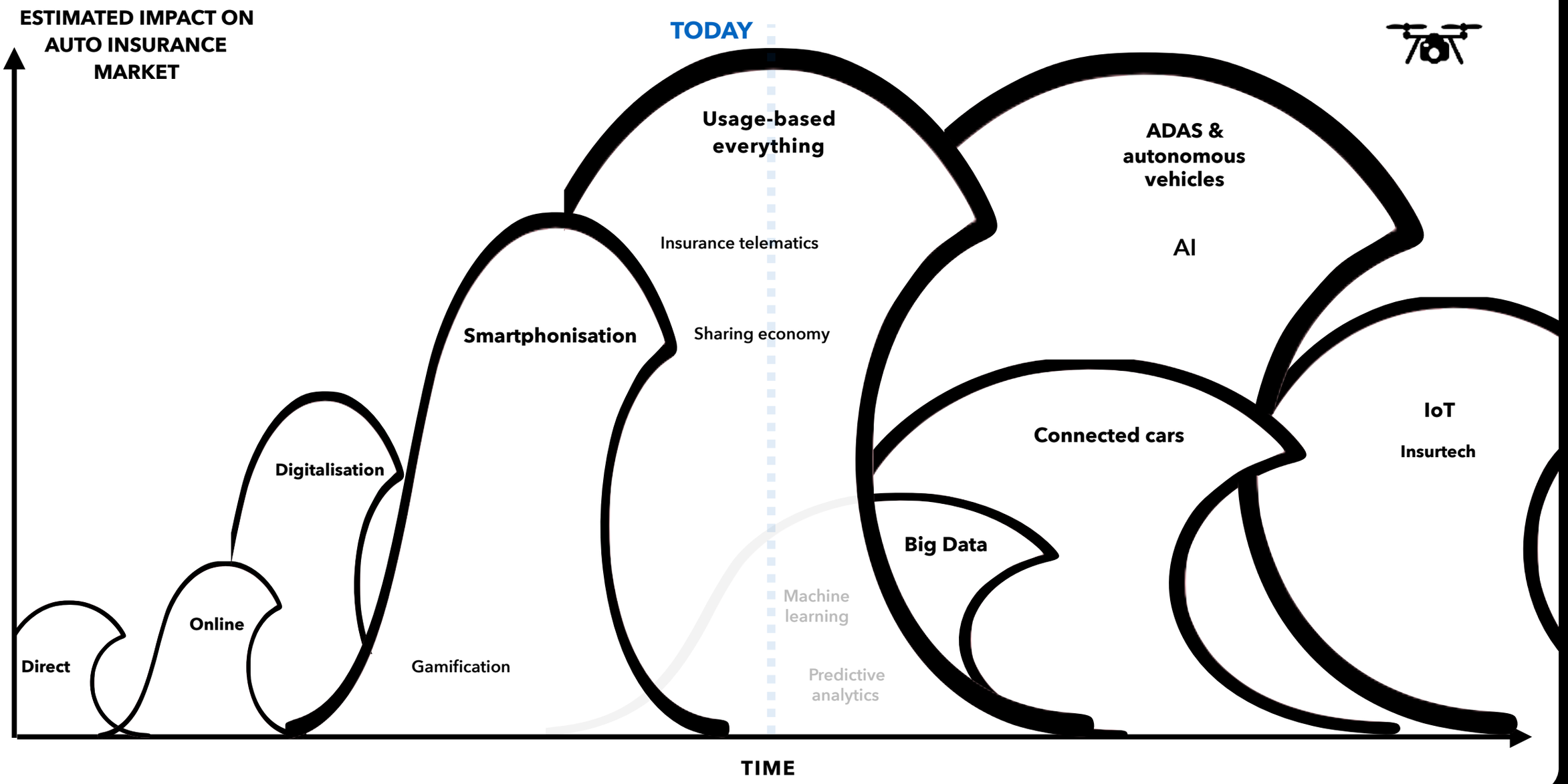
Nobody will be left untouched



Source: PTOLEMUS

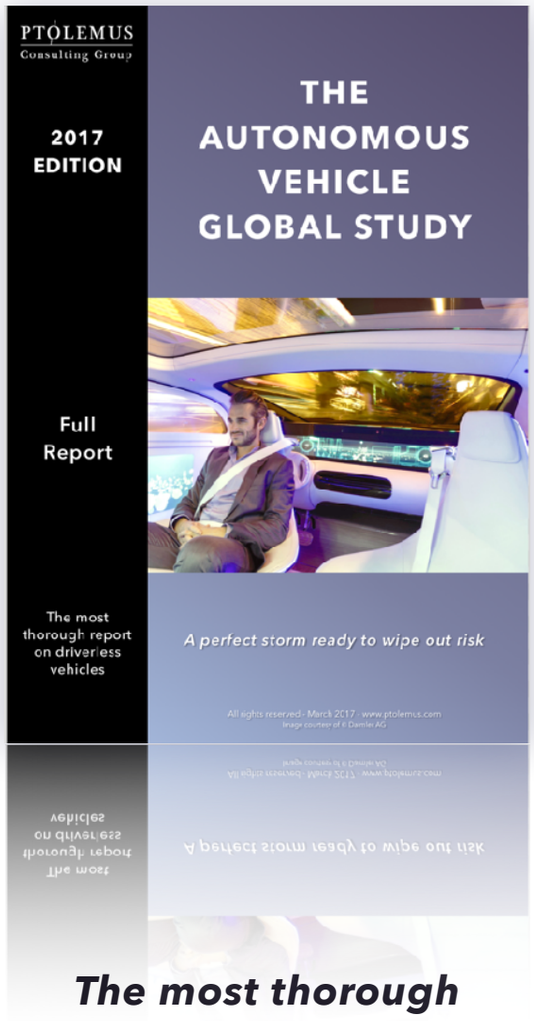
And for insurers, the sea is not getting any quieter...

The waves - Major trends affecting the auto insurance business



Source: PTOLEMUS

The study quantifies the true impacts of ADAS and AVs on safety, risks and the complete ecosystem



The most thorough investigation of the driverless future

- **600+ pages of research using:**
  - 60 interviews in 8 countries
  - 12 months of research performed by 10 consultants
  - A uniquely precise and complete methodology
  - over 200 figures (charts, tables, etc.)
- Assessment of the **key factors affecting the start, the acceleration speed and the penetration** of the different level of automation from today to 2030
  - Overview of the regulatory background, applicable regulation, evolution and trends globally
  - Complete analysis of the technology building blocks including suppliers and cost analysis
  - A global quantitative analysis of the mobility market and its role in delivering driverless cars
- **27 ADAS explained** and their impact on claims analysed
- **21 OEMs and technology providers** analysed and their AV strategy compared
- **A qualitative & quantitative evaluation of the impacts of automation on**
  - Safety
  - Personal data protection
  - Connected services
  - The automotive industry
  - The risk sector
- **2015-2030 bottom-up ADAS & AV market forecasts**
  - Global forecast over 18 markets
  - ADAS and AV **penetration forecast by level and car segment**
  - Forecast on crash volumes and severity, claims costs and insurance premiums

250 companies mentioned in the report

PTOLEMUS Consulting Group

INTRODUCTION

Autonomous Vehicle Global Study

LIST OF COMPANIES MENTIONED IN THE STUDY

Company	Type	Company	Type
Association of British Insurers	Insurer	Lyft	Mobility Services Provider
Advanced Scientific Concepts	Automotive hardware supplier	Magna Electronics	Automotive hardware supplier
Ageas			
Aisin A			
Alfa Ro			
Allianz			
Alphab			
Alpine			
Amazo			
AND Pi			
Apple			
ARGO			
ARUP			
Athlon			
Atkins			
ATZuch			
Audate			
Audi			
Autogl			
Autoliv			
Autona			
Autonc			

Company	Type	Company	Type
Autotalks	Automotive hardware supplier	Munich RE, NA	Insurer
AXA	Insurer	MyTaxi	Mobility Serv Provider
BAE Systems	Automotive hardware supplier	NASA	Software/AI developer
Baidu	Software/AI developer	National Highway Traffic Safety Administration	Regulator/ Government agencies
Belron International ltd	Breakdown services provider	Nauto	Automotive hardware su
Blacklane	Mobility Services Provider	NavInfo	Mapping pro
BMW Group	OEM	Navya	OEM
Bolloré	Mobility Services Provider	Nexteer	Automotive hardware su
Bosch	Automotive hardware supplier	Nicigo ADAS	Automotive hardware su
BYD Co.	Automotive hardware supplier	Nirenberg Neuroscience	Software/AI developer
Capgemini	Software developer	nuTonomy	Software/AI developer
Car2Go	Mobility Services Provider	NVIDIA	Automotive hardware su
Careco	Mobility Services Provider	NXP	Automotive hardware su
Careem	Mobility Services Provider	O2	Telecom infrastructure
Carglass	Breakdown services	Octo Telematics	Telematics service provider
CATAPULT UK	Research/standards institute	Ola	Mobility Services Provider
Centro Tecnologico de l'Automocion Galicia (CTAG)	Research/ standards institute	Opel	OEM
CESVIMAP	Research/ standards institute	Otto	Software/AI developer
Chariot	Mobility Services Provider	Ottomatika	Software/AI developer
Chrysler	OEM	OuiCar	Mobility Services Provider

Company	Type	Company	Type
Civil Maps	Mapping provider	Paravan Industry	Autonomous systems developer
Cloud made	Software/AI develo		
Co-op	Insurer		
Cohda Wireless	Automo hardwa		
Comma.ai	Autono develo		
Communauto l'autonomie	Mobilit Provide		
Continental	Automo hardwa		
Control-Tec	Softwar		
Cruise Automation	Softwar develo		
CTAG	Researc institute		
CVTA	Automo associa		
DAF Trucks	OEM		
Daimler AG	OEM		
Daimler Insurance Services	Insurer		
Delphi	Automo hardwa		
DeNA	Softwar develo		
DENSO	Automo hardwa		
DfT	Regulat Govern agencie		
Didi Chuxing	Mobilit Provide		
Dodge	OEM		
Drive.ai	Autono develo		

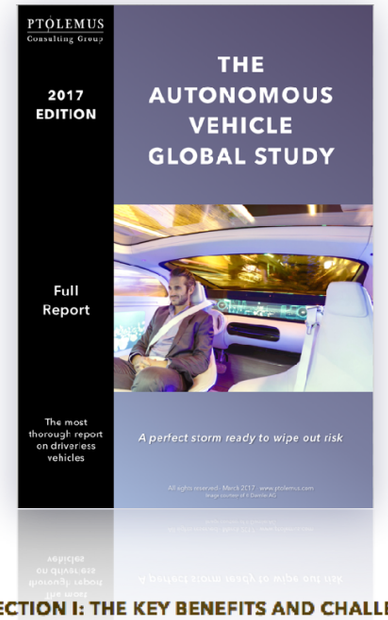
Company	Type	Company	Type
DriveNow	Mobility Services Provider	RSA	
Drivy	Mobility Services Provider	Safe drive	
Elektrobit	Mapping provider	Safran	
Engineering and Physical Sciences Research Council	Research/standards institute	SAIC (UK	
Enjoy	Mobility Services Provider	SAIPS	
Ericsson	Telecom infrastructure	Samsung	
Ertico	Research/standards institute	Savari	
Euro NCAP	Research/standards institute	Seeo	
European Commission	Regulator/ Government agencies	Siemens	
Facebook	Software/AI developer	Sixt SE	
Faraday Future	OEM	Skoda	
Farmers Insurance	Insurer	Smart	
Fiat Chrysler Automobiles	OEM	SMMT	
First Direct	Mobility Services Provider	SoftBank	
Folksam	Insurer	STMicroe	
Ford	OEM	Subaru	
Ford Carsharing	Mobility Services Provider	Sunfleet	
Free2Move	Mobility Services Provider	Suzuki	
Freescale	Automotive hardware supplier	SWECO	
Fujitsu Ltd.	Automotive hardware supplier	Swiss Rei Company	
Garmin	Mapping provider	Takata Co	
General Motors	OEM	Tata	
Getaround	Mobility Services Provider	Tesla	

Company	Type	Company	Type
Gett	Mobility Services Provider	Texas Instruments	Automotive hardware supplier
Global NCAP	Research/standards institute	Thatcham Research	Research/standards institute
GoDrive	Mobility Services Provider	The Alliance for Transportation Innovation	Automotive trade association
Google	Software/AI developer	The Floow	Telematics service provider
Grab	Mobility Services Provider	Times Car Plus	Mobility Services Provider
Greenwheels	Mobility Services Provider	TomTom	Mapping provider
HailO	Mobility Services Provider	TorcRobotics	Autonomous systems developer
Harman International	Automotive hardware supplier	Toshiba	Automotive hardware supplier

Company	Type	Company	Type
Hella KGaA Hu Co			
HERE			
Highways Eng			
Hitachi Autom systems			
Honda			
Horiba Mira			
Horizon Robot			
Huawei			
Hyundai			
Ibeo automoti			
IBM			
IBM Watson			

Company	Type	Company	Type
Infineon	Automotive hardware supplier	Visteon	Automotive hardware supplier
Infiniti	OEM	Vodafone	Telecom infrastructure
InMotion	Mobility Services Provider	Volkswagen	OEM
Insurance Europe	Insurer	Volvo Car Group	OEM
Insurance Institute for Highway Safety	Research/standards institute	Voxx international	Automotive hardware supplier
Intel	Automotive hardware supplier	Wabco	Automotive hardware supplier
Jaguar Land Rover	OEM	WaiveCar	Mobility Services Provider
Jeep	OEM	Waymo	OEM
Karhoo	Mobility Services Provider	Yandex	Software/AI developer
Koolicar	Mobility Services Provider	Zenrin	Mapping provider
leddartech	Automotive hardware supplier	ZF Lenksysteme	Automotive hardware supplier
LG Electronics	Automotive hardware supplier	ZF TRW	Automotive hardware supplier
Lincoln	OEM	Zipcar	Mobility Services Provider
Local Motors	OEM	Zoomcar	Mobility Services Provider
		Zurich Insurance Company	Insurer

Over 600 pages: simply the deepest report on the subject



REPORT STRUCTURE

SECTION I: THE KEY BENEFITS AND CHALLENGES OF ADVANCED DRIVING ASSISTANCE SYSTEMS (ADAS)

1. What are ADAS and autonomous functions
- A. The 4 human cognitive processes
- B. The 4 steps of ADAS evolution
- C. The 6 major systems group
- D. The 5 levels of automation (... or is it 4?)
- E. Today's OEM involvement

2. What is at stake here?
- A. Analysis of the impacts of automation
- B. 10 other markets that will be affected by ADAS
- C. Alongside the evolution of ADAS, EV will emerge

3. The key technologies involved and their evolution
- A. Passive to active to ADAS safety systems
- B. Upfitted and embedded safety systems
- C. The building blocs of ADAS
- D. The 12 gates left to cross before cars are automated

SECTION II: LEARNINGS FROM THE RESEARCH AND TRIALS

1. The public-funded European projects

2. The biggest spenders in R&D budgets

3. The first steps in commercial vehicle automation

SECTION III: HOW AUTONOMY IS CHANGING THE CAR INDUSTRY

1. The evolution of the car- driver relationship
- A. Measuring and anticipating customer resistance/ acceptance
- B. How autonomous vehicle will manage re-engagement in the future
- C. Analysis of the emerging challenges in re-engagement process
- D. Assessment of the OEM-Driver communication and the required changes
- E. ADAS data management strategy

2. The transition to autonomous driving from the customer perspective
- A. The new challenges of buying, selling, and using ADAS
- B. Segmenting the ADAS technologies
- C. The business case for the customer
- D. The business case for the level 4 driverless scenario

3. What can we learn from the Tesla crashes
- A. Analysis of the 4 cases
- B. Tesla's response
- C. Tesla's liability

4. Assessment of the core manufacturers' and suppliers' strategies and the evolving landscape
- A. OEM profiles
- B. The imminent future for OEMS
- C. How the OEMs compare
- D. Supplier Profiles
- E. The role of technology suppliers in automation
- F. Comparing the core suppliers

SECTION IV: CALCULATING THE IMPACT OF ADAS ON INSURANCE COSTS/ REVENUES

1. ADAS testing and market penetration evolution
- A. Safety testing stakeholder landscape
- B. The role of NCAPs in the deployment of ADAS safety technologies
- C. Quantifying the adoption of ADAS in 3 mature, developed markets

2. How to calculate the impact on claim and premium reduction
- A. The challenge behind calculating the impact of ADAS
- B. Modelling the impact of ADAS and autonomy on claims reduction
- C. ADAS impact on claims reduction
- D. Calculating the impact of ADAS on accident reduction
- E. Next steps to better calculate claims and premium reduction
- F. How to calculate the impact of ADAS on Premium Expenditure

3. Impact of autonomous functions on the UBI proposition
- A. Calculating the impact of ADAS features on driver behaviour and UBI scores
- B. Will autonomy signal the end of UBI?

SECTION V: THE ENVIRONMENTAL FACTORS INFLUENCING THE TIMELINE

1. The current regulations and how they impact the evolution of ADAS and automation
- A. the Vienna Convention
- B. Regulations for experimenting on autonomous functions
- C. Traffic Rules (national and international conventions
- D. Technical Vehicle Regulations
- E. Civil and criminal law – do they apply as is or are changes needed?
- F. How to insure automated vehicles: insurance code changes required
- G. Data privacy issues

2. Country by country assessment

3. 5 questions to solve the liability issue
- A. Is there such thing as an ethical dilemma?
- B. Risks and responsibilities for the OEMs
- C. What are the risks for other stakeholders?
- D. How to demonstrate liability?
- E. What are the liability rules today?
- F. Recommendations on how to limit liability today with the deployment of ADAS functions

4. Technical factors affecting the timeline
- A. Understanding the autonomous vehicle architecture
- B. The 5 necessary technological components of ADAS systems
- C. Safety technologies on the market
- D. Data management
- E. Cost evolution and effect on ADAS adoption

SECTION VI: THE AUTONOMOUS VEHICLE VALUE CHAIN AND CHANNELS TO MARKET

1. The battle for control of the autonomous vehicle value chain
- A. Partnerships and acquisitions
- B. The competition for control

2. Mobility as a service: The route to market for driverless cars
- A. Car sharing
- B. Ride hailing
- C. OEMs are taking control of mobility services

SECTION VII: ADAS AND AV GLOBAL MARKET FORECASTS

1. Introduction and methodology

2. ADAS and AV global forecast main outputs
- A. Automotive market forecast
- B. How automation will affect the insurance market

SECTION VIII: CONCLUSIONS

1. Timeline for the evolution of assistance and automation
- A. Expectations vary between stakeholders
- B. The evolution of the function stack
- C. Do we believe HAVs will arrive earlier than expected?
- D. The path to growth of the driverless car

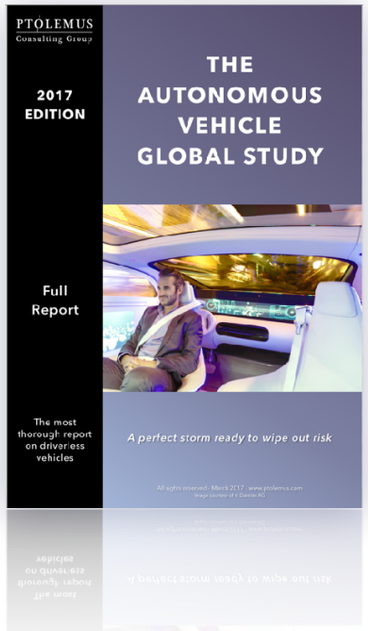
2. The main benefits of ADAS systems quantified
- A. Impact on claims
- B. Impact on premiums
- C. Return on investment for the driver
- D. Impact on the UBI market

3. The key factors influencing ADAS/autonomy adoption
- A. Technology evolution
- B. Autonomous vehicles delivery strategy: key takeaways
- C. Machine driver delivery strategy: key takeaways
- D. Will automation increase vehicle prices?

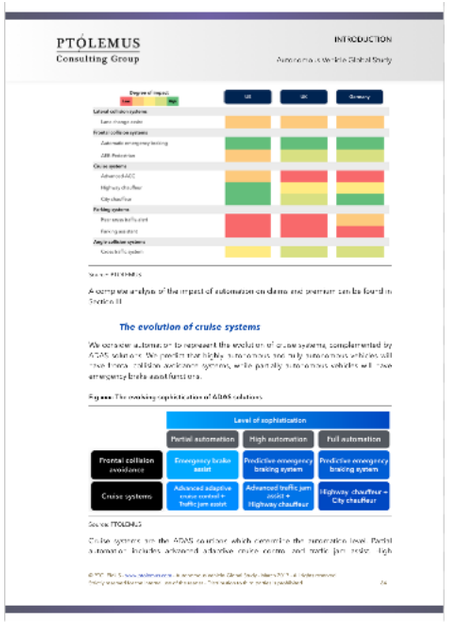
4. Liability and insurance takeaways
- A. How will HAVs be insured?
- B. Who is liable if a automated vehicles crashes?
- C. What will the OEMs do?

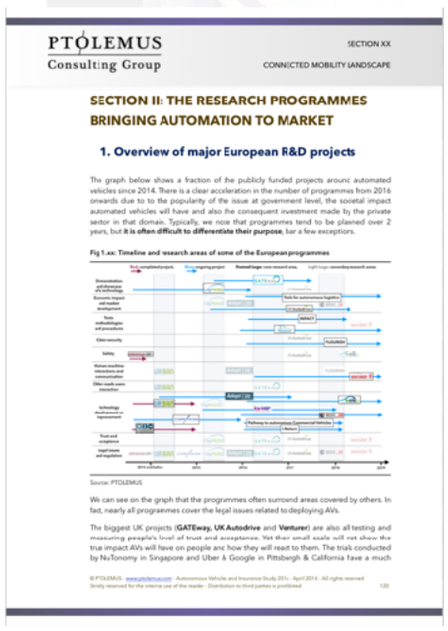
5. Modelling the driverless vehicle introduction
- A. Market entry strategies for the driverless car

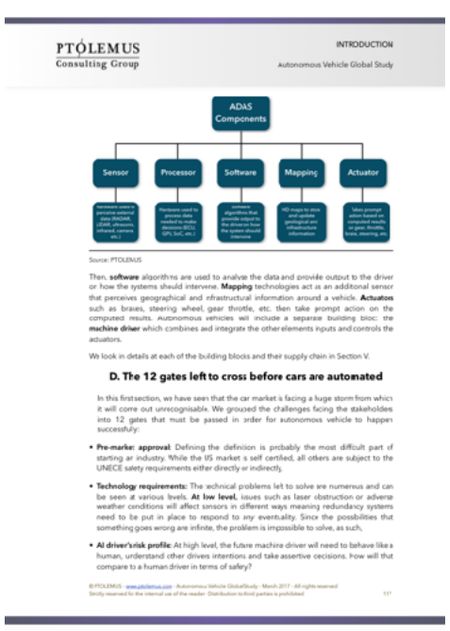
Over 600 pages of peer-reviewed analysis

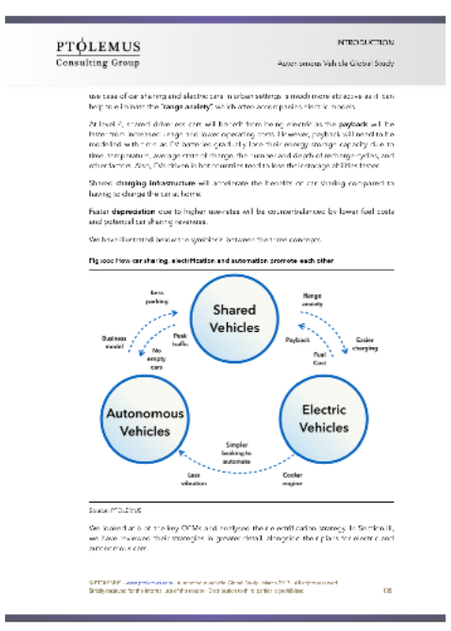


TYPICAL PAGES

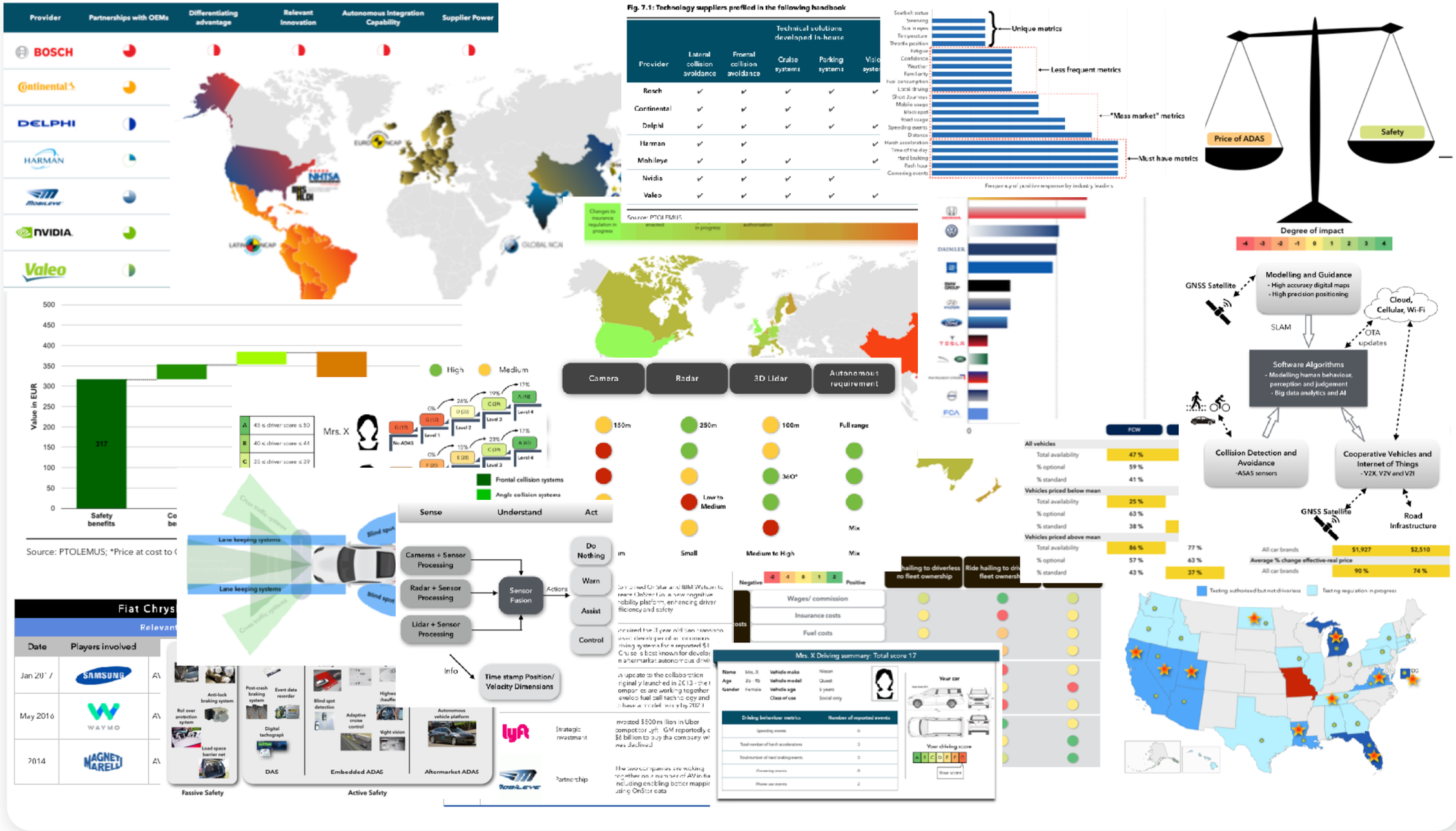








Outputs validated and illustrated by over 200 graphs



The first global 2015-2030 AV bottom up forecast by level and vehicle segment in 18 regions

Vehicle segments

Small	Mini, Fiat500
Lower medium	Ford Fiesta, Opel Corsa
Upper medium	Opel Astra, BMW 3
Executive	BMW 5 and 7 series, Audi Q5

ADAS levels

Level 1	Driver assistance
Level 2	Partial automation
Level 3	Conditional automation
Level 4 - driven	High automation
Level 4 - driverless	High automation

Model scope & granularity

Private passenger & fleet / company cars

- Level 1
- Level 2
- Level 3
- Level 4 - Driven
- Africa
- Asia - Pacific
- Latin America
- North America
- Europe

Regions

European Union
- France
- Germany
- Italy
- Spain
- UK
- Rest of EU

Russia

Rest of Europe

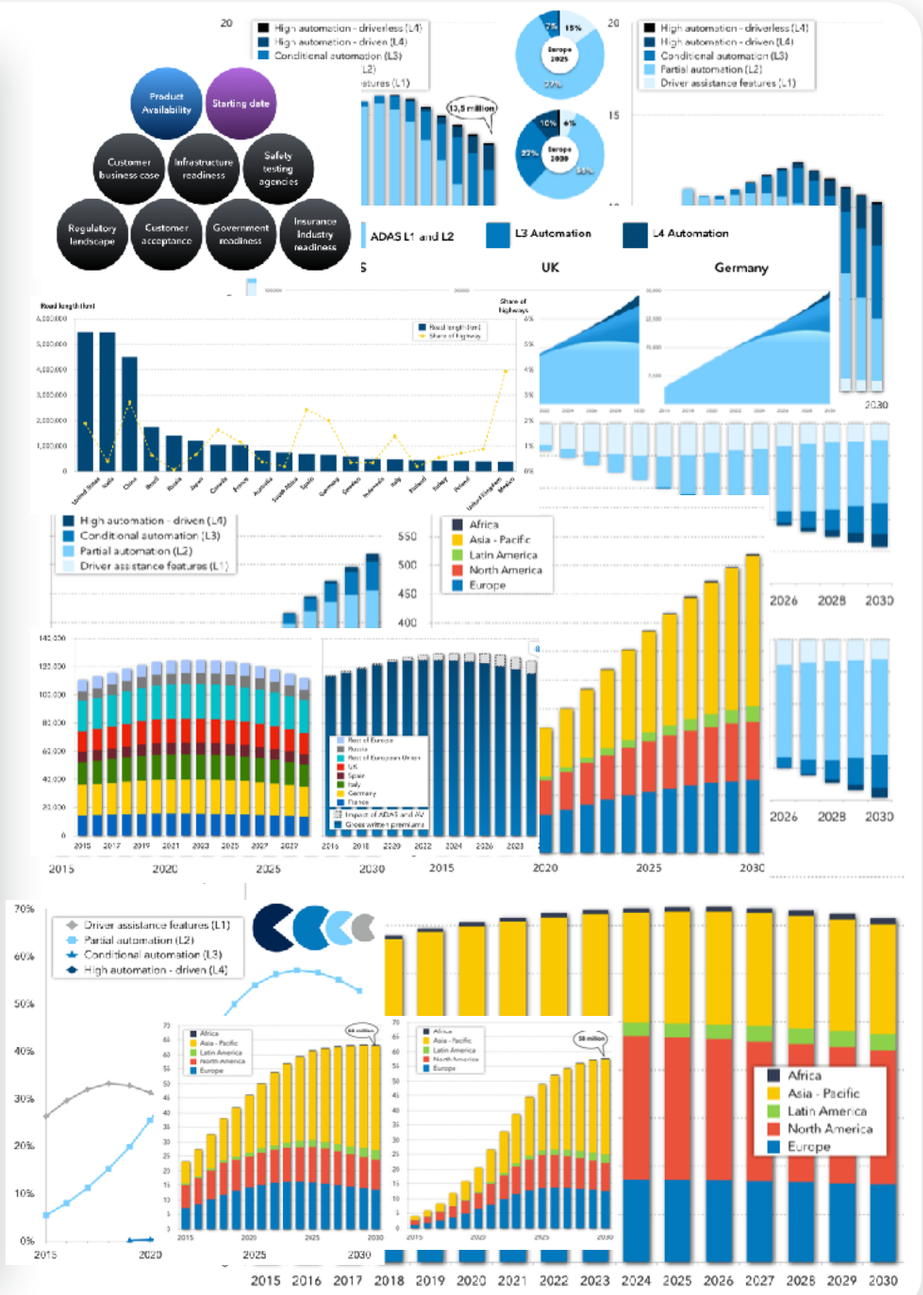
North America
- USA
- Canada

Latin America

Asia - Pacific
- China
- India
- Japan
- Australia
- Rest of APAC

South Africa

Rest of Africa



23 automotive OEMs and suppliers profiled and analysed

23 automotive OEMs and suppliers profiled and analysed

BOSCH

Continental

DELPHI

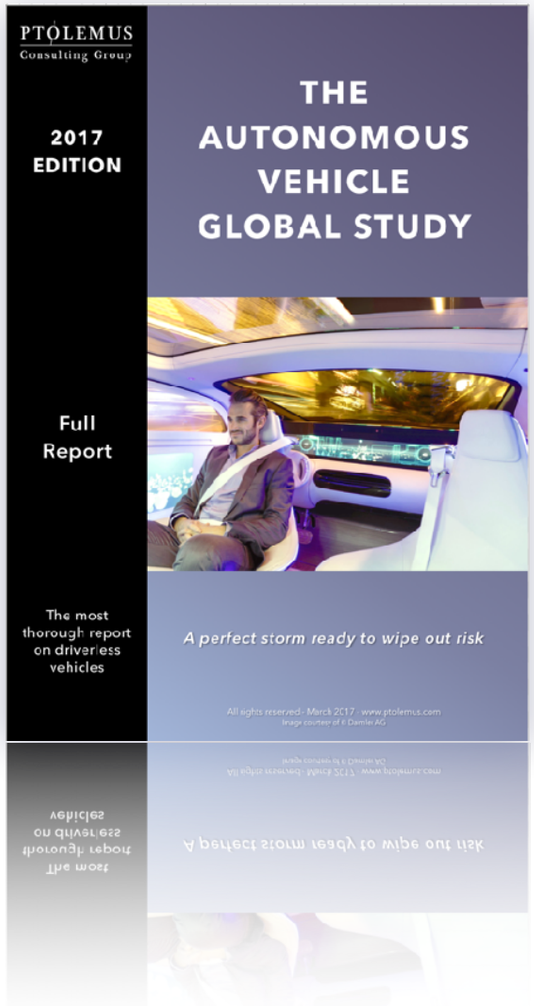
HARMAN

MOBILEYE

NVIDIA

Valeo

The AV Global Study: a single, worldwide company licence



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Reports	Full Study with market forecasts	Full Study with slides & market forecasts*
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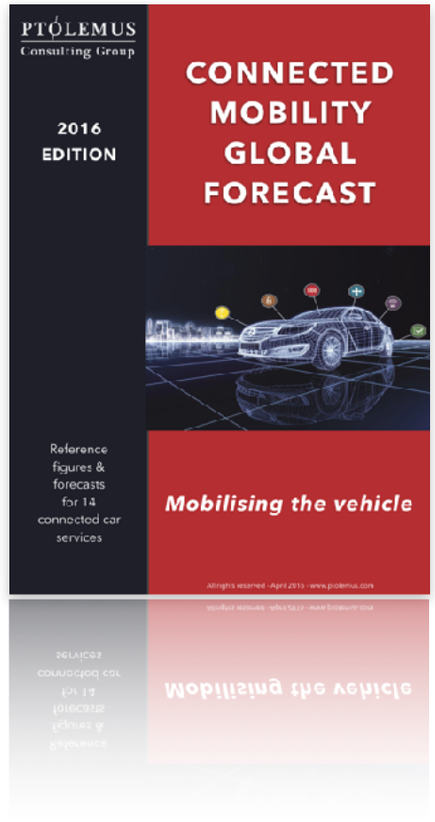
For more information and to order the study, contact thomas@ptolemus.com

PTOLEMUS brings unparalleled depth of knowledge in connected and autonomous vehicle services

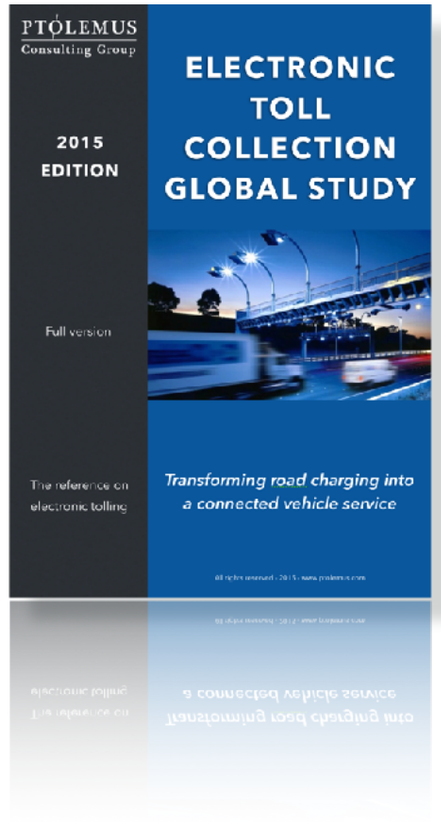
The reference report on UBI, quoted by The Economist, the Financial Times and the Wall Street Journal

The most comprehensive research on insurance analytics

The most thorough analysis of ADAS and AVs



Referenced figures and forecasts for 14 connected car services



The reference on vehicle payment services

Recognised research globally

They mentioned PTOLEMUS research

Rastreator.com
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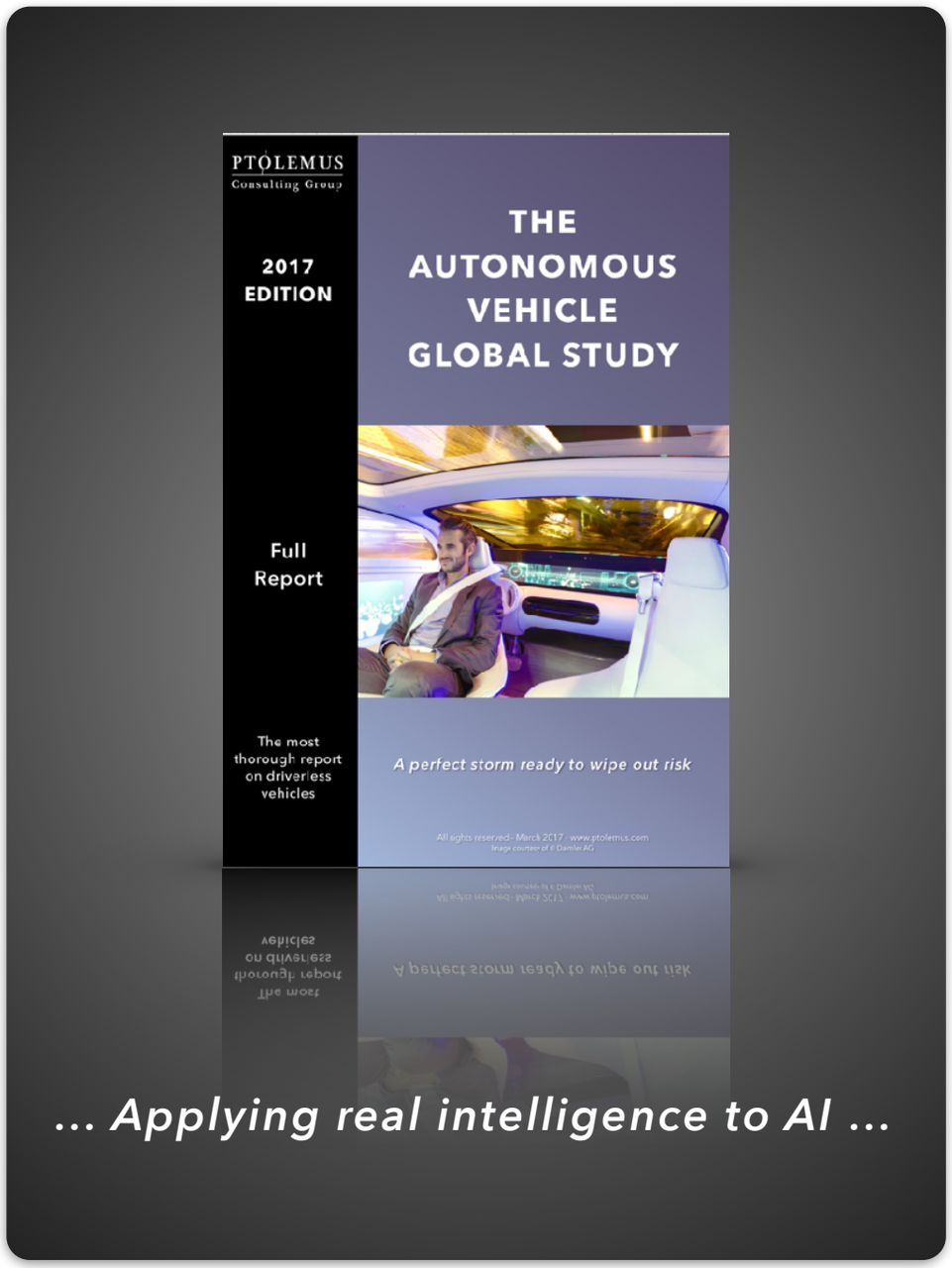
Shape the revolution with the AV Global Study



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