PTOLEMUS
Consulting Group

FREE
ABSTRACT

The updated reference report on UBI and digital insurance

CONNECTED AUTO INSURANCE

Asia Pacific Study

Will connected cars dominate the auto insurance industry?

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CONNECTED AUTO INSURANCE GLOBAL STUDY

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CONNECTED AUTO INSURANCE GLOBAL STUDY

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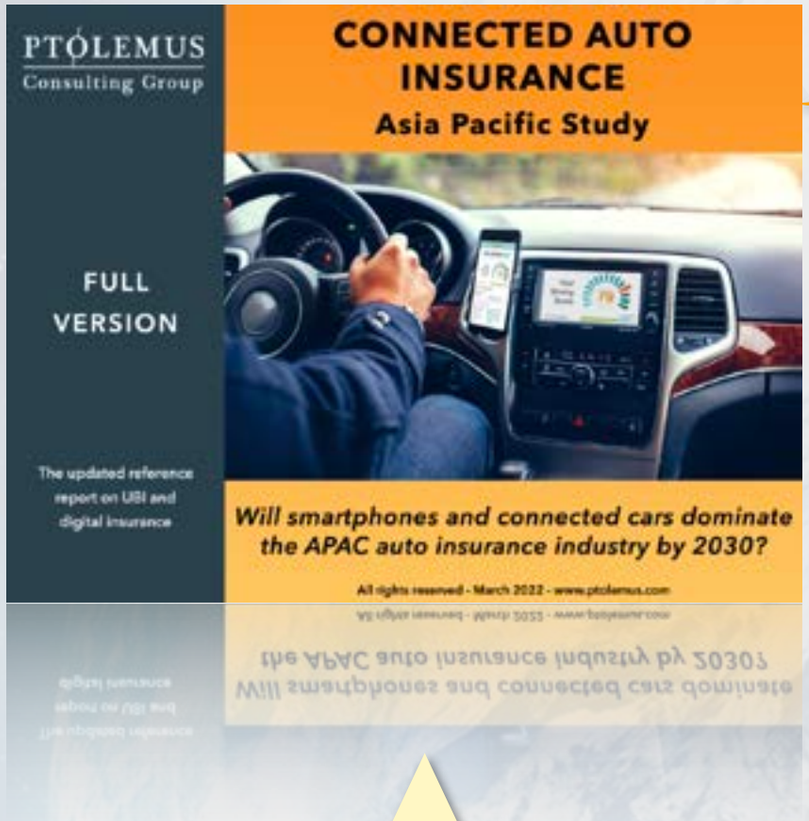
The study will answer the following key strategic questions on the connected auto insurance landscape

What is the strategy of major OEMs in insurance telematics?

Why should insurers adopt insurance telematics?

What are the trends and drivers for usage-based insurance growth between 2020 - 2030?

What will be the role of aftermarket devices in the future usage-based insurance?



What has been the impact of COVID-19 on insurance telematics industry?

Will OEM telematic solutions challenge existing insurer's business?

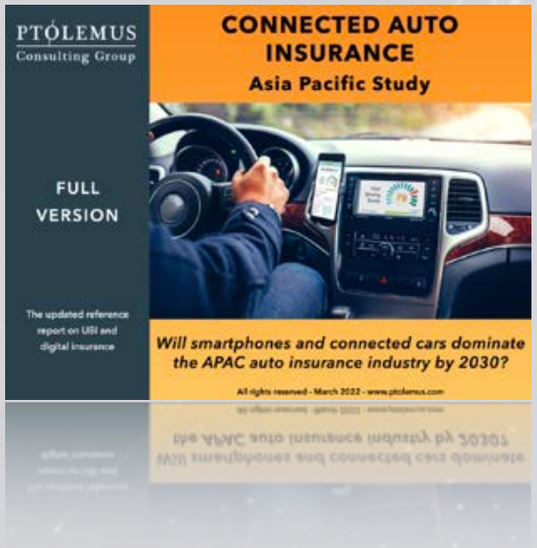
What will be the size of the usage-based insurance market in 2030 by region?

What will be the role of the emerging insurtech players in the UBI value chain?

What will be the predominant technology used to collect insurance telematics data by 2030?

How will UBI grow in the APAC region, by 2030?

A comprehensive report on the global usage-based insurance industry for personal line insurance



More than just market research.

A strategic analysis of the connected auto insurance business and the global usage-based insurance market

- **430-pages of analysis** of the connected auto insurance industry including, strategies, use-cases and geographies, based on:
  - 11 years of constant market surveillance
  - Multiple interviews with key stakeholders
- Strategy analysis and assessment of the **4 key routes** OEMs have to enter the connected insurance market
- **An analysis of the** usage-based insurance value chain, including technologies, benefits, and Covid-19 impact
- **Analysis of the current status of the global UBI industry** that includes:
  - Digital brokers role in the insurance value chain
  - OEM's future role in the insurance value chain
  - VDH's future role in the insurance value chain
  - Opportunities for insurers
- **Profiles of 3 key countries and regions leading the Asia Pacific connected auto insurance industry, including details such as:**
  - Share of active UBI policies & top car insurers
  - Market trends and timeline
  - Regulatory summary and UBI impact assessment
  - UBI value chain in Europe
- **2020-2030 bottom-up market forecast encompassing:**
  - Active policies
  - Technology splits
  - Revenues by technology
  - Distribution model, and
  - region/country

The report is the result of 9 months of work by a team of 8 consultants and analysts with 7 nationalities (1/2)

Frederic Bruneteau
Managing Director, Brussels

The **founder** of PTOLEMUS, Frederic has accumulated **25 years of experience of the mobility and transport domains** and 15 years of strategic and financial advisory.

He has become **one of the world's foremost experts of connected insurance** and is interviewed on the subject by publications such as the *Financial Times*, *Forbes*, the *Wall Street Journal* and *The Economist*. He has also spoken at over 40 conferences on the subject.

He has led over 160 consulting assignments including 70 related to UBI, helping many world leaders define and implement their strategy including:

- **Insurers** such as Admiral, Aioi Nissay Dowa Insurance, AXA, Baloise, Crédit Agricole Assurances, Generali, HUK Coburg, Liberty Mutual, Macif, Matmut, Nationwide, Société Générale Insurance, etc.
- **Analytics / telematics suppliers** such as Alfa Evolution, Danlaw, DriveFactor, LexisNexis, MUNIC, Octo Telematics, Pioneer, Sentiance and Vodafone Automotive.

Frederic also leveraged his experience of leading & reviewing 15 reports including the **UBI Global Study** and the **Fleet Insurance Telematics Global Study to review this study.**

Andrew Jackson
Research Director, London

With a career in market research spanning 12 years, **Andrew has over 8 years of experience working in the automotive and mobility domains**.

He has delivered **advisory services, custom projects, data and insights for some of the biggest names in mobility** e.g. BCA, Continental, CNH Industrial, Delphi, Johnson Controls, Hyundai, LeasePlan, Mannheim, Mercedes Benz, Mobis, PSA, SEAT, Tenneco, Volkswagen and Zego Insurance.

Over the years, he has been sought to share his opinion via a variety of publications such as the *Financial Times*, the *Wall Street Journal* and *Automotive Industries, AMonline, Fleetworld* and *Fleet News* as well as a variety of national newspapers. He is also interviewed on global automotive events by Bloomberg, CNBC and Reuters.

Andrew is a **Certified Member of the Market Research Society (CMRS)**. Andrew is also a qualified Change Management Practitioner, a Certified Scrum Product Owner and Agile Business Analyst.

Andrew directed the design, research, analysis and forecast. Plus, he wrote several sections and entirely reviewed this report.

Alberto Lodieu
Senior Manager, Paris

Alberto has 11 years of experience in strategy and operations consulting.

He has specialised in the mobility, insurance and assistance industries in projects related to corporate and competitive strategy, operations excellence and business analytics.

He has **participated in over 30 assignments** helping clients such as Abertis, **AGC Automotive, AXA Partners**, CNES, the French space agency, **CVC Capital Partners, Danlaw**, DMP, Deloitte, **Europ Assistance**, the European Commission, **Gruppo Banorte**, Ferrovial, **HUK Coburg, Liberty Mutual Insurance**, **Société Générale Insurance**, **Silver Lake**, Telespazio, Transurban**, wejo** and **ZirconTech**.

Alberto helped review, research and write this report.

Damien Orsoni
Business Analyst, Paris

After graduating from Kedge Business School and the University of Groningen in 2019, Damien completed his MSc in Management at Milan's Bocconi University in 2021.

During his studies, he worked at S2M-Group, an IT consulting firm based in Barcelona, where he participated in projects with major financial institutions, insurance companies and telecom operators located in France. His area of focus was Client Communication Management.

Damien took up the role of VP of Cuora Consulting, a strategy consulting association offering pro-bono consultancy services to international NGOs and social start-ups. There, he had the chance to work with Ecosteer, a data ownership platform enabling companies in the augmented mobility industry to monetise their IoT investments by involving their customers into the data value chain.

Damien contributed to the research, analysis and writing of this report.

The report is the result of 9 months of work by a team of 8 consultants and analysts with 7 nationalities (2/2)

Nina Neubauer
Business Analyst, Brussels

An urban planning and transportation engineering graduate, Nina has developed expertise in **Autonomous Vehicles (AVs), Electronic Toll Collection, Smart Cities and connected cars** by assisting companies such as AXA Partners, Bain Capital, Advent International, Baumarc Project, Intrado, Telepass and Vodasun Energie.

She has completed several research projects related to **traffic management** and **engineering** for the AVL Motor Test Center AB in Gothenburg and within the TU Munich.

For a global roadside assistance operator, she helped define their **connected car service strategy** and built a **forecast of 7 connected car services markets** in Europe.

For a private equity firm, Nina analysed the **European electronic tolling market**.

She has built our **2020-2030 global automotive market forecasts** and contributed to our **Connected Vehicle Payments Global Study**.

Nina helped build the market forecasts for this report.

Spardha Taneja,
Senior Business Analyst, Brussels

Spardha has gained 3 years of experience in the automotive and insurance sector. She has specialised in usage-based charging and Big Data analytics, gaining experience from companies such as Abertis, **AXA, AXA Partners, Capvis, Danlaw, HUK Coburg, Hitachi, Mobivia, Octo Telematics and wejo**.

She formulated a search engine marketing strategy to increase the visibility of Wayscral's (part of **Mobivia** group) web site on search engine result page based on process mapping of non-financial KPIs in the electric bicycle market.

Spardha has been conducting research on the global insurance telematics market for PTOLEMUS UBI market quarterly dashboard for 2 years. She has developed a specific expertise of smartphone-enabled Usage-Based-Insurance, by analysing 16 technology service providers and 15+ UBI apps for our Mobile Insurance Global Study.

Spardha led the research, analysis and writing of this report.

Hosung Suh
Business Analyst, Brussels

Hosung obtained his Bachelor's degree in Economic History at Erasmus University Rotterdam in June 2018, and went on to complete an MSc in Strategy and International Business at Nova School of Business and Economics in 2020.

Amid the course of his studies, he worked on projects that fed his curiosity to explore and learn different roles and different industries. He spent some time as a Sales Analyst for the beer segment in Belgium and also worked at Henkel as Brand Manager in Germany.

Furthermore, he broadened his experience by completing a consulting project at Europ Assistance in Portugal where he improved the products and operations within the roadside assistance branch, while exploring and learning about the future of mobility and usage-based insurance market.

Hosung contributed to the research, analysis and writing of this report.

Filippo Frezet
Business Analyst, Brussels

Filippo has gained experience **in mobility, insurance and emergency services,** helping clients such as Advent International, Bain Capital, the European Commission, SkyToll, wejo and Zego Insurance.

He has contributed to several consulting and research projects e.g.

- **For the European Commission, he analysed the impact** of mandating a combination of positioning technologies on mobile phones for emergency applications (E112)
- **Helped a European ITS company defining its expansion and M&A strategy**
- **For a leading private equity fund,** he conducted the **due diligence** of a leading electronic tolling service provider
- **He participated in the research and writing of PTOLEMUS' Vehicle Data Market Global Study**, the first in-depth analysis of car data hubs worldwide, analysing companies such as Caruso, LexisNexis, Otonomo, Verisk and wejo,
- He also led the work for our **Gig Economy Motor Insurance European Study.**

Filippo contributed to the research, analysis and writing of this report.

Will connected cars dominate the auto insurance industry?

Elon Musk just tweeted Tesla's intent to launch a UBI product in Texas in October, citing why, with the stream of "actual driving data", Tesla was best placed to price insurance premiums for its customers.

For once, however, this announcement is not so "avant-garde" and in fact represents the tip of the iceberg for the insurance industry…

COVID-19 has triggered the demand for mileage-based insurance…

Based on 9 months of research, this report reveals that the collapse in car usage provided by pandemic-related confinements has led policyholders to demand flexible policies priced on their actual mileage.

Many insurers, especially in the US, issued rebates, as policyholders demanded refunds, and, in response to the outcry, established UBI programmes too.

Furthermore, a large number of carriers told us how **demand for Mileage-Based Insurance (MBI) has increased significantly,** with reports of **40-50% of all new policies being written to connected auto insurance programmes** no longer being uncommon.

… and OEMs are responding

With the now dominant share of connected cars being sold in developed countries, OEMs are responding to the demand for km-based policies.

Aided by the COVID-19 pandemic but also OEMs' own initiatives, **connected car insurance is increasingly substituting traditional car insurance.** Since 2017, the growth of connected car insurance programmes has been **outpacing insurance based on aftermarket devices.**

PTOLEMUS' research identified that at least 13 global OEMs have launched telematics insurance programmes in the last two years, all **of which use the car's built-in connectivity without the need for additional aftermarket hardware.**

At least **17 OEMs are selling connected car services** with dynamically-priced insurance already available from Ford, GM, Kia, Hyundai, Mercedes-Benz, Stellantis, Tesla, Toyota and Volkswagen. Many car manufacturers have also forged insurance partnerships (i.e. Ford with Arity, GM with American Family, Ford with Octo Telematics, PSA with AXA, Daimler with SwissRE)**.**

Furthermore, in a clear statement of intent, 50% of all OEM in-house UBI programmes now use connected car data only, removing insurers or TSPs from the equation entirely.

What will be the impact?

PTOLEMUS has found that aftermarket devices will continue to hold a significant global marketshare for the next 5 years, but PTOLEMUS **expects the share of black boxes, cigarette-lighter adaptor, dash cameras** and **OBD dongles global to decline by 2030**.

That is not to say that the future will be OEM data only. Indeed, PTOLEMUS also found that the growth in **smartphone-based programmes will continue for Pay How You Drive programmes.**

This can be attributed to the ease of app distribution and relative low cost.

Critically however, **the biggest strength of smartphone insurance comes from its ability to connect with the consumer** in a way that no other aftermarket device can offer.

Is it too late for insurers adopt UBI?

Not necessarily! The advent of the COVID pandemic has inadvertently resulted in a public referendum on traditional insurance products. Due to this exceptional event, **the benefits of UBI have finally become evident to policyholders**.

The reasons for UBI adoption are very much established too, with **5 key areas where the technology can provide benefits**, including: customer acquisition, onboarding, customer engagement, policy management and, claims management.

Also, by using connected insurance within claims management, insurers can reap significant improvements in claims processing, **reducing lead times by up to 75%. Meaning a lead time of 20-30 days can be reduced to little more than a week.**

But insurers must move fast to address the growing vacuum in the market as, automakers and digital brokers are proving that they will be able to disrupt the market.

A market that will be multiplied tenfold

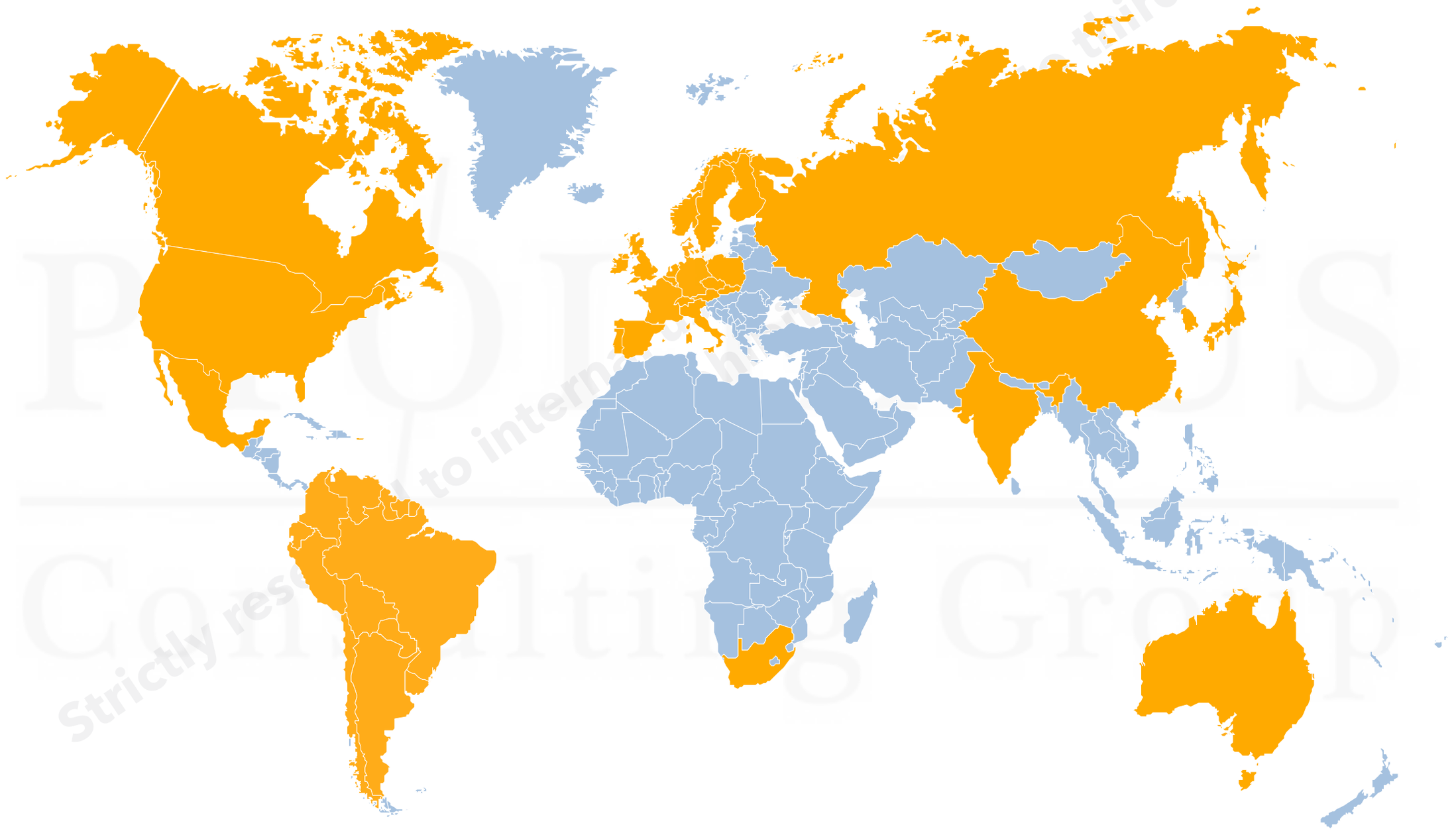
Today, the market for **connected auto insurance represents 26 million active policies across all types of distribution models and technologies, generating €15 billion in premiums.**

Nearly 50% of global active programmes are concentrated in the USA, the UK and Italy. However, in last two years, 16 smaller markets have been positing double-digit growth too.

We expect that the increasing ease and lowering costs of data collection will allow UBI-based policies to grow to **248 million** across **18 regions.**

As a result, global UBI premiums are expected to surpass **€150 billion by 2030, 10 times more than last year!**

The report covers the top 15 countries and regions that are most active in connected auto insurance



Connected Auto Insurance APAC Study 2022 - Glossary

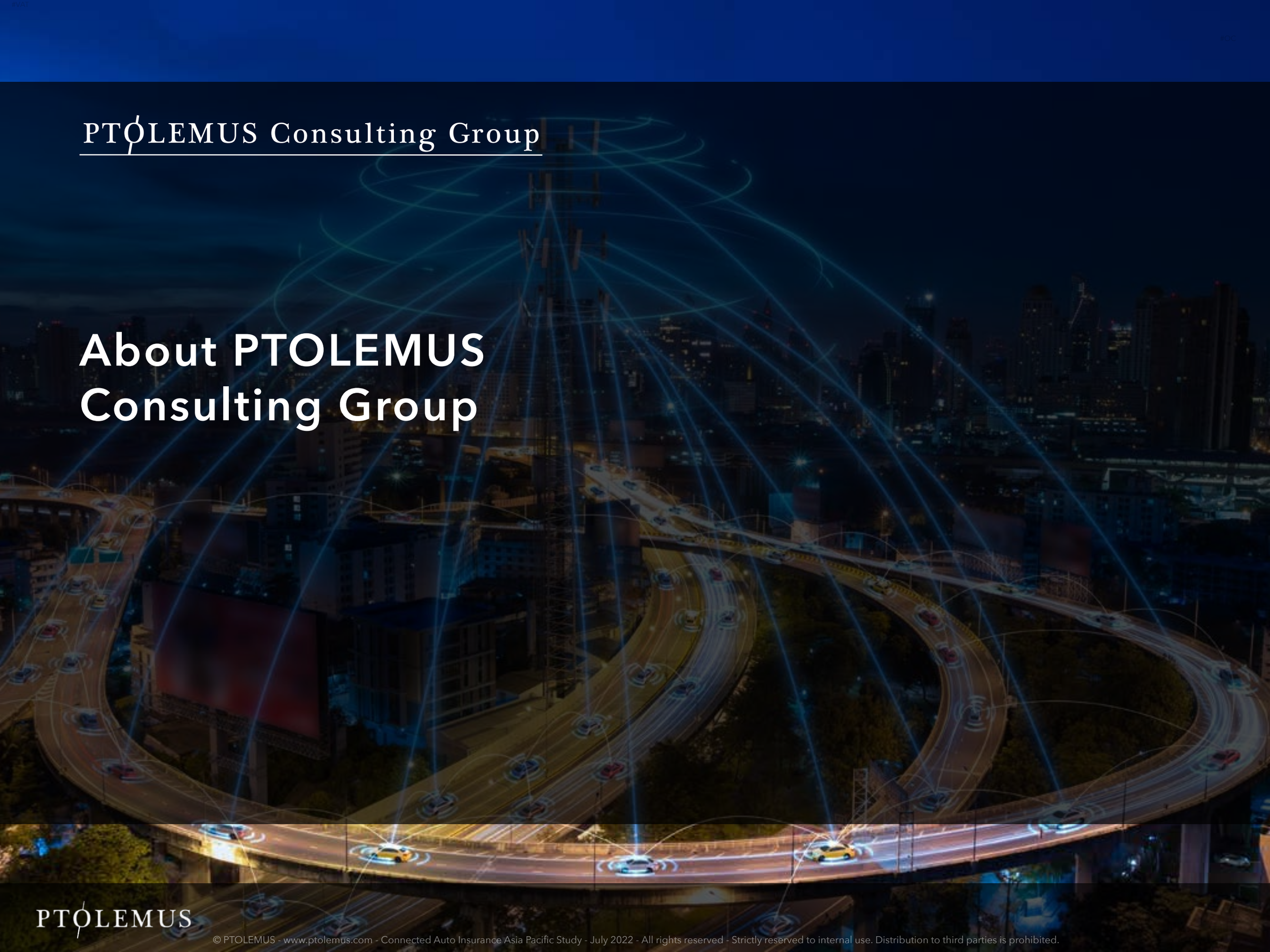
3G	Third generation mobile networks (also called UMTS)
4G	Fourth generation of cellular wireless standards (also called LTE)
5G	Fifth generation of cellular wireless standards
ADAS	Advanced Driver Assistance System
API	Application Programming Interface
bCall	Breakdown call, i.e. a call-based roadside assistance service
BOM	Bill of Material
CAAS	Car As A Service
CAN-bus	Controller Area Network (One of the car's network)
CASCO	Casualty and Collision (equivalent to comprehensive insurance)
CEN	The European committee of standardisation
CLA	Cigarette Lighter Adaptor
CPM	Cost Per Thousand
CRM	Customer relationship management
CONTRAN	Conselho Nacional de Trânsito (National Traffic Council; Brazil)
CTR	Click Through Rate
DAB	Digital Audio Broadcasting
DAB+	Approximately twice as efficient as DAB
DMB	Digital Multimedia Broadcasting
DQ	Driver Quotient
DSRC	Dedicated Short Range Communications
DTC	Diagnostic Trouble Code
DVB-T	Digital Video Broadcasting – Terrestrial
eCall	Emergency call, the pan-European assistance system that is now integrated in all new EU car models
EC	European Commission
ECU	Electronic Control Unit
EDR	Electronic Data Recorder
EES	Egis EasyTrip
EETS	European Electronic Toll Service
eFNOL	Electronic First Notification Of Loss
EOBD-II	European On Board Diagnostics
EOBR	Electronic On Board Recorder
EV	Electric Vehicle
FCD	Floating Car Data
FMD	Floating Mobile Data
FMS	Fleet Management System
FNOL	First Notification Of Loss
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HGV	Heavy Goods Vehicle
ITS	Intelligent Transport Systems
IVR	Interactive Voice Response system
IPR	Intellectual Property
KPI	Key Performance Indicator
LBA	Location-Based Advertising
LBM	Location-Based Marketing (e.g. promotional coupons)
LCV	Light Commercial Vehicle
LTE	Long Term Evolution, aka 4G mobile networks
M2M	Machine to Machine
MBI	Mileage-based insurance
MEMS	Micro-Electro-Mechanical System
MNO	Mobile Network Operators
MTBF	Mean Time Between Failure
MTPL	Motor Third Party Liability
MVR	Motor Vehicle Records
NCTS	National Computerised Transit System
NFC	Near Field Communication
OBD	On-Board Diagnostics
OBU	On-Board (telematics) Unit
OEM	Original Equipment Manufacturer
OS	Operating System
OSM	Open Street Map
OTA	Over The Air
PAYD	Pay As You Drive insurance
PC	Passenger Cars
P&C	Property & Casualty insurance (incl. auto & home insurance)
PCB	Printed Circuit Board
PHYD	Pay How You Drive insurance

Connected Auto Insurance APAC Study 2022 - Glossary

PID	Parameter ID
PIP	Personal Injury Insurance
PND	Portable Navigation Device
POI	Point Of Interest
POS	Point Of Sales
PPC	Price Per Click
PSAP	Public Service Answering Point
QoS	Quality of Service
RFID	Radio-Frequency IDentification
RHYD	Reward How you Drive (discount is replaced with a non-monetary reward)
SAAS	Software As A Service
SVR	Stolen Vehicle Recovery
SVT	Stolen Vehicle Tracking
TBYB	Try before you buy insurance schemes (generally using an app to monitor driving risk before underwriting)
TCO	Total Cost of Ownership
TISA	Traveller Information Services Association, in charge of standardising traffic information services
TMC	Traffic Message Channel, a technology for delivering traffic and travel information to drivers (sometimes also called Alert-C)
TMS	Transport Management System
TPS eCall	Third-Party Service eCall, connected to a private assistance provider (e.g. IMA for PSA or AllianzOrtungs for BMW))
TSP	Telematics Service Provider
TTP	Telematics Technology Provider
UBI	Usage-Based Insurance
V2V	Vehicle to Vehicle
VAS	Value Added Services
VMS	Variable Message Signs, displaying traffic information on key motorways
VIN	Vehicle Identification Number
VPN	Virtual Private Network
WAN	Wide Area Network (typically the cellular network)
WLAN	Wireless Local Area Network (typically a WiFi network)

PTOLEMUS Consulting Group

About PTOLEMUS Consulting Group



PTOLEMUS

The first strategy consulting & research firm entirely focused on augmented mobility & automation

Strategy consulting services

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

Market research services

- **Off-the-shelf reports**
- **Subscription services**
- **Custom market research**

Fields of expertise

Mobility services	Car pooling Car sharing MAAS	Micro-mobility Ride hailing Shared mobility	Smart parking Tax refund
Vehicle services	bCall eCall FMS SVT / SVR	Tracking VRM In-car Wi-Fi Parking	Navigation Speed cameras Traffic information
New energies	BEV EV charging Fuel cards	Fuel cells Hydrogen	PHEV Vehicle-to-grid
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	Robo-taxis Shuttles
Enabling technologies	Positioning (GNSS / WiFi / cellular) M2M / connectivity	Smartphones Sensors	Telematics devices V2X

Our clients come from across the mobility ecosystem

Analytics, maps & applications providers

arity · BEMOBILE · BMJ · CarPay · CCC · Cognizant · COYOTE · DYNAMIC MAP PLATFORM · Google · here · ESRI · Increment P · RMS · LexisNexis · PASCO · sas · sentiance · tdf · TOMTOM · TOWERS WATSON · TrueMotion · Verisk Analytics · wejo · ZENRIN

Automotive manufacturers & suppliers

AGC · ALPINE · Audi · BOSCH · BRIDGESTONE · CNH INDUSTRIAL · Continental · DAIMLER · DELPHI · Ford · GM · HARMAN · HINO · HONDA · intel · ISUZU · MICHELIN · nauvo · MITSUBISHI MOTORS · NISSAN · Pioneer · QUALCOMM · QOROS · RENAULT · SCANIA · SIERRA WIRELESS · SUZUKI · Telit · TOYOTA · ZF

Telematics solution providers

ARKAN · arvento · CAMBRIDGE MOBILE TELEMATICS · DAMLOW · DigiCore · drivefactor · edriving · Eliocity · FleetComplete · Fleetmatics · GSGroup · LO/JACK · masternaut · IMS · MIVIC · OCTO · Quartix · Queclink · SafeFleet · smobi · SiriusXM · SISTEMA · Scope Technologies · Tantalum · TELTONIKA

Mobile telecom players

AT&T · ERICSSON · proximus · SFR · SK telecom · Sprint · TELEKOM AUSTRIA GROUP · Telefónica · verizon · vodafone

Fleet & fuel, ITS & regulators

abertis · ALD Automotive · ARAL · ARVAL · autostrade · AVIS · Axxès · bp · Brisa · DKV · ecopistas · Edenred · egis · eni · EUROMASTER · EUROPEAN COMMISSION · ew · ferrovial · FLEETCOR · kapsch · OMV · Nomad Digital · NORBIT · SKYTOLL · SKEDGO · sanef · TELEPASS · THALES · TOLL COLLECT · Total · Transurban · T-Systems · VITRONIC · wex · zipcar

Device & location suppliers

ANDREW · cnes · LOCATION SMART · NAVIZON · NOKIA Connecting People · gmv · HUAWEI · SAMSUNG · ThalesAlenia Space · Telespazio · SYSNAV · TruePosition

Insurers, aggregators & assistance providers

AAA Insurance · ADMIRAL · Agero · Aioi Nissay Dowa Insurance · Allianz · Allstate · AMERICAN FAMILY INSURANCE · AVIVA · AXA · Baloise · carrot · covea · CREDIT AGRICOLE ASSURANCES · Desjardins · europ assistance · FARMERS · FIA · GENERALI · The Hartford · IAG · ICICI Lombard · intact · ASSISTANCE · INGOSSTRAKH · HUK · Liberty Mutual · MACIF · Matmut · MENORA · MONDIAL ASSISTANCE · Munich RE · SOMPO JAPAN · Nationwide · OUT INSURANCE · PROMUTUEL · rac · RSA · smile · SOCIETE GENERALE · State Farm · Swiss Re · telesure · TOKIO MARINE · youi · ZURICH

Banks & private equity investors

Advent International · Amadeus Capital · Amundi · BainCapital · Bank of America Merrill Lynch · BARCLAYS · THE BALPOST GROUP · capvis · Cinven · citigroup · CVC · DISRUPTIVE · Goldman Sachs · HELLMAN & FRIEDMAN · INVESTCORP · J.P.Morgan · HUTTON COLLINS · Leonardo & Co. · MONTEZEMOLO & PARTNERS · NOMURA · RENOVA GROUP · PAMPLONA CAPITAL MANAGEMENT · SILVERLAKE · TIME FOR GROWTH · THOMA BRAVO

170 consulting assignments to help our clients define their strategy …

Defined strategic positioning in insurance telematics value chain

MICHELIN

Evaluated UBI market opportunities in Europe, Asia and Latin America

Liberty Mutual

Defined the strategy & business plan of its telematics programme

Aioi Nissay Dowa Insurance
MS&AD INSURANCE GROUP

Helped the company's Board understand the impact of telematics

Insurance group

Defined the scoring & pricing of its PHYD programme

European insurer

Helped the company its EU market entry strategy

Fleet telematics service provider

Appraised future telematics technology & market trends and their impacts

ADMIRAL

Helped our client define its mobile UBI strategy

Global insurance group

Helped evaluate European OBD market opportunities in FMS, UBI and roadside assistance

Major telematics device vendor

Evaluated the market potential of insurance telematics in Europe

QUALCOMM

Helped the company define its strategy towards OEMs

Major insurance data provider

Defined its European connected insurance market entry strategy

Consumer electronics group

Source: PTOLEMUS

… perform market sizing, due diligence & business planning projects…

Conducted the commercial due diligence of Octo Telematics

Amadeus Capital Partners Limited
MONTEZEMOLO & PARTNERS

Assisted in the review of the global insurance telematics market

KKR

Helped the client define the strategy & business case of its new telematics business

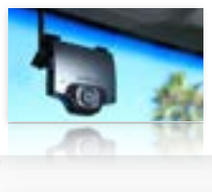
Automotive tier-1 supplier

Performed a global review of the insurance telematics market

SILVERLAKE

Performed the vendor due diligence of Cobra Automotive prior to its acquisition by Vodafone

INTEK GROUP



Led technology due diligence of Lytx, a US video-based fleet Telematics Service Provider

BainCapital

Evaluated the analytics solution of a global insurance TSP

Private equity fund

Evaluated the impact of telematics on claims losses

French insurance company

Evaluated the EU market for smartphone-based fleet management

wejo

Built insurance telematics business plan in 5 EU countries

TOYOTA INSURANCE MANAGEMENT

Led commercial due diligence of ITmobile, a Belgian fleet TSP

FleetComplete

Conducted a global review and forecast of the Usage-Based Insurance market

Cinven

Source: PTOLEMUS

… and help them deliver their strategy

Defined & implemented its partnership strategy in the connected vehicle ecosystem

egis

Assisted in sourcing a driving behaviour database across Europe

Global tier-1 automotive supplier

Helped the company build its driver behaviour scoring solution

Telematics Service Provider

Helped the technical team identify valuable OBD data for its future telematics diagnostics offering

Roadside assistance operator

Evaluated the technical & safety characteristics of a telematics solution using an OBD dongle

Mid-sized insurance group

Evaluated the solution of an Irish fleet Telematics Service Provider

Strategic investor

Helped the OEM leverage its data for its insurance telematics strategy

SCANIA

Sourced a large scale driving database to build a global auto insurance risk score

Insurance scoring company

Evaluated the technical solution of a CAN-bus telematics solution provider

Tyre maker

Defined the telematics platform specifications on analytics & driver coaching

Consumer electronics player

Assisted in sourcing an OBD dongle for mass deployment in China

Major connected platform provider

Evaluated the security of the solution of a green driving service provider

Major financial group

Source: PTOLEMUS

We have helped insurance and assistance companies in over 10 countries

ADMIRAL

Aioi Nissay Dowa Insurance
MS&AD INSURANCE GROUP

Allianz
Global Assistance

AXA

Baloise
Insurance

CA

europ assistance

FIA

GENERALI

HUK

Liberty Mutual

MACIF

Matmut

MONDIAL ASSISTANCE

Nationwide

SOCIETE GENERALE

PTOLEMUS can help both insurers, OEMs and their suppliers achieve their connected insurance objectives

- **Strategy definition**
  - Market entry assistance
  - Data strategy and analysis
  - End-to-end UBI programme definition
  - Mobile insurance strategy development
  - VAS strategy
  - Data monetisation strategy
  - e-FNOL strategy
- **Investment assistance**
  - Strategic review
  - Commercial due diligence
  - Market forecasting
- **Innovation management**
  - Insurance policy definition
  - Integration with fleet telematics
  - Telematics pricing strategy
  - Reward strategy
  - Value added services (VAS) strategy
  - Loss reduction plan
- **Procurement**
  - Identification of relevant suppliers
  - Selection of telematics technology & suppliers
- **Business development**
  - Partnership strategy definition
  - Partnership strategy implementation
- **Deployment**
  - Data privacy strategy
  - Analytics, scoring and pricing strategy
  - Specifications of telematics-enabled products
  - Design & deployment of telematics platform

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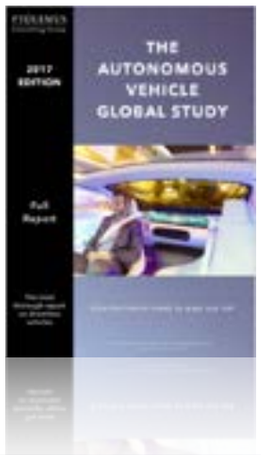
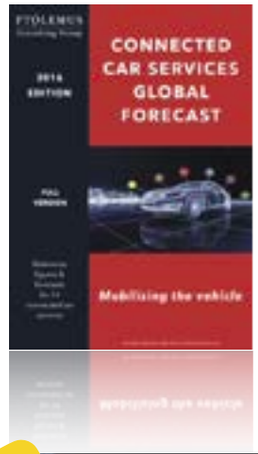
AUTONOMOUS DRIVING



CONNECTED CAR

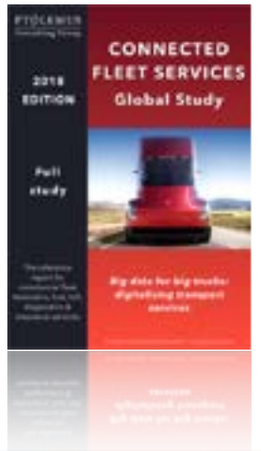


DIGITAL INSURANCE

ELECTRONIC TOLLING

MOBILITY

FLEET MANAGEMENT



CONNECTED AUTO INSURANCE GLOBAL STUDY

PTOLEMUS

Status of the global connected auto insurance market

1 An introduction to connected auto insurance

2 The current insurance telematics value chain

3 How COVID-19 has been a catalyst for change

PTOLEMUS

An introduction to connected auto insurance

1 What is connected insurance?

2 What are the types of data available?

3 What are the types of programmes in use?

PTOLEMUS

What is connected insurance?

It is an insurance policy in which an insurer uses **dynamic data** acquired via telematics devices to **personalise and improve its service offering** to a customer.

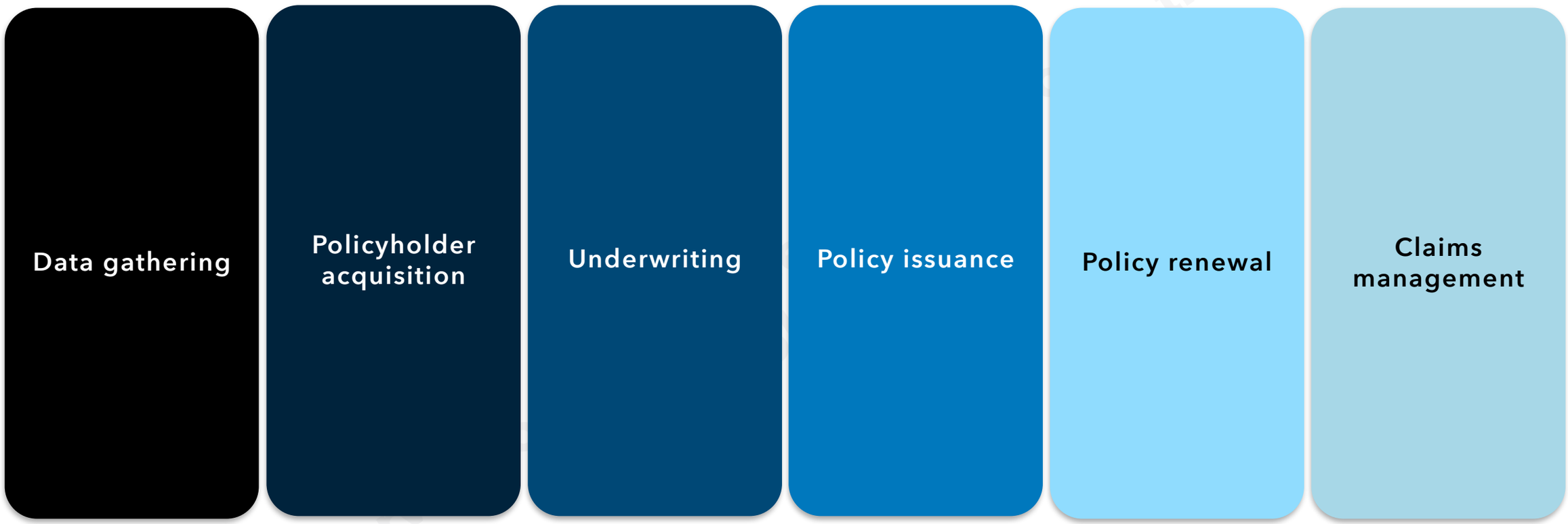
Insurance telematics, also known as connected insurance, enables insurers to **collect actual data** that relates to an individual policyholder.

It enables the insurer to **better understand the risks** directly associated with an individual policyholder, or - with enough data - to refine their overall actuarial calculations.

In doing so, the insurer can **increase its profitability** by mitigating risk exposure, rewarding better driving standards, and improving risk modelling and management.

Traditional auto insurance products can be broken down into 6 core components and rely on the collection of static data

The components of traditional auto insurance

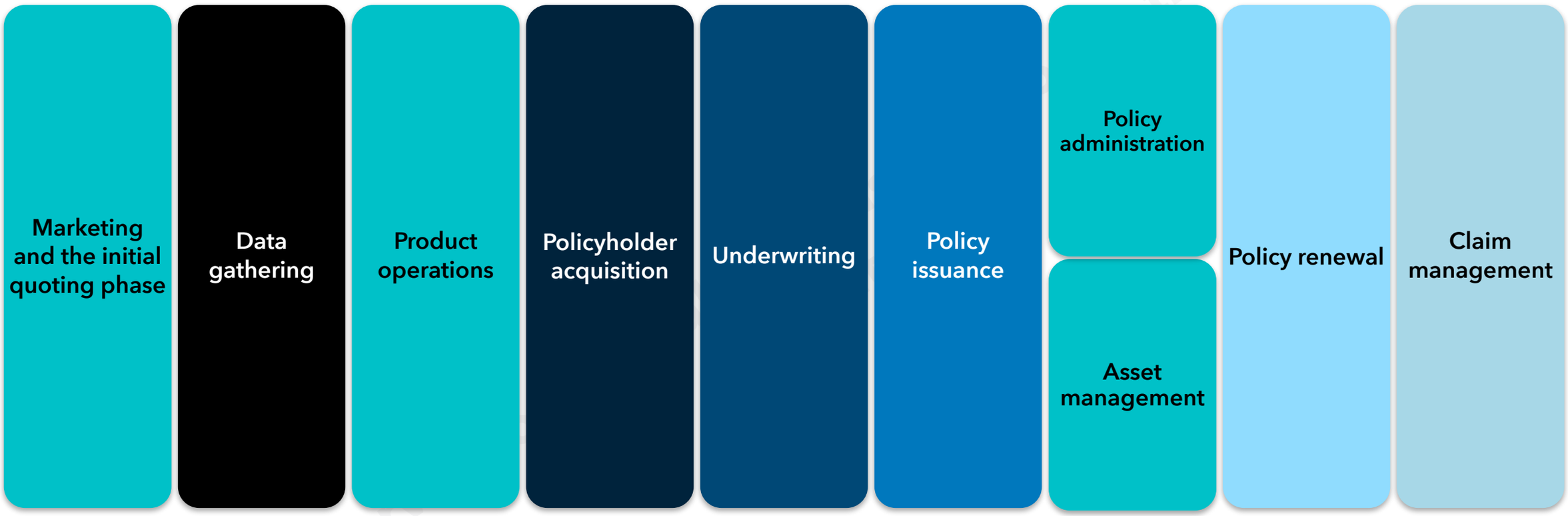


- Traditional vehicle insurance policies estimate risk that is based on **static datasets** including age, vehicle type, garaging location, years without claim, recorded driving convictions, etc.
- As a fixed data set, **it does not change after being recorded** and cannot refresh information in real time and by virtue of the collection process is out-of-date immediately after the date of collection.
- After underwriting, this information is stored **until the renewal date**, when a review of the documentation occurs to validate whether the information is accurate and if there have been any changes to the policyholder's circumstances.
- The data is also reviewed and updated when a claim is made.

Source: PTOLEMUS

By "connecting" auto insurance products to telematics data, the ability to refine and improve customer interaction increases

The connected insurance-enabled value chain



- By virtue of being "connected" the number of touch points that can be refined and improved for an insurer increases, thus enhancing policyholder contact points and - hopefully - a stronger customer relationship at the point of renewal.
- **Connected insurance not only depends on static data but also on dynamic data.**

- Dynamic data, by definition, is continuously variable and is liable to change after it is recorded.
- Dynamic data can be considered as any time series data that comes from sensors or monitoring devices and is generated on a second-by-second, or higher, frequency basis.

Source: PTOLEMUS

Connected insurance requires alternative marketing strategies

The connected insurance-enabled value chain

Marketing and the initial quoting phase

- By virtue of a connected insurance policy being a "new" product, it requires an alternative marketing strategy to traditional insurance products:
  - Data privacy is a perennial concern for motorists;
  - The upside (i.e. lower premiums) can still not incentivise uptake if concerns cannot be effectively mitigated.
- Prior to issuing a new policy, insurers are required to have a process already set up to provide telematics devices and fit them into customers' cars.
- Of course in the case of smartphone-based driver monitoring applications, they are required to have a capable IT infrastructure.

Underwriting

Policy issuing

Policy administration

Asset management

Policy renewal

Claim management

Source: PTOLEMUS

Insurance telematics also markedly differs operationally as the insurer must ensure devices are distributed and operational

The connected insurance-enabled value chain

Marketing and the initial quoting phase

Data gathering

Product operations

- The telematics device supplier needs to be added to the value chain to fit the monitoring device in the customer's car (except with smartphone UBI).
- The insurer owns the customer relationship and arranges for the outfitting of devices.
- The insurer generally uses a TSP to collect the data and create a risk score.
- The insurer uses this score to influence premiums and offer discounts.
- By virtue of being "connected" the number of touch points for an insurer increases, thus enabling more policyholder contact and - hopefully - a stronger customer relationship at the point of renewal.
- **Connected insurance not only depends on static data but also on dynamic data.**
- Dynamic data, by definition, is continuously variable and is liable to change after it is recorded.
- Dynamic data can be considered as any time series data that comes from sensors or monitoring devices and is generated on a second-by-second, or higher, frequency basis.

Source: PTOLEMUS - Note: TSP: Telematics Service Provider

Connected insurance differs from traditional insurance, as the customer must agree to the sharing of personal data

The connected insurance-enabled value chain

- In the case of Try-Before-You-Buy (TBYB), pushing customers to buy the policy at the end is vital.
- The policyholder acquisition stage demands a higher level of customer engagement.
- For instance, insurers can offer a **Try-Before-You-Buy** (TBYB) option whereby the customer has the option to subscribe to or decline the policy.
- In such a model, the insurer must typically collect at least 300 km of the customer's driving data.

Policyholder acquisition

Underwriting

Policy issuing

Policy administration

Asset management

Policy renewal

Claim management

Source: PTOLEMUS

Connected insurance can provide a rich source of data to actuaries enabling enhanced risk assessments to be made

The connected insurance-enabled value chain

- Rate making and risk modelling with telematics data requires a new set of skills, human resources and IT infrastructure.
- In addition to insurance, the carrier offers risk detection and prevention services.
- The insurer can work with the TSP or an OEM or another partner to collect data.
- The insurer recommends the use of telematics or safety technologies.
- The insurer offers high-level risk control assistance.

- Might consist of best practice recommendations, coaching but is not necessarily directly linked to telematics data.
- Typically, at the underwriting stage, the insurer has accumulated more than **300 km** of driving data (at least 10 long distance driving records) as well as background information about the vehicle, the driver and his driving habits.
- Consequently, rate-setting with telematics data **requires a new set of skills and IT infrastructure** to combine all this information in order to offer a fair and competitive price.

Underwriting

Policy issuing

Policy administration

Asset management

Policy renewal

Claim management

Source: PTOLEMUS

Being "connected" can improve automation of data provision for back office tasks, greatly assisting policy administration

The connected insurance-enabled value chain

- Telematics data provides an opportunity for insurers to constantly monitor and communicate with motorists regarding where, when and how they are driving.
- The insurer uses the data analysis to influence premiums and offer discounts.
- The TSP largely controls the customer relationship.
- The other big difference between traditional auto insurance and UBI policy is in the latter's administration of policies.
- This provides an opportunity for insurers to monitor and communicate with their policyholders on a constant basis.
- For example, according to **Insurethebox**, their **business model contains around 200 customer touch points** for them to communicate, monitor and interact with customers.

Marketing and the initial quoting phase

Data gathering

Policy administration

Asset management

Policy renewal

Claim management

Source: PTOLEMUS

With telematics, positive and adverse selection can happen at the underwriting stage but also at policy renewal

The connected insurance-enabled value chain

Marketing and the initial quoting phase

Data gathering

Product operations

Underwriting

Pricing

Distribution

Policy renewal

Claim management

- A share of the riskiest drivers that suffer from a premium rise will prefer to "churn" (move to another insurer).
- In a market where the vast majority of auto insurers still set tariffs based on statistical criteria rather than personal actual records, these highly risky drivers will benefit from lower prices at other insurers.
- Conversely, the safest drivers will have a clear interest in keeping their policy with the initial insurer, thereby reducing the churn rate of good drivers.
- On the whole, **insurers that implement telematics will benefit from a natural effect of adverse/positive selection.**
- Those that do not will end up increasing their risk exposure due to a lack of adverse selection.

Source: PTOLEMUS

With regards to claims processing and provision of emergency assistance, connected insurance can greatly reduce lead-times

The connected insurance-enabled value chain

Marketing and the initial quoting phase

Data gathering

Product operations

Policyholder acquisition

- Connected insurance can assist insurers in multiple ways when it comes to claims management including:
  - FNOL;
  - Accident reconstruction;
  - Claims handling.
- With telematics devices, insurers / TSPs can identify, with an increasing degree of certainty, which type of events should be recognised as an accident.
- In the case of Scope Technologies, as the accident-related data reaches its claims support platform, it uses neural network-based modelling to determine the occurrence of the accident, filtering out false positives.
- The analysis is based on a large database of lab test crashes as well as their own accident data.
- Insurers are also able to derive a reconstruction scenario to determine the legitimacy of the injuries.
- Whilst this has been used in claims for decades, we see a shift forward in the use of data for claim management.
- The aim today is to use sensors to detect the severity and angle of the shock.
- Then to transfer that into accident gravity for the driver and for car parts repairs as well as to verify that the claim is not fraudulent.

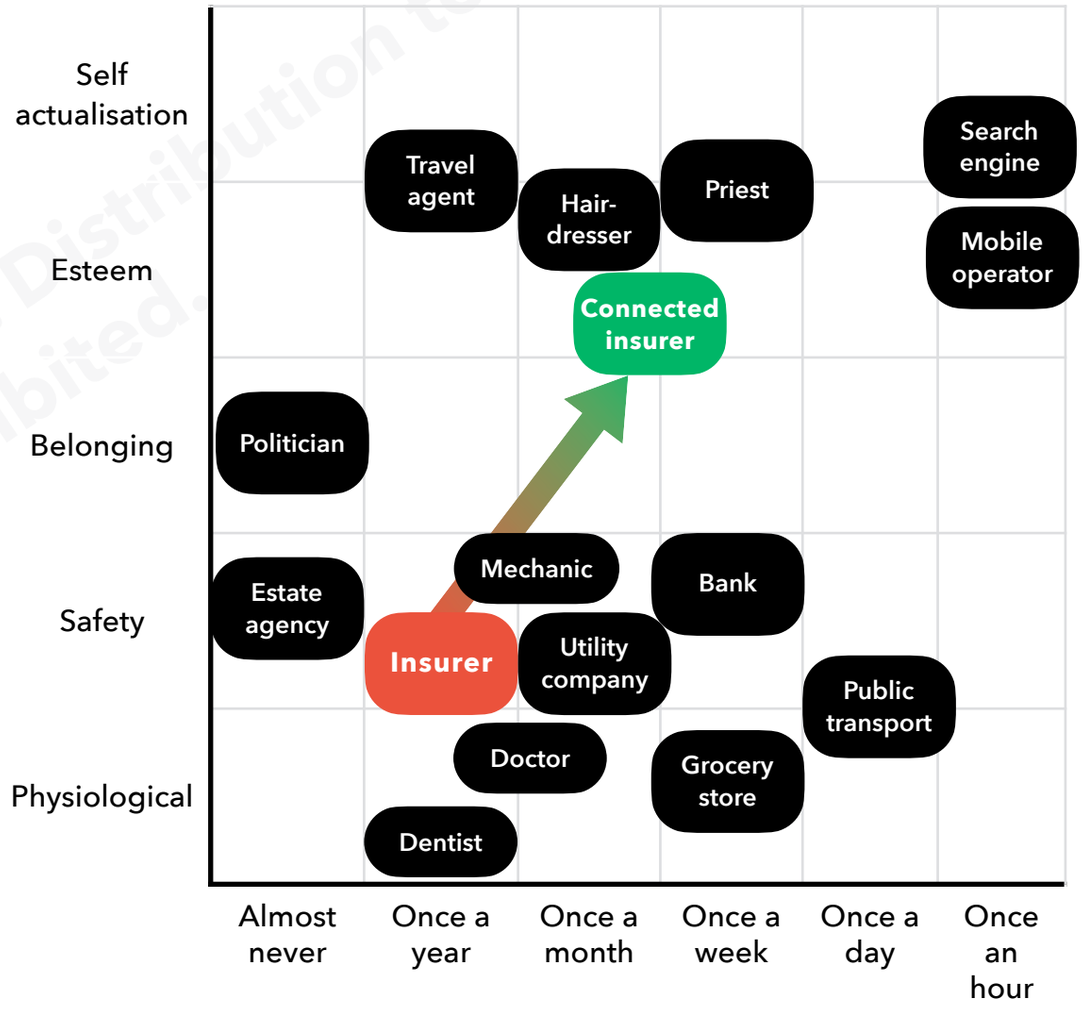
Claim management

Source: PTOLEMUS

By utilising connected insurance, an insurer has the potential to increase customer touch points and build a relationship

- Compared to numerous service industries such as telecommunications, banking or retail, **the relationship between consumers and their insurer has always been relatively limited and made out of negative events:**
  - Generally, customers have a contact with their insurer or broker **once a year at most**. Most of their contacts with their insurance company are generally related to the payment of bills;
  - In many cases, the contract can last several years and it is renewed automatically;
  - On average, their customers **file a claim every 12 years** in the UK **or every 25 years** in France.
- This contributes to make **auto insurance a commodity** because customers have **little intimacy** with their insurer.
- By developing connected insurance products, an insurer has the opportunity to both **provide more responsive "traditional" services** associated with an insurance policy.
- Furthermore, the insurer has the opportunity to **build a relationship** with the policyholder via more frequent - and relevant - contact, which ultimately can influence the decision-making process to **increase customer retention** when the time comes for policy renewal.

Typical contact frequency of commonly-used services



Source: PTOLEMUS

An introduction to connected auto insurance

1 What is connected insurance?

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3 What are the types of programmes in use?

PTOLEMUS

Connected insurance has historically used aftermarket devices to generate and facilitate the collection of data

The 6 main device types used for connected insurance

A "black box" can be self- or professionally-fit. It can be connected to a vehicle CAN bus (data network) to access additional sensor data, or can be a self-contained unit with all sensor capabilities built-in.

Some TSPs also supply a beacon or "tag" which, once paired with the phone, acts to validate the driver's presence and potentially to augment the data collected and transmitted by the smartphone.

An OBD "dongle" connects to a vehicle's onboard diagnostics port to access and transmit data available via the OBD-II communication standard available in all passenger cars* since 1996.

Smartphone UBI apps use the phone's built-in sensors, accelerometers and data connection.

A cigarette lighter adapter (CLA) is a driver self-fit device which is powered by the 12 volt auxiliary power supply found in-vehicle.

Vehicles increasingly feature fully built-in (or line-fitted) data connectivity which, whilst not explicitly designed for connected insurance, enables the vehicle sensor suite to providing some datasets an insurer may require for connected insurance.

Source: PTOLEMUS; Note: OBD-II is not a mandatory requirement in battery electric vehicles

The data sets that are typically collected by these devices can be static or dynamic

Static data

Driver data

- Name
- Age
- Gender
- Contact details
- MVR records
- Background check
- Etc.

Vehicle data

- Brand / make
- Model
- Year
- Body
- VIN
- Registration
- Engine size
- Power
- Fuel type
- Etc.

Dynamic data

Contextual data

- Exterior temp
- Ambient pressure
- Weather
- Traffic
- Road category
- Time
- Speed limit
- Idling
- Etc.

Vehicle health data

- DTCs
- Maintenance need
- Battery level
- Coolant temp
- Light status
- Oil temp
- Oil pressure
- Tyre pressure
- Fuel level
- Etc.

Driver data (dynamic)

- Claims history
- Fatigue
- Health record
- HoS
- Distraction
- Etc.

Driving data

- Location
- Speed
- Mileage
- Acceleration
- Braking
- Cornering
- Crash
- Etc.

In-cab data

- # passengers
- Navigation
- Seat belts
- Etc.

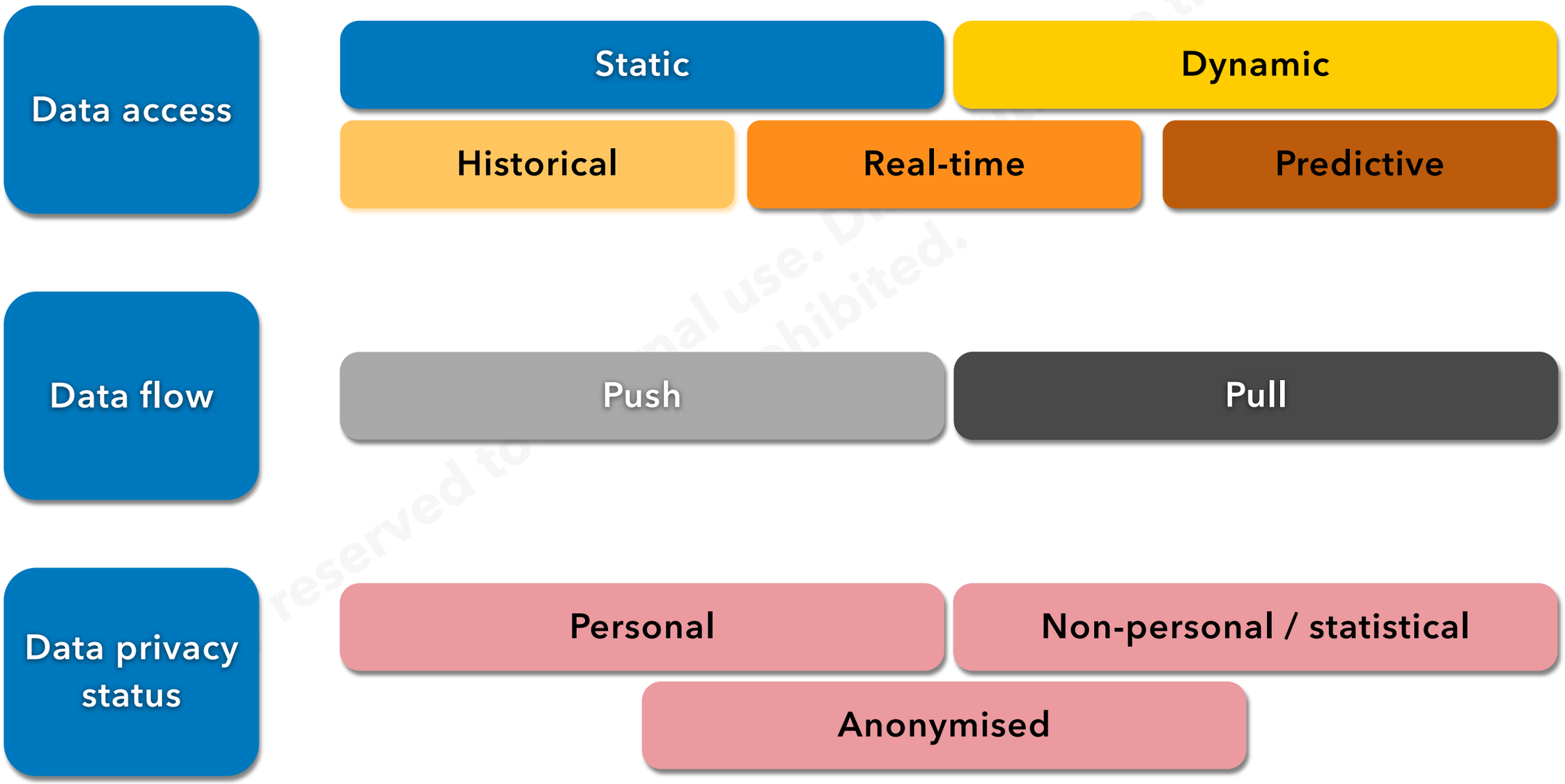
Transaction data

- Ship from address
- Destination address
- Invoice #
- Order #
- Product code
- Commodity code
- Product description
- Quantity
- Unit measure
- Extended amount
- Freight amount
- Duty amount

Source: PTOLEMUS

Furthermore, data can have multiple access modalities, flows and privacy models

Basic vocabulary used for car data (2/2)



Source: PTOLEMUS

Dynamic data is critical to the functionality of connected insurance

Data access modalities

Static data

- **Does not change after being recorded.**
- It is a **fixed** data set.

Dynamic data

- **May change after it is recorded.**
- Periodically updated or changes asynchronously over time as new information becomes available.

Historical

- **About past events** and circumstances.

Real-time

- Captured in (near) real time at a certain **frequency.**
- Transmitted at a certain **latency.**
- Usually timestamped.

Predictive

- Usually **based on the analysis** of aggregated historical data.
- **Generally providing the most valuable insights.**

➡ Historical data are very useful to design taxonomy, discover use cases, experiment and test applications before going to development and production

➡ Predictive data can only be produced if historical data are well understood and categorised

Source: PTOLEMUS

TSPs collect a mixture of static and dynamic data to analyse drivers with connected insurance policies

How insurers collect, process and use data to score drivers

Data collection

Raw data

Dynamic data
- Time of day
- GPS coordinates (1 Hz)
- Acceleration (6 axis)
- Video
- Vehicle speed
- Vehicle direction
- Fuel consumption
- Odometer
- Magnetometer

Static data
- Date
- Noise
- Airbag deployment
- Device plug in
- Ignition

Data processing

Contextual data

Dynamic data
- Weather
- Fuel consumption
- Traffic data

Static data
- Road network
- Vehicle information
- User details
- Speed limits
- Vehicle information

Storage and filtering
- Data cleaning
- Data filtering
- Data enrichment
- In app & cloud analysis

Data analysis

Driving variables

Dynamic data
- High acceleration
- Harsh braking
- Cornering
- Trip duration and pauses
- Distance
- Real-time speed
- Average speed
- Driving time
- Real-time location
- Distraction
- Trip summary

Driver scoring factors

- Fraud detection
- FNOL
- Parking
- Crash detection
- Crash reconstruction

Source: PTOLEMUS

Capturing car / policyholder data is not new and numerous suppliers already exist

Static data suppliers

AAADATA

acxiom

COX AUTOMOTIVE

EQUIFAX

Dynamic data suppliers

Mercedes me

1010 101 110 BMW CarData

An introduction to connected auto insurance

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There are 5 main usage-based insurance programme types

The 5 models of UBI

PHYD

Pay-How-You-Drive (PHYD) involves a device or smartphone being fitted inside the vehicle and sending driving data to the insurance company. The premium is adjusted based on the driver's assessment/risk rating.

RHYD

Reward-How-You-Drive (RHYD) involves a device/smartphone being fitted inside the vehicle sending driving style data to the insurance company. However, unlike PHYD, the driver specifically earns rewards for good driving behaviour.

SAFETY

Safety-based policies are telematics programmes that offer safety and security services such as emergency calling services (eCall), breakdown recover services (bCall), Stolen Vehicle Tracking & recovery, etc.

PAYD

Also called Pay-As-You-Go or Mileage-based Insurance. A device in the vehicle that sends mileage data to the insurance company. The premium is entirely or partly mileage-based (sometimes combined with location and time data).

Pay-per-mile

As it is not based on telematics, the premium is calculated based on the vehicle mileage reported by the driver, sometimes using a picture of the odometer.

Four of them leverage telematics devices to collect data

Telematics-based UBI models

PHYD

Pay-How-You-Drive (PHYD) involves a device or smartphone being fitted inside the vehicle and sending driving data to the insurance company. The premium is adjusted based on the driver's assessment/risk rating.

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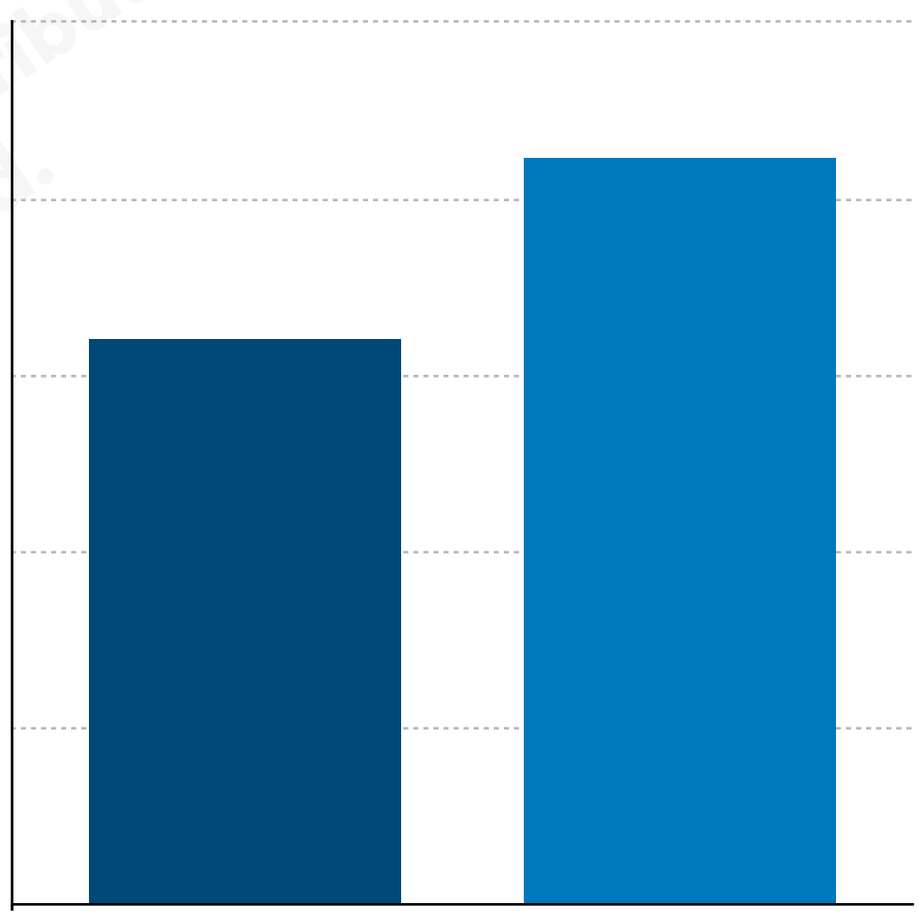
Customers increasingly use e-commerce channels and demand flexibility and personalisation from their insurance products

Consumer behaviour

- Despite persistent differences between countries, **the COVID-19 crisis has enhanced dynamism in the e-commerce landscape across countries** and has expanded the scope of e-commerce, including through new firms, consumer segments (45+) and products (e.g. groceries):
  - In Europe, retail sales via mail order houses or the internet in April 2020 increased by 30% compared to April 2019, while total retail

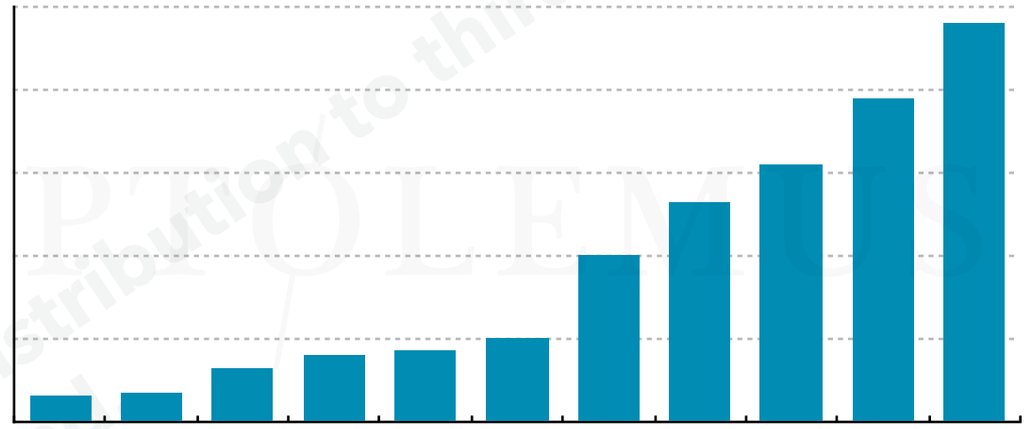
Estimated quarterly U.S e-commerce sales ($ million)



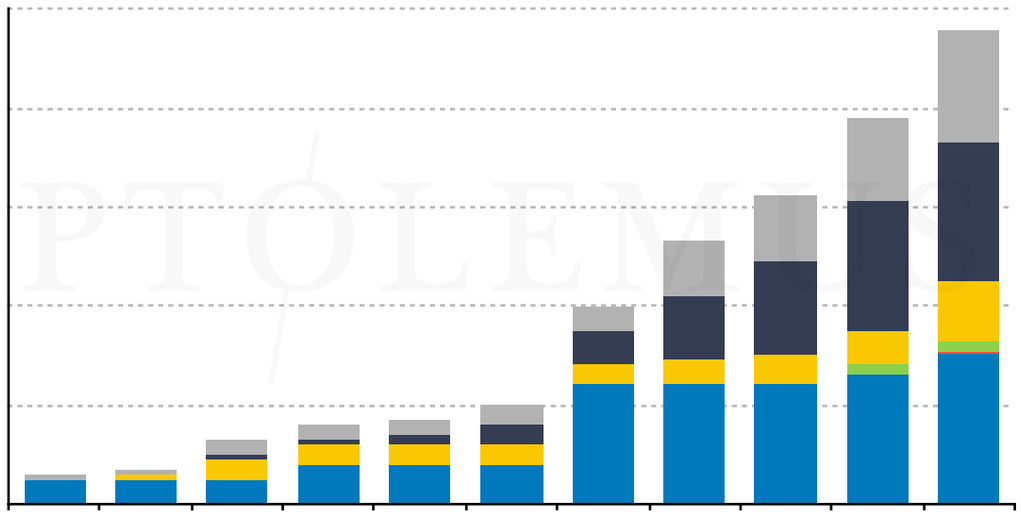
Pay-As-You-Drive (PAYD) programmes are relatively basic but also present an ideal market entry point for insurers

- **While remaining simple to understand, PAYD policies reward low mileage drivers, who, in most cases, carry lower risks:**
  - This is a big advantage vs. standard policies, which in essence result in low mileage drivers premiums subsidising high-risk motorists;
  - However, PAYD does not take into account the behaviour of drivers, e.g. a very aggressive driver will pay the same as a very smooth driver.
- At the end of 2020, **PAYD programmes represented 21% of all active programmes worldwide and 25% of all worldwide active policies**;

Number of active PAYD programmes worldwide



Number of PAYD programmes by device type



Source: PTOLEMUS

Pay-per-mile insurance programmes are also simple but not automated and open to fraud

SWOT analysis of pay-per-mile insurance

Strengths	Weaknesses	Opportunities	Threats
✓ Simple model, easy to explain for brokers and direct agents.	✳ Does not integrate other behavioural factors than mileage (e.g. driving times).	★ Increase in petrol prices pushes such usage-based models.	✦ Certain attractive customer segments will still pay more than they should, which could push them towards telematics-based solutions.
✓ Positive incentive to drive less, leading to lower risks.	✳ **Open to fraud as it is largely based on customers' own declarations.**	★ **COVID-19 restrictions have thrust mileage-based programmes into the "limelight".**	✦ Rising costs of insurance for young & senior drivers makes it unaffordable to drive in certain countries (notably the UK), pushing these segments towards telematics.
✓ Indirect positive effects on the environment (CO_2 emissions, noise, etc.).	✳ No opportunity to develop direct link with the customer.	★ Large diffusion of smartphones enables insurers to request customers to more easily send a digital photograph of their odometer.	✦ **Increased penetration of connected cars will make telematics-enabled MBI very easy.**
✓ **Indirect positive effects on fuel consumption.**	✳ Declaration cannot easily be requested more often than on a yearly basis, resulting in 12 months time lag in pricing (an increase of claims in year N leads to increased premiums in year N+1).	★ Acceptance of traditional risk factors is decreasing as they are increasingly seen as sheer discrimination.	
✓ **Low cost as does not require a device / an installation.**	✳ No incentive to improve driving style.		
	✳ **Not automated**, i.e. requires the driver to report his/her mileage.		

Pay-per-mile

Not telematics-based - The premium is calculated based on the vehicle mileage reported by the driver, sometimes using a picture of the odometer.

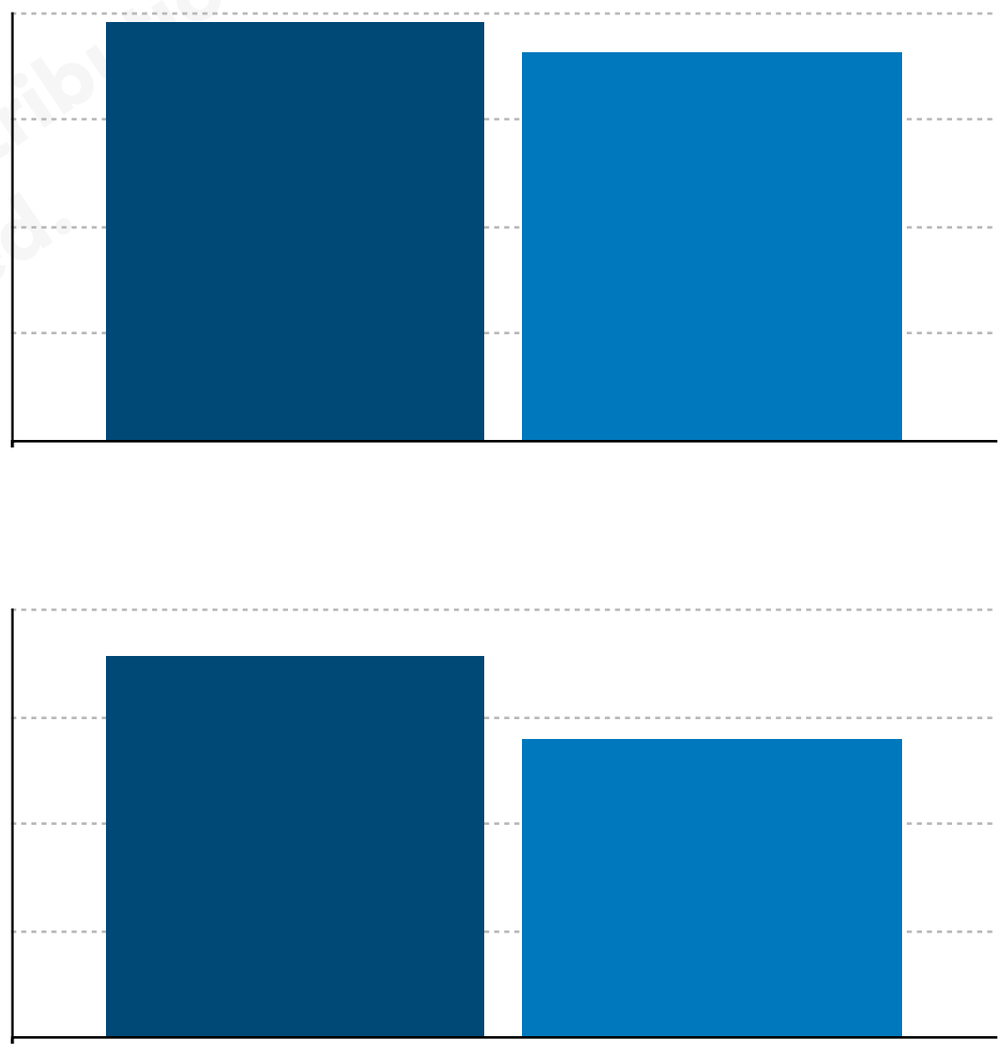
Source: PTOLEMUS

The general decrease in miles driven will boost the interest of both MBI and pay-per-mile insurance

Consumer behaviour

- **The number of all miles driven came down by 7%** and 21% in the top tier 1 markets of UBI between 2019 and 2020:
  - This indicates a continued decrease in the number of miles driven everywhere;
  - Even after the lockdowns have lifted in many

All vehicle miles driven (billion)



Source: PTOLEMUS, Federal Reserve Economic Data (USA) and TRA (UK)

The key strengths of PAYD / MBI are its simplicity and high customer acceptance

SWOT analysis of PAYD insurance

Strengths

- **Simple model**, easy to explain for brokers and direct agents.
- **Well accepted by customers**, which leads to good volumes.
- **Incentive to drive less,** leading to lower risks.
- **Indirect positive effects on the environment** (CO_2 emissions, noise, etc.)
- **Indirect positive effects on fuel consumption.**
- **Sometimes also takes into account the place and time of driving.**
- **Ability to adjust pricing on a dynamic basis.**

For models with a black box only:

- **Ability to strongly reduce fraud.**
- **Ability to recover the vehicle in case of theft.**
- Ability to provide eCall and thus reduce the number of fatalities.

Weaknesses

- **Does not integrate driving behaviour factors.**
- Little opportunities to develop direct link with the customer (except through smartphone).
- Little control over driving risks in case of fleets.
- This model requires a device in the vehicle (if only a tag), which makes it more expensive than a mobile-only PHYD programme.
- **Data provided is less rich and predictive of risks than with PHYD.**
- **Difficult business model in low premium markets.**
- No incentive to improve driving style.

Opportunities

- Increase in petrol prices pushes such usage-based models.
- Acceptance of traditional risk factors is decreasing as they are increasingly seen as sheer discrimination (cf. "post-coding" debate between ABI and the Conservative Party in the UK).
- More and more data sets are available, making the rating more accurate every day.
- Gender ruling and other similar anti-discrimination rulings or European directives could prevent the use of the most useful risk factors (age, postcode, etc.)
- Ability to sell VAS (real-time traffic information, vehicle locator, roadside assistance, remote diagnostics, etc.)
- **Increased penetration of connected cars will make MBI very easy.**
- **COVID-19 restrictions have thrust mileage-based programmes into the "limelight".**
- **The growing proportion of EVs (which tend to drive less) will boost BI.**

Threats

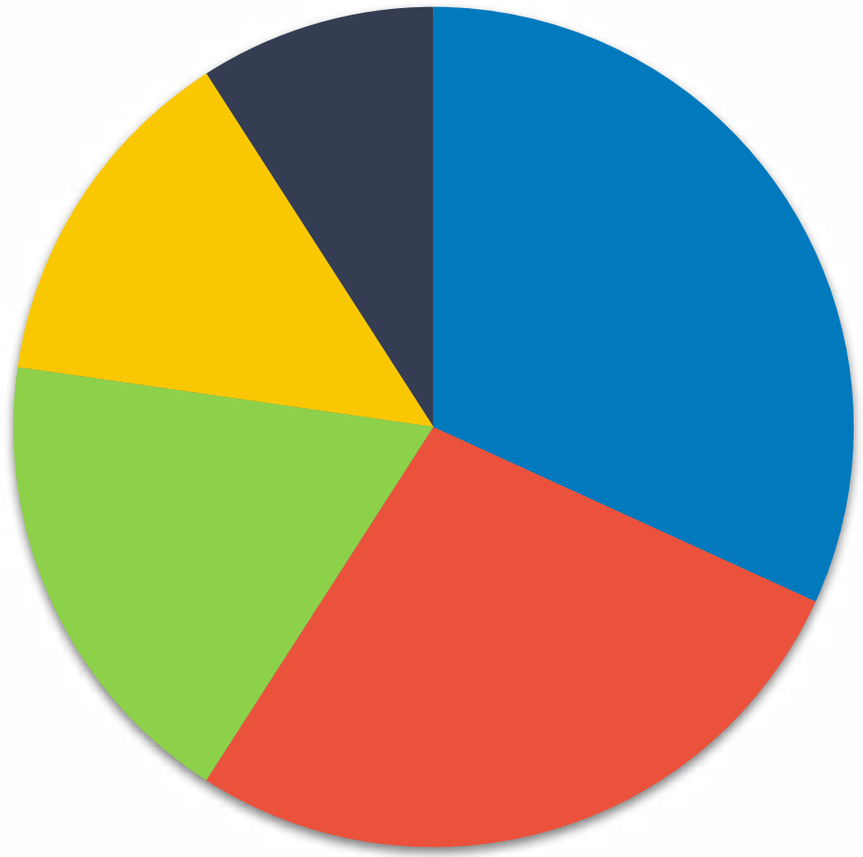
- This model requires a device in the vehicle (if only a tag), which makes it less frictionless than a mobile-only PHYD programme.

Since 2020, XX mileage-based programmes have been launched

Mileage-based UBI launches worldwide, by geography, since 2020*

- Since January 2020, the global market for MBI programmes has **grown at a CAGR of XX%.**
- Geographically, the distribution of new MBI

Breakdown of mileage-based launches worldwide, by region



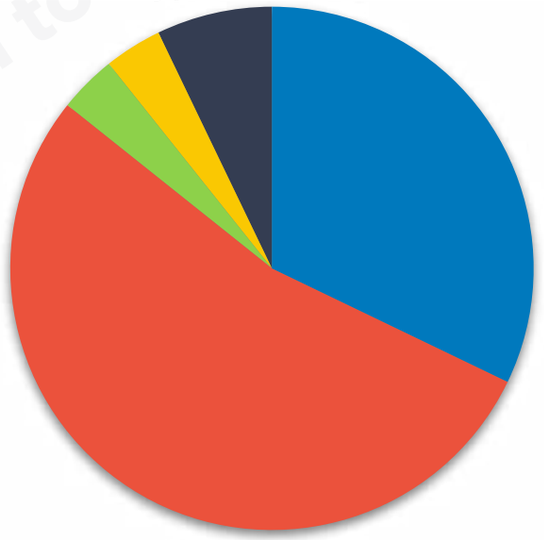
Source: PTOLEMUS; Note: (*) Programme launches recorded by PTOLEMUS between 01/2020 and 04/2021

...of which, XX% are based on either smartphone or line-fitted devices, eroding OBD dependency.

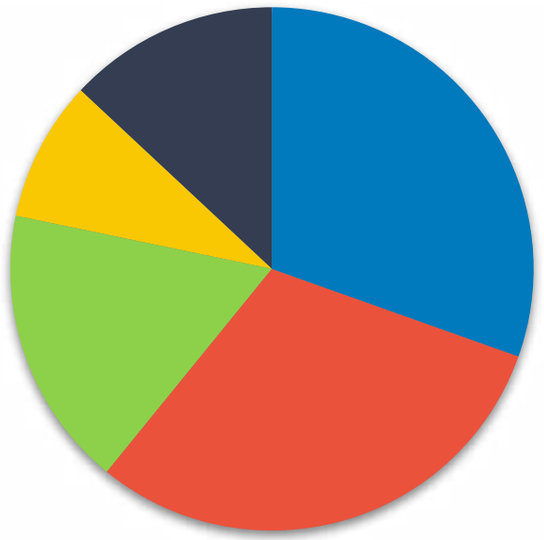
Mileage-based UBI launches worldwide, by technology

- Of the XX programmes launched since January 2020, XX% can be attributed to either **smartphone or line-fitted technology.**
- Tellingly, in the period from January 2017 to December 2019, **XX% of XX MBI programmes were based on OBD** accounted for merely 4%

Breakdown of mileage-based launches worldwide, by device type (2017-2019)



Breakdown of mileage-based launches worldwide, by device type (2020-2021*)

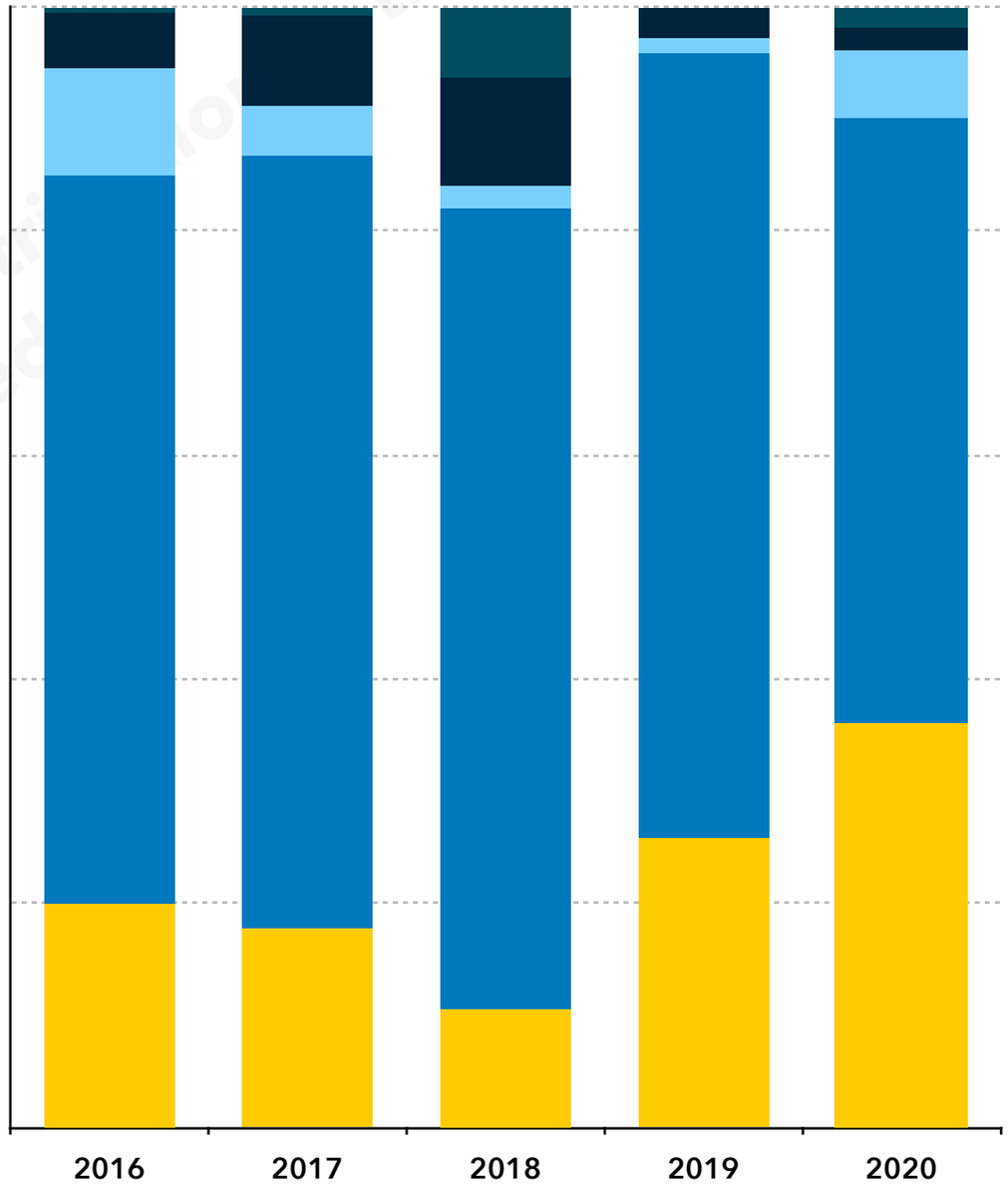


Source: PTOLEMUS; Note: (*) Programme launches recorded by PTOLEMUS between 01/2020 and 04/2021

Mileage-based insurance is back in fashion catalysed by the COVID-19 pandemic

Evolution in the breakdown of UBI offerings worldwide

- **There has been a notable increase in demand for PAYD programmes** around the globe owing to motorists' growing desire for products more suited to the changing patterns, and frequency of usage:
- **The COVID pandemic has both:**

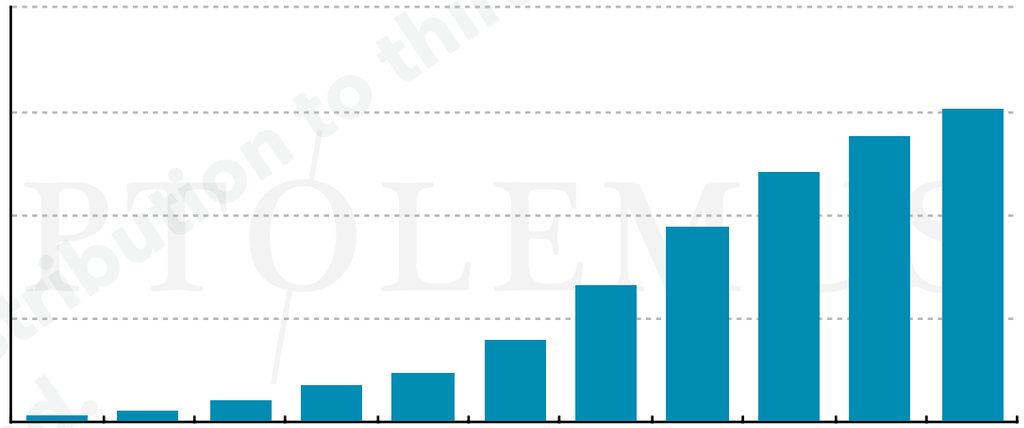


Source: PTOLEMUS UBI quarterly dashboard

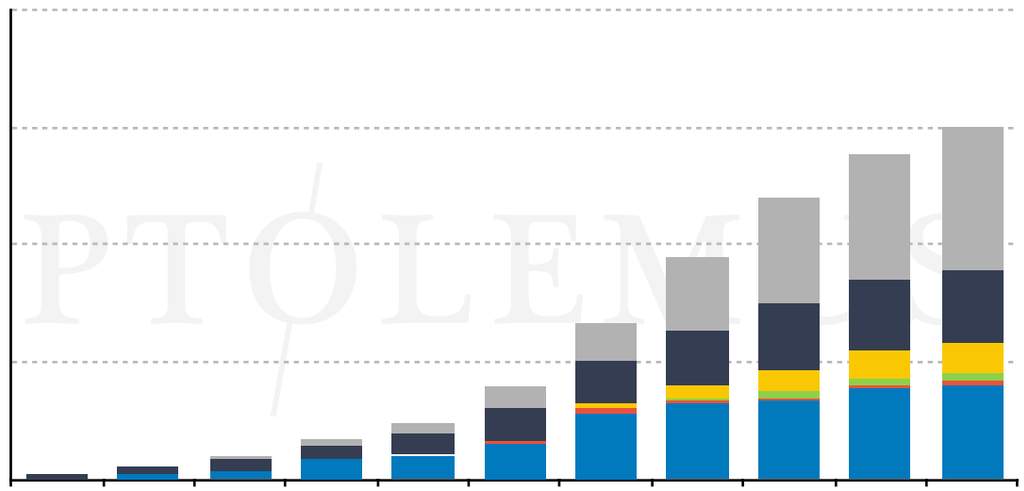
Pay-How-You-Drive (PHYD) is the most widely implemented type of connected insurance programme globally

- Due to the aforementioned shortcomings of PAYD programmes, **Pay-How-You-Drive programmes take other factors than mileage into account e.g. driver behaviour** (harsh braking, speed, etc.):
  - A journey on Saturday night with over-speeding events will cost much more than a smooth ride on Tuesday at 3 PM.
- At the end of 2020, PHYD represented **XX% of all active programmes worldwide** and XX% of of all worldwide policies:
  - [illegible] and pay drivers whilst 75%

Number of active PHYD programmes worldwide



Breakdown of PHYD programmes by device type

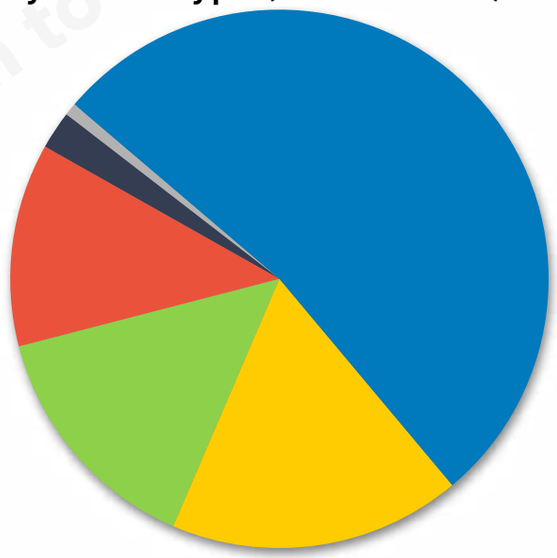


Since 2020, XX PHYD programmes have been launched worldwide with reliance on OBD technology collapsing

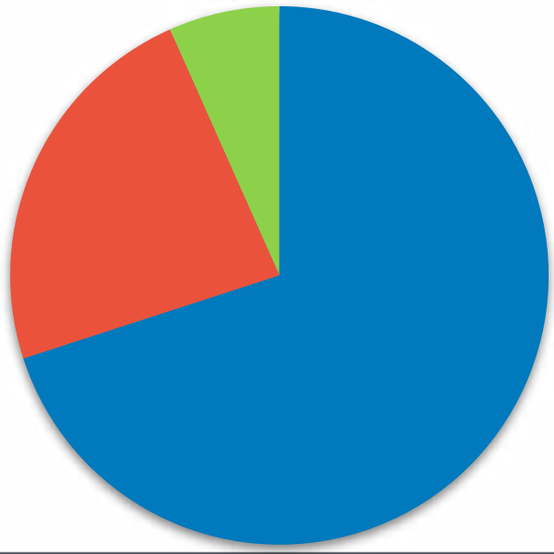
PHYD launches worldwide, by technology

- Similarly to MBI new programme launches the mix of device types is **shifting away from OBD usage.**
- In the period from January 2017 to December 2019, **XX% of XX PHYD programmes were based on smartphone devices** whilst OBD dongles **underpinned**

Breakdown of PHYD launches worldwide, by device type (2017 - 2019)



Breakdown of PHYD launches worldwide, by device type (2020 - 2021*)



Source: PTOLEMUS; Note: (*) Programme launches recorded by PTOLEMUS between 01/2020 and 04/2021

Behaviour-based schemes (PHYD & RHYD) can be highly personalised, though stigma caused by tracking still remains

SWOT analysis of driver-behaviour based programmes

Strengths

- **Individual pricing based on actual driving behaviour** (mileage, time, place, style, etc.)
- **Indirect positive effects on the environment (CO_2 emissions, noise, etc.)**
- **Indirect positive effects on fuel consumption.**
- **Ability to provide rich actual driving data to actuarial models.**
- Strong incentive to improve driving skills and style.
- **Ability to adjust pricing on a dynamic basis** (to the customer's driving behaviour and to market changing patterns).
- **Ability to retain the safest customers** and weed out high the most risky ones.

For models with a black box only:

- **Ability to strongly reduce fraud.**
- **Ability to recover the vehicle in case of theft.**
- Ability to provide eCall and thus reduce the number of fatalities.

Weaknesses

- **Risk of decreasing the overall size of the auto insurance market** can be seen negatively by market leaders.
- Cost of purchasing and installing the device when an OBU is used.
- Difficult business model in low premium markets.
- Complex business case for low premium drivers.
- **Perception of possible infringements on privacy** (Big Brother effect).
- **Complexity to explain scoring factors to consumers.**
- Necessity for all departments in the organisation to take interest and work together.
- Requires experienced actuaries and the recruitment of data scientists.

Opportunities

- Decreasing cost and new types of telematics devices.
- Better customer acceptance of the use of private data.
- Ability to discriminate based on real risks instead of age-based pricing that may become unlawful.
- Ability to sell VAS (Real-time traffic information, vehicle locator, roadside assistance, remote diagnostics, etc.)
- eCall and other driver services available from a dashboard-mounted solution.
- Use of additional CAN bus-related data sets (e.g. number of passengers, seat belt fastened).
- **Growing penetration of connected vehicles around the world.**

Threats

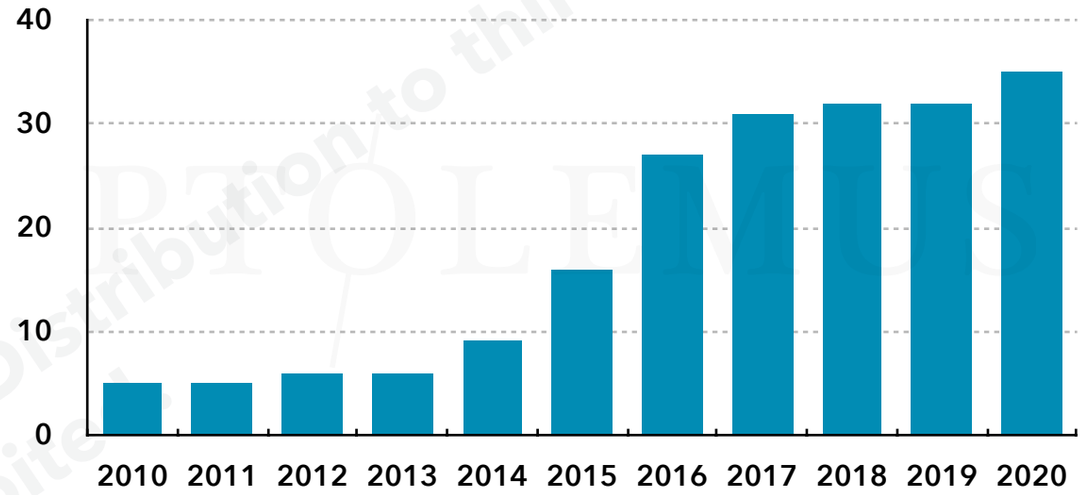
- Risk of backlash against "customer tracking".
- Laws preventing insurers to charge for the rental of the device (e.g. in Italy).
- OEMs ability to act as an insurer or broker using their own data.
- Google becoming able to score based on smartphone data already collected in the background.

Source: PTOLEMUS - Note: OBU: On-Board Unit (i.e. telematics device)

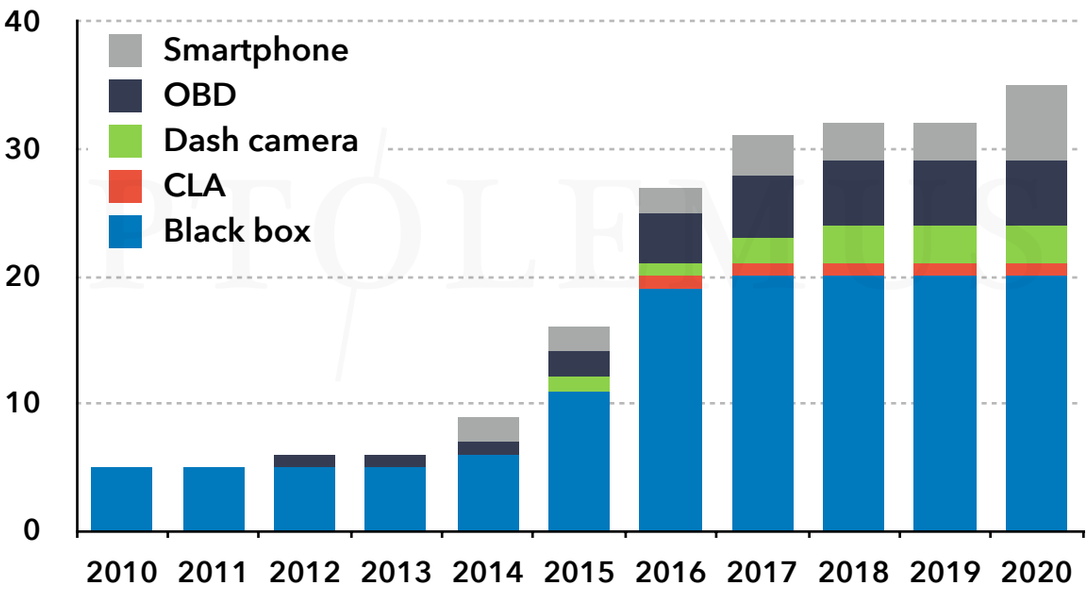
Safety-centric programmes offer emergency assistance services and are dominated by leave-in devices

- Safety insurance programmes differ from PAYD or PHYD as they **focus on the provision of additional services** such as:
  - **Emergency assistance (in the event of a collision) / eCall;**
  - **Roadside assistance (RSA) or bCall;**
  - **Stolen vehicle tracking (SVT);**
  - **Stolen vehicle recovery (SVR);**
  - **Claims management.**
- To benefit from such a policy, customers agree to install a device in their vehicle for the duration of the policy:

Number of safety programmes worldwide



Number of safety programmes by device type



Source: PTOLEMUS

Safety-based programmes, whilst niche, are easy to understand and popular in countries with significant car crime

SWOT analysis of safety-centric programmes

SAFETY

Safety-based policies are telematics programmes that offer safety and security services such as emergency calling services (eCall), breakdown recover services (bCall), stolen vehicle tracking & recovery, etc.

Strengths	Weaknesses	Opportunities	Threats
✦ **Pricing is typically fixed** as safety programmes are available as a "bolt-on" product. ✦ **Conceptually easy to understand by the customer as the benefits of the product are obvious.** ✦ Due to these benefits, these schemes tend not to suffer from the negative perception of privacy invasion. ✦ Devices can be simple "self-installable" black boxes. ✦ Does not necessarily require constant monitoring, i.e. connection to call centre can only occur at the moment the accelerometers in the device detect a collision.	✦ Niche product that will only appeal in certain countries / customer or vehicle segments. ✦ Cost of purchasing and installing the device when a black box is used. ✦ Perception of possible infringements on privacy (Big Brother effect) can still exist.	✦ Decreasing cost and new types of telematics devices. ✦ Better customer acceptance of the use of private data for safety-related purposes. ✦ Other driver services available from a dashboard-mounted solution. ✦ **OEMs have never focused on anti-theft services and are still neglecting these niche services.**	✦ Laws preventing insurers to charge for the rental of the device (cf latest Italian law). ✦ Growing market of connected vehicles. ✦ **eCall capability is now compulsory for all new car models in the EU and Russia.**

There are 3 main data collection models of connected insurance

The 3 data collection models for connected insurance

TBYB

Try Before You Buy (TBYB) is a relatively new model for advertising and distributing insurance. It involves applicants signing-up for a **trial period** during which time they are assessed, with the aim being to "qualify" for the insurance product.

Once the trial period concludes, the insurer assesses the recorded driver-data and either accepts the applicant onto the scheme or denies the applicant and proposes another policy.

Leave-in

As the name suggests, a leave-in distribution model involves the **telematics device being used to record driving data being fitted inside the insured vehicle (or the phone) for the full period of the insurance policy.**

Roll-over

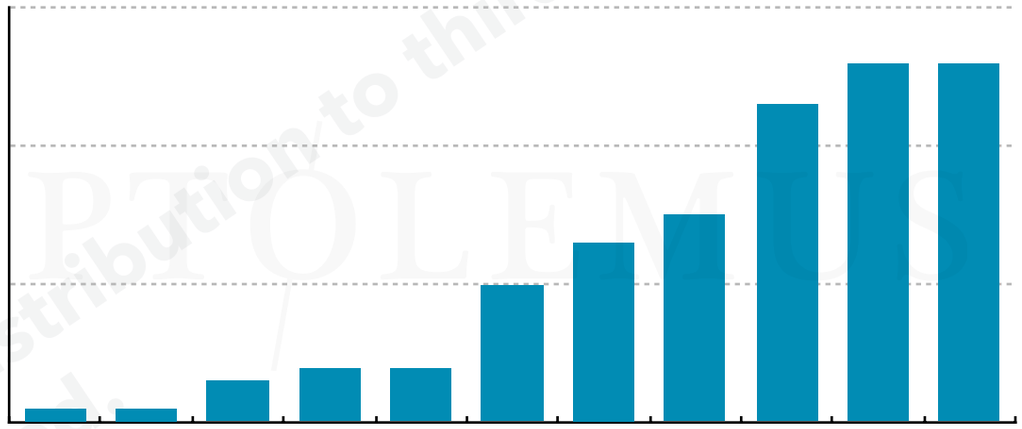
Roll-over programmes involve the telematics device being self-installed in the policyholder vehicle for a temporary period of time (usually between 3-4 months). The policyholder will typically pay up to 50% of the quoted premium at the beginning of the insurance period, with the data collected being assessed by the insurer, and a discount on the remaining 50% of the policy quotation being awarded to the policyholder.

Programmes based on a roll-over model re-use the same device to perform the assessment of multiple drivers (one after the other).

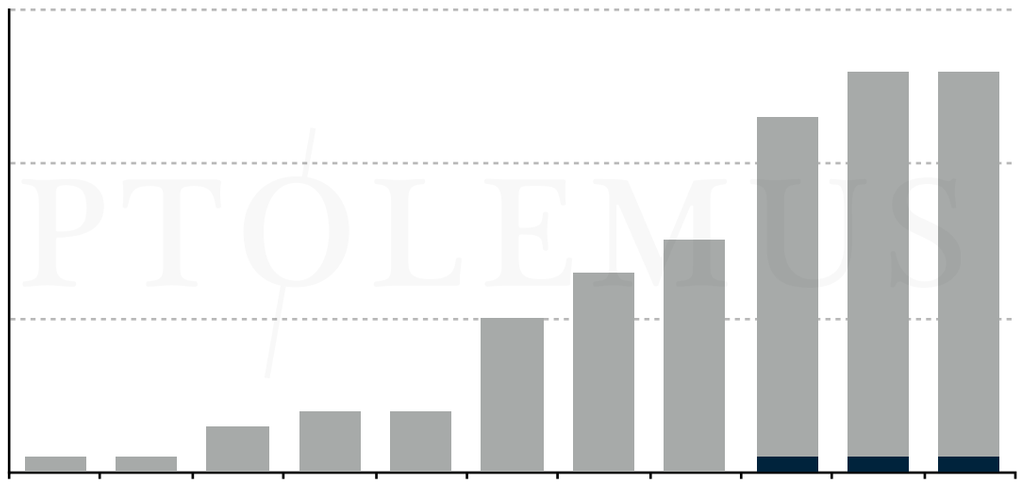
App-based TBYB schemes have grown very fast but have reached a plateau in recent years

- Smartphone apps have made TBYB possible and enticing:
  - The first version was launched by **AXA** in 2009, called ***DriveAware;***
  - Since 2014 the number of active programmes has been in constant growth, plateauing at XX programmes in 2020.
- Initially, **most programmes only lasted a year.** Post-launch, many were not supported with the required marketing and

Number of TBYB-enabled programmes worldwide



Number of TBYB-enabled programmes by device type

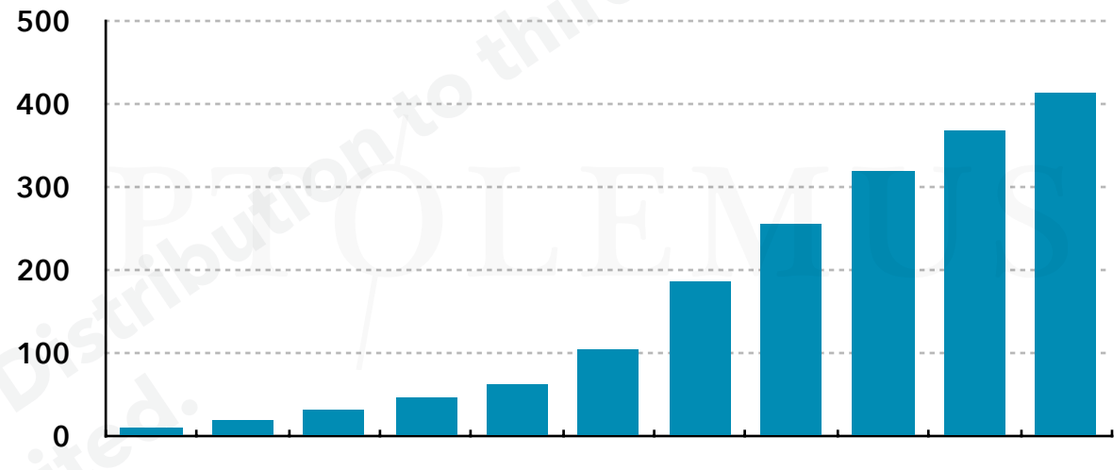


Source: PTOLEMUS

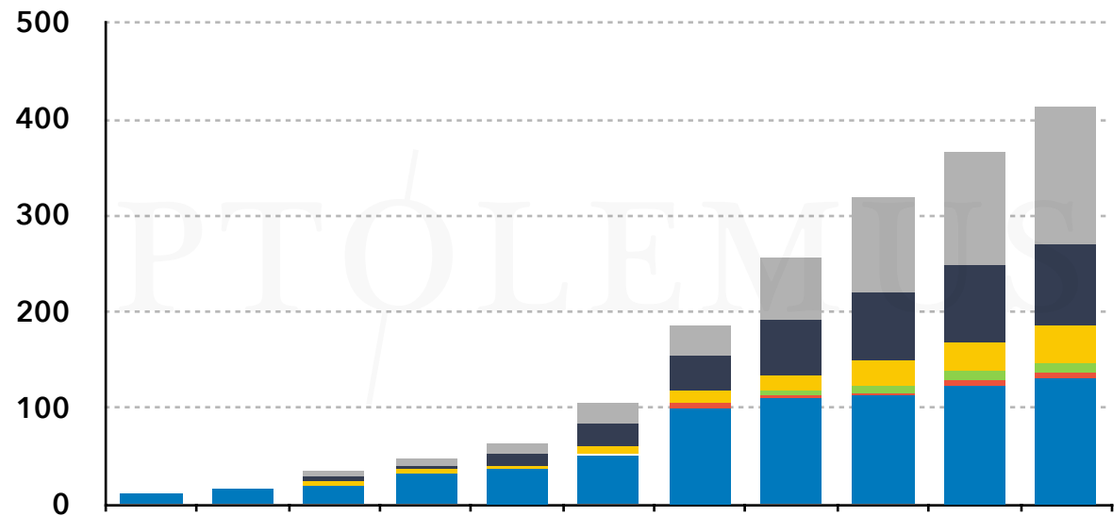
Leave-in programmes represent 90% of all UBI programmes but only 55% of underwritten policies

- **Leave-in programmes are historically associated with European insurers** (Italy, UK) and generally involve the fitment of a telematics device for the duration of the policy
  - The first leave-in programme was launched in Italy by **Unipol** in 2003
  - Since then the number of programmes has been in constant strong growth registering a **XX% CAGR between 2005 and 2020**
  - At the end of 2020, leave-in schemes represented nearly

Number of active leave-in programmes worldwide



Breakdown of leave-in programmes by device type

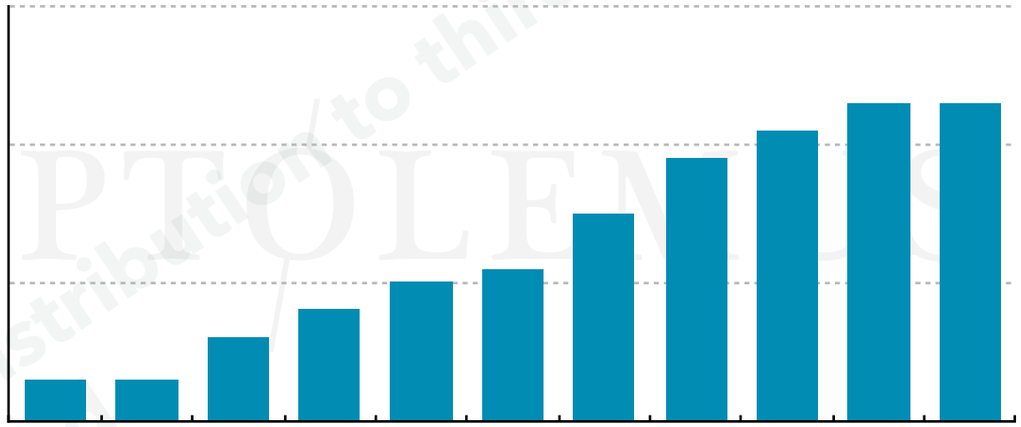


Source: PTOLEMUS

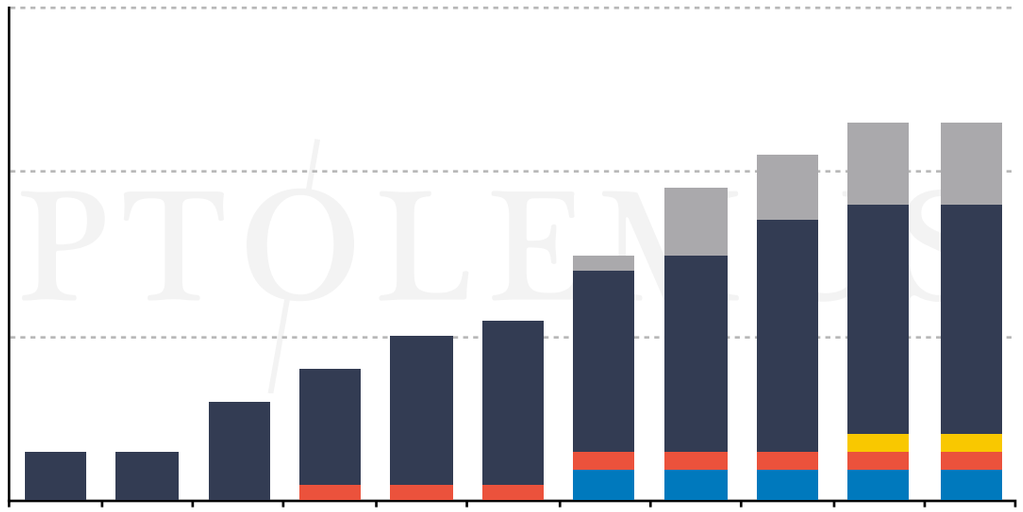
Due to their self-installable and reusable nature, OBD dongles have perennially dominated roll-over programmes

- Roll-over programmes are simple in concept, and involve the **temporary installation of a device in the insured vehicle to monitor driving behaviour for a period of 3-6 months.**
- The earliest version recorded by PTOLEMUS dates back to 2007, when **Liberty Mutual** launched ***Safeco Rewind***.
- Since then, the number of active programmes has

Roll-over programme active (cumulative)



Breakdown of roll-over programmes by device type



Many large traditional insurance companies have launched successful UBI programmes

Allstate
You're in good hands.

- Allstate launched its ***Drivewise*** mobile UBI programme in 2014.
- Data is collected through **smartphones** and policyholders can access personalised

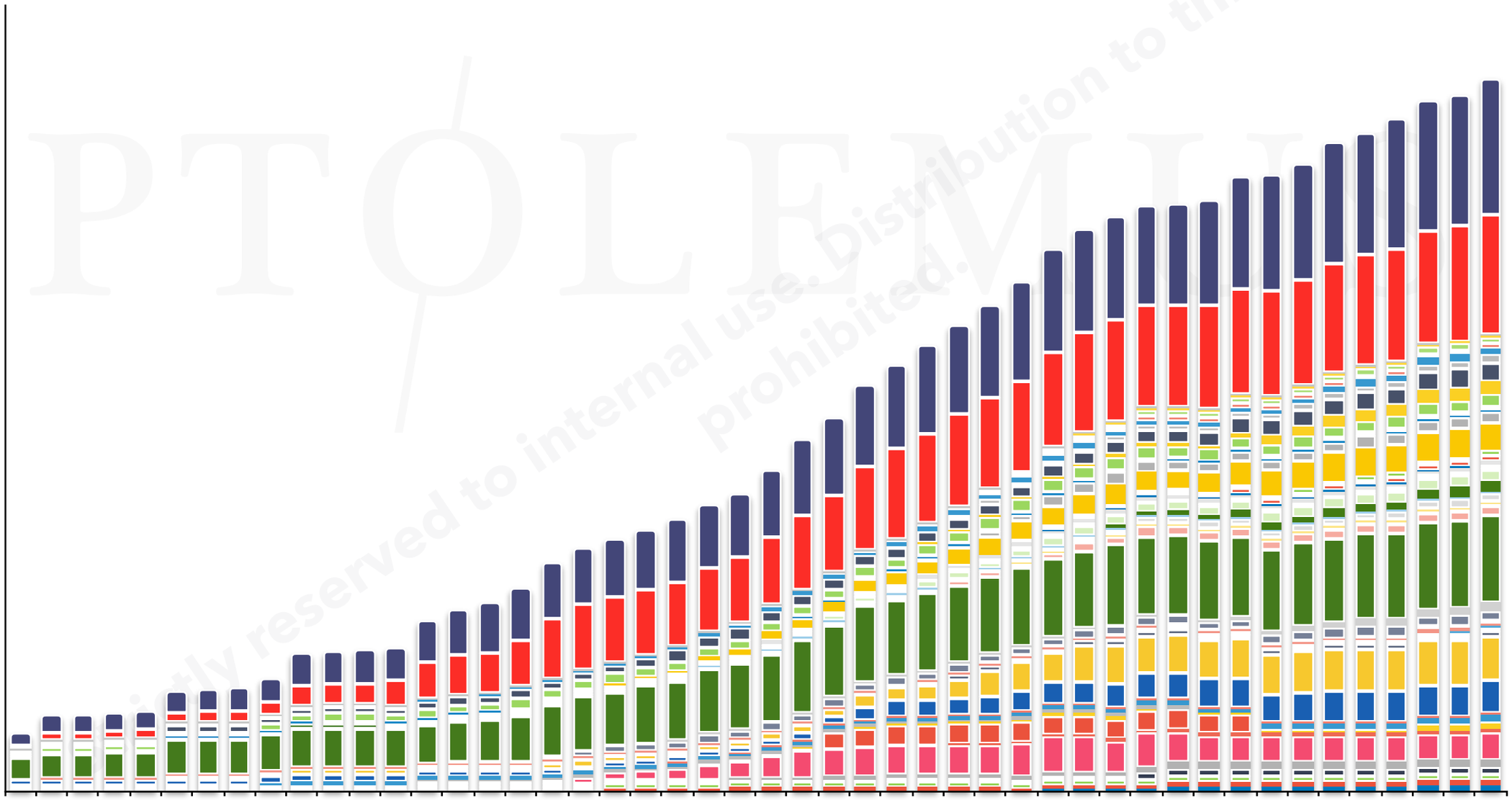
HUK HUK-COBURG
Aus Tradition günstig

- The number 1 auto insurer in Germany, HUK-Coburg launched its ***Telematik plus*** UBI programme in 2019.
- Data is collected via a **smartphone** and policyholders can access a personalised

Source: PTOLEMUS

After a period of stagnation from 2017 to 2018, connected insurance is growing globally once more

Number of active UBI programmes worldwide



CONNECTED AUTO INSURANCE GLOBAL STUDY

PTOLEMUS

Regional and country profiles

1 Europe

2 NORAM

3 LATAM

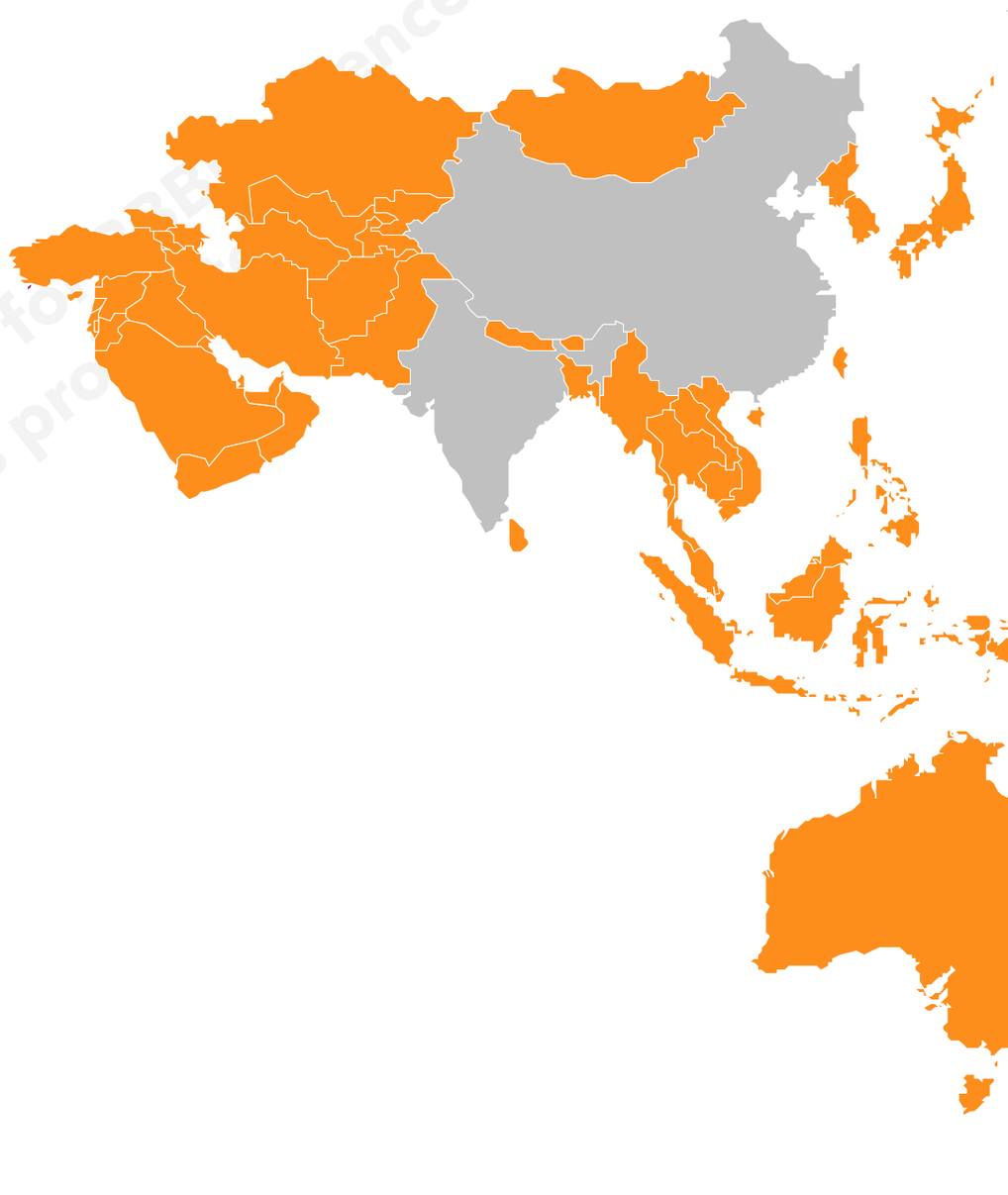
4 APAC

5 Africa

PTOLEMUS

The UBI market across the rest of APAC is diverse….

# active UBI policies	xx
# UBI programmes	xx
# vehicles insured	xx
Uninsured rate	xx
Average UBI premium	xx
1st UBI programme	xx



Source: PTOLEMUS

Auto insurers in the rest of APAC region observed mixed results in 2020 with regards to COVID-19 related restrictions

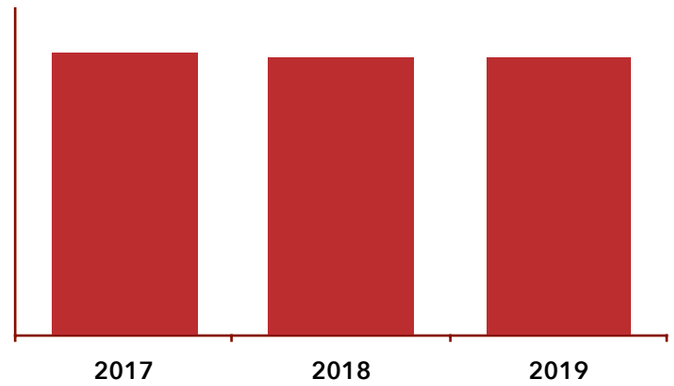
Car insurance overview

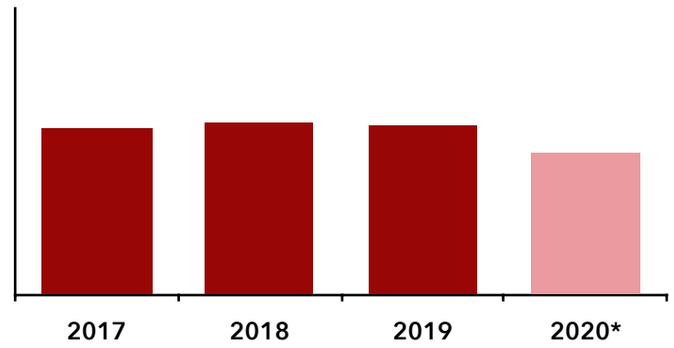
- The auto insurance market in the rest of APAC observed mixed results in 2020.
- In South Korea, **KB Insurance's** non-life GWPs and claims increased

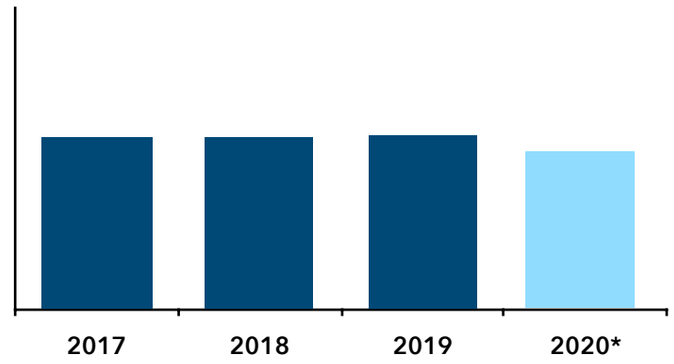
premiums due to reduced accidents and lower claims frequencies;

- For example, **Aioi Nissay** GWPs decreased by xx% YoY in 2020, but its loss ratio also declined by x points;
- In 2021, **Aioi** and **CMT**

Key figures







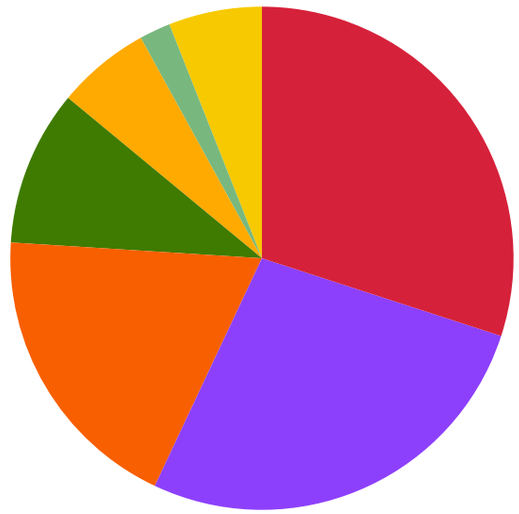
Source: PTOLEMUS, GIROJ, S&P; Note: (*) PTOLEMUS estimate

DB Insurance, Tokio Marine and KB Insurance account for xx% of UBI policies in the rest of APAC

Market trends

- The total number of passenger vehicles in use in the rest of APAC was estimated to be **x million units in 2020.**
- Accounting for disparities
- **DB Insurance, Tokio Marine and KB Insurance** are the market leaders, serving x% of active UBI policies in the region.

Share of active UBI policies of top insurers



Top TSPs in the market

Market share of top car insurers

Source: PTOLEMUS; Note: (*) Aioi Nissay, Tokio Marine and Carrot Insurance provide UBI programmes with internally developed solutions

Despite support from insurtech associations, many countries lack regulatory sandbox programmes to support the UBI market

Regulation

Insurance & Finance

- Across most of the rest of APAC countries, **third-party liability coverage is mandatory**, but due to different levels of regulation and enforcement, the average uninsured rate is estimated at xx%:

regulations, which contributes to a high uninsured rate.

- In 2021, South Korea took a notable step forwards, when the South Korean Financial Services Commission (**FSC**) announced a

Data & Technology

- Fintech and insurtech associations have proliferated across the rest of the APAC region, which is supporting the growth of innovation.
- X fintech associations from Australia, Hong Kong, Japan, Malaysia, Philippines, Singapore,

Singapore, the country is a leading regional fintech hub:

- Investments in Singaporean insurtech companies **quadrupled in 2020 compared to 2019**, reaching $xx million.

- Similarly, **JumpStart** stated that insurtechs in Asia received a total

Impact on UBI

- The **high uninsured rate** in the rest of the APAC market is a challenge for many countries, such as Malaysia and Thailand, and requires further efforts by regulatory institutions to increase the penetration of policies in the auto insurance segment.
- **Insurtechs** in rest of APAC are experiencing strong growth as they are expected to tap into one of the biggest addressable markets, estimated at **x million passenger vehicles in 2020.**
- Although the rest of the APAC UBI market is at an early stage, major insurers and investment companies believe it has a large potential, among other innovative

Source: PTOLEMUS, APAC FinTech Network, FSC, Jumpstart,, ThomsonReuters

xx% of the xx UBI programmes launched in rest of APAC since 2015 were smartphone-based

Recent timeline of events

Launches

2000

Aioi Nissay launched the first UBI programme in Japan, a line-fitted PAYD programme in partnership with **Toyota.**

2006

5 new UBI programmes launched, including Intelligent Pilot, a dash camera based UBI programme for fleets by **Tokio Marine** in Japan in partnership with **Pioneer.**

2011-2014

13 new UBI programmes launched, including 6 in Australia and 3 in Japan.

2015

14 new UBI programmes launched, mostly based on smartphones (8).

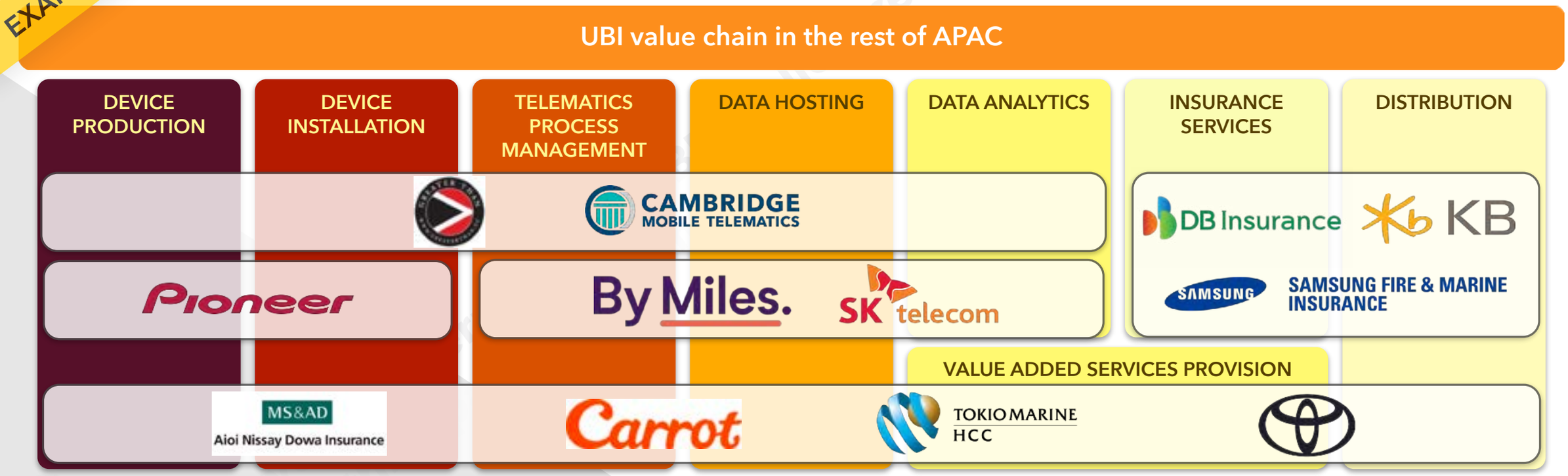
DB Insurance launched smarT-UBI, a smartphone-based PHYD programme with **SK Telecom.**

2016

16 new U launched Agent Pe cam base by **Tokio** smartph program **KB insur** Telecom

Source: PTOLEMUS

The UBI market across the rest of APAC is heavily represented by xx and xx players



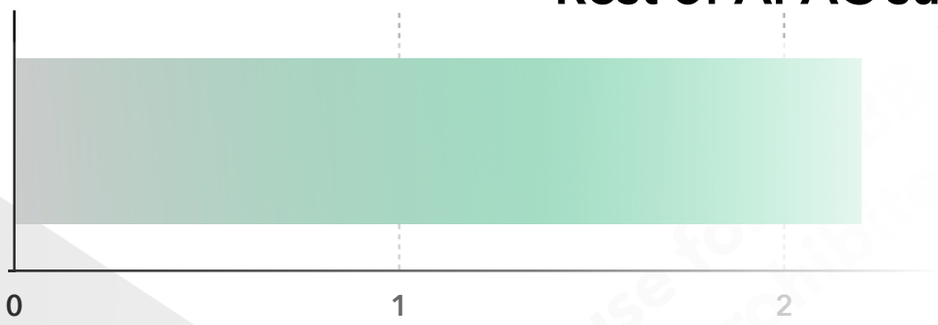
Key trends in the value chain

- **DB Insurance, Tokio Marine and KB Insurance** represent
- **NEW ENTRANTS**: Several major global players have entered
- Moreover, in 2020, **Tokio Marine** deployed an AI auto

EXAMPLE COUNTRY PROFILE

The wider UBI market across the rest of APAC is has low growth potential but Korea & Japan stand-out as high potential markets

Rest of APAC suitability index

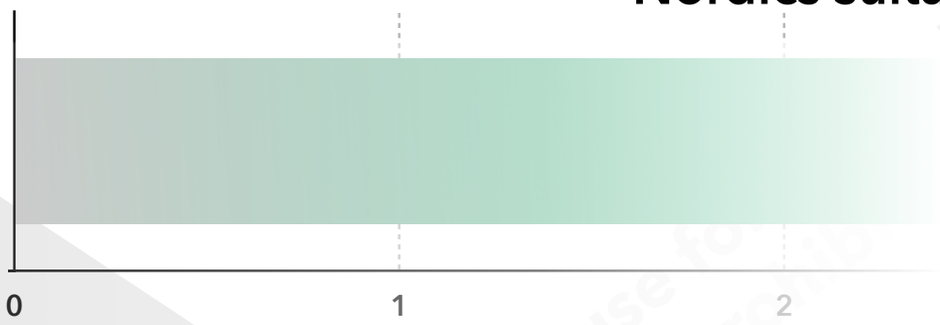


Variables used to calculate the suitability inde

- Average premium
- Loss ratio
- Fraud
- Theft
- Vehicle density
- Regulation
- UBI penetration
- Uninsured rate
- Willingness to share data

Japan has potential to become a stable UBI market due to high vehicle density and mature regulation

Nordics suitability index



Variables used to calculate the suitability i

- Average premium
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- Willingness to share data

Source: PTOLEMUS

CONNECTED AUTO INSURANCE GLOBAL STUDY

PTOLEMUS

Top 25 global company profiles

1 Telematics Service Providers

2 Insurance companies

PTOLEMUS

EXAMPLE COMPANY PROFILE

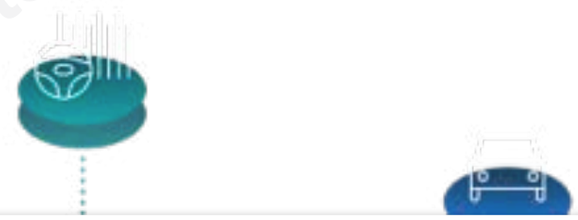
Arity started as AllState's in-house TSP but now provides services to other insurers too

xx million
Active policyholders equipped
0
xx million

xx
Active UBI programmes
0
xx

xx billion
Kilometres recorded
0
xx billion

Creation	2016
HQ	Chicago, USA
Staff	xx
Revenue	€ xx million



Company introduction

UBI offering

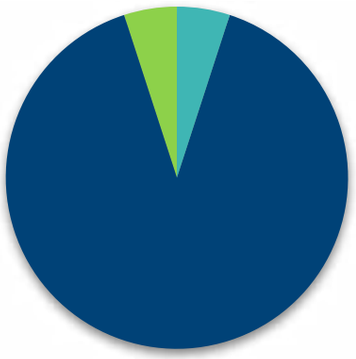
- **Arity** provides insurance telematics solutions to **Allstate** and **Farm Bureau Insurance** in x solution formats: web-based software tools, white label mobile apps and via the integration of its software modules to customers' app.
- **Arity** is part of **Allstate Insurance Company** and has analysed more than xxx billion miles of driving data collected through OBD devices, smartphones and other

Analytics

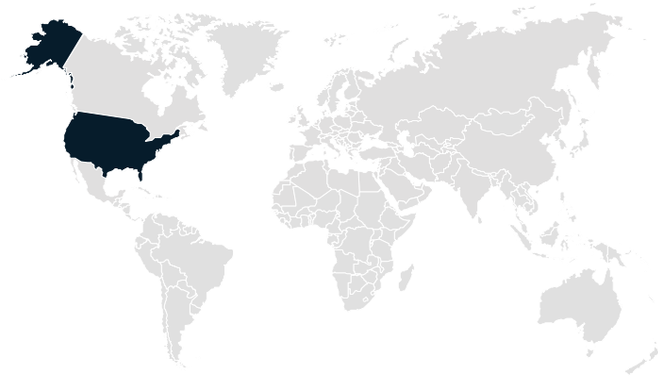
Channels

Arity is focused on the US market and XX% of its customers use a smartphone-based solution

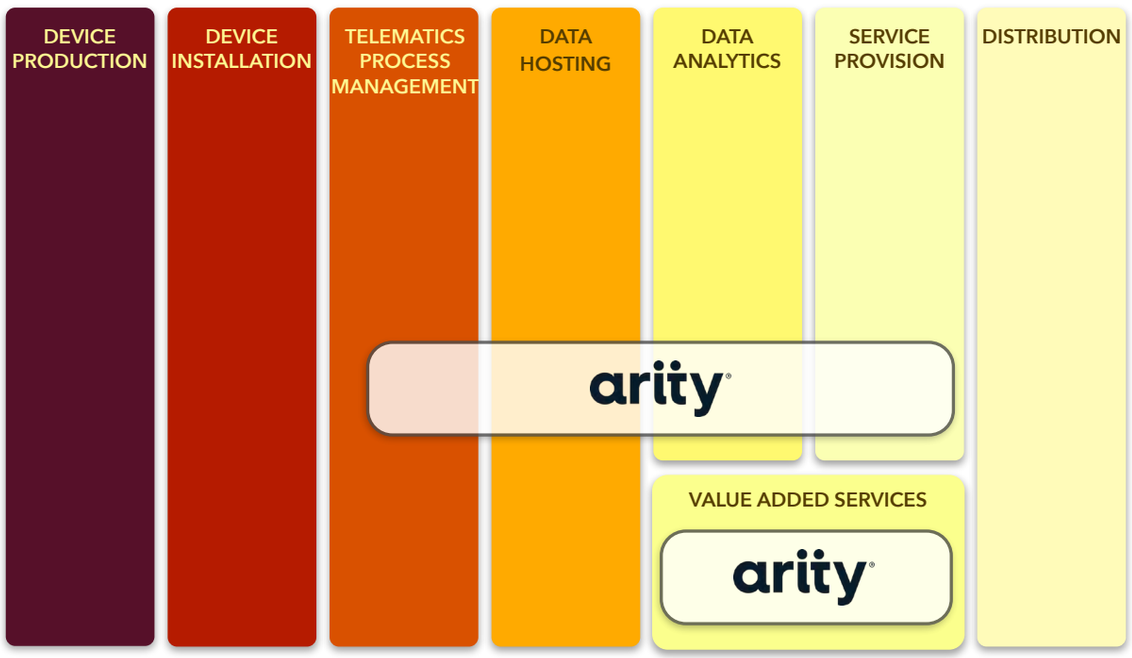
Type of solution



Geographic reach



Value chain positioning



Partnerships

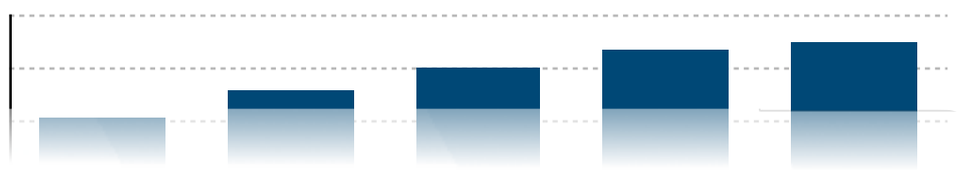
Launch Acquisition/funding

05/2021	Arity launches Arity IQ
02/2021	Arity partners with Ford to provide Ford connected cars driving scores based on driving behaviour

Source: PTOLEMUS

Arity seeks to expand its customer portfolio by serving non-Allstate carriers

Active policyholders equipped* (Personal lines, million)



App services powered by various devices today

- **Arity's** number of policies grew at XX% CAGR from 2016 to 2020:
  - It represented XX% of the US UBI market share which equated to X million active policies in 2020.
  - As a result of **Arity's** extensive driving data knowledge, the **TSP** is able to analyse a wide range of driving parameters;
  - Consequently, **Arity** provides XX% of **PHYD** policies for **Allstate** and XX% of **PHYD** policies

Source: PTOLEMUS; Note: (*) PTOLEMUS estimates

Arity has created several partnerships with OEMs such as Ford to provide telematics services

Recent timeline of events

Funding
Launches
Announcements

2016 ... 2018 2019 2020 2021

- **2016 ...** Allstate
- **2018** Allstate partners with Life360 app to capture their customers' driving data.
- **2018** Arity partners with City of Chicago to
- **2019** WeatherBug partners with Arity to provide contextual data for use in Arity's services.
- **2020** Southern Farm Bureau launches a new Personal line UBI programme with Arity.
- **2021** Auto Care Association partners with Arity to provide data.
- **2021** Arity launches Arity IQ, a digital marketeers.
- **2021** Arity partners with Ford to provide Ford

Source: PTOLEMUS

Drivewise is part of Allstate's mobile app and offers up to XX% discount based on driving habits

Example of programme: "Drivewise" by Arity

- **Drivewise** is part of the **Allstate mobile app**. The app allows users to manage proof of insurance, manage claims, pay policy bills and request roadside assistance.

parameters to calculate the driving score and cash rewards:

- **vehicle speed;**

Allstate Mobile - Drivewise

"Drivewise" ratings

Google Play ★★★★☆ (75.4k ratings)

App Store ★★★★★ (674.1k ratings)

- *"Allstate's Drivewise programme gives you their best discount for monitoring your speed and braking and for allowing them to withdraw your premium*

"Drivewise" key features

- **My trips** provides driving feedback based on completed trips:
  - The app does not make a distinction

- **Phone activity** provides feedback on phone usage behind the wheel to encourage safe driving behaviour.

Source: PTOLEMUS

Arity provides a comprehensive UBI platform via its SDK and off-the-shelf apps

Scoring KPIs monitored

✓ Used for scoring ✓ Collected but not used

Parameters collected	Events measured
Speed	Local driving
Time of day/ Day of week	Congestion driving
Mileage	Short journeys
Time driven	Commute driving
Smartphone usage	Confidence / Smoothness
Acceleration	Cornering
Deceleration/ braking	Pace speeding trend
Road type	Sun in eyes
Weather condition	Night time driving
Fatigues (breaks)	Black spots
Cockpit noise	Driver distraction
Reckless manoeuvre	Sudden lane change
Location	Extreme speeding

Features offered by Arity through its platform

✓ Available features

Events recorded

Auto-start	Manual trip editing	Driving style feedback	Social network integration	Driver/vehicle pairing (tag)	Psychometric test
Driver score feedback	Driver/ passenger detection				

Distraction monitoring

Phone usage differentiation	Hands free detection (BT)	App used differentiation	Holding the phone	Noise-based	

Value added services

Trip log	Parental features (geofence)	Vehicle service reminder	Real-time traffic information	Speed camera locations	Turn-by-turn navigation
Work/private use	Where is my car?	Parking locator	Fuel prices	Fleet driver management	Roadside assistance (bCall)

Insurance services

Crash detection	Claims management	Cross line offering	Customer management	Document upload	Pre-registration ID checks
Post-crash services	Mobile Payment	Integration with non-motor offers	Policy registration	Renewals	Image analytics

Gamification

Standard for all users	Use competition	Competition within a group	Use badges	Gamified with driving feedback	Benefit varies

Top 25 global company profiles

1 Telematics Service Providers

2 Insurance companies

PTOLEMUS

EXAMPLE COMPANY PROFILE

Admiral is the largest individual provider of usage based insurance, in the UK

Active UBI policies: XX — 0 — X million

Gross written premium: € XX** — 0 — XX billion

# of UBI programmes: XX — 0 — XX

Creation	1991
HQ	Cardiff, UK
Staff	XX
Revenue	€ XX billion

Company introduction

UBI offering

- **Admiral** has been actively providing UBI programmes since 2010 and it currently offers multiple pay-how-you-drive programmes.
- **Admiral** holds **XX% of the UBI market share** in the **UK.**

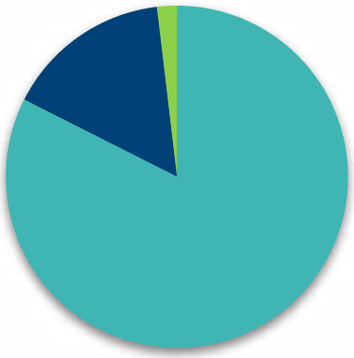
Targets

Channels

Source: PTOLEMUS; Note: (*) PTOLEMUS estimates; (**)GWP auto insurance premium Admiral 2020

Admiral has partnered with industry leaders such as Octo Telematics and CMT to offer UBI product offerings

Type of solution

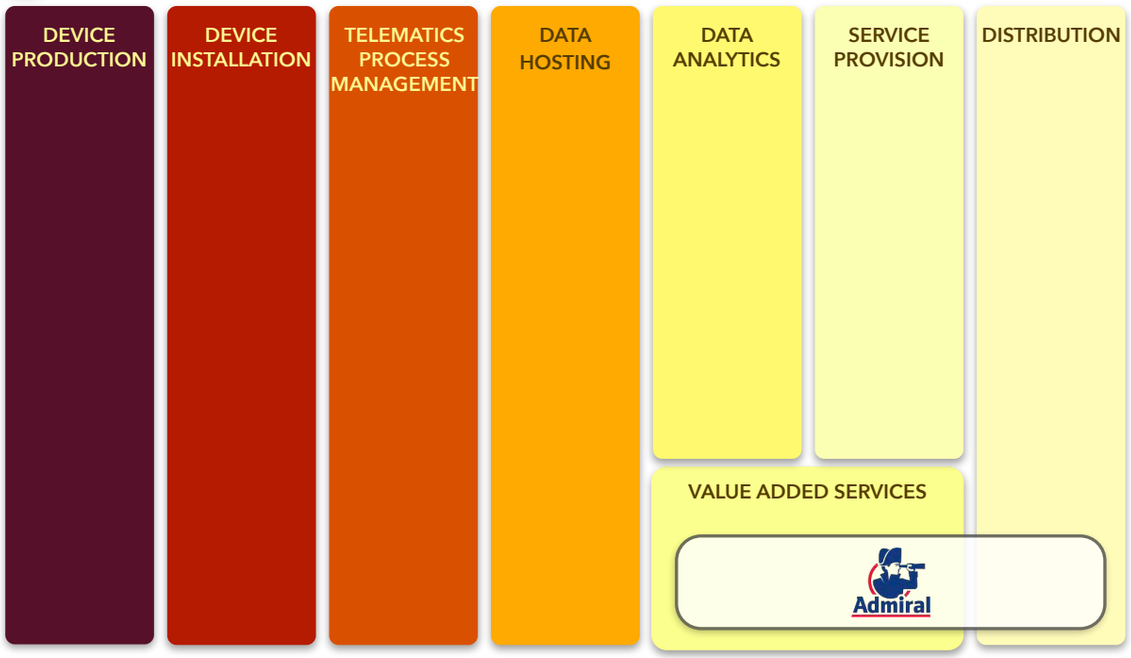


Services

Usage-based insurance

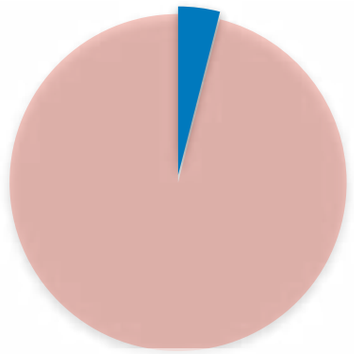
Geographic reach

Value chain positioning



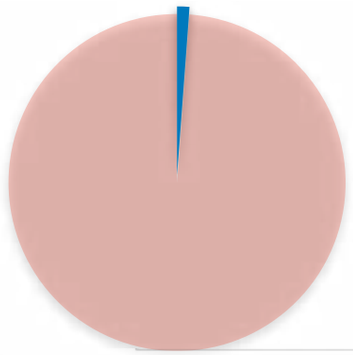
Market share & partnerships

Admiral's regional UBI market share*



Telematics service provider

Admiral's global UBI market share

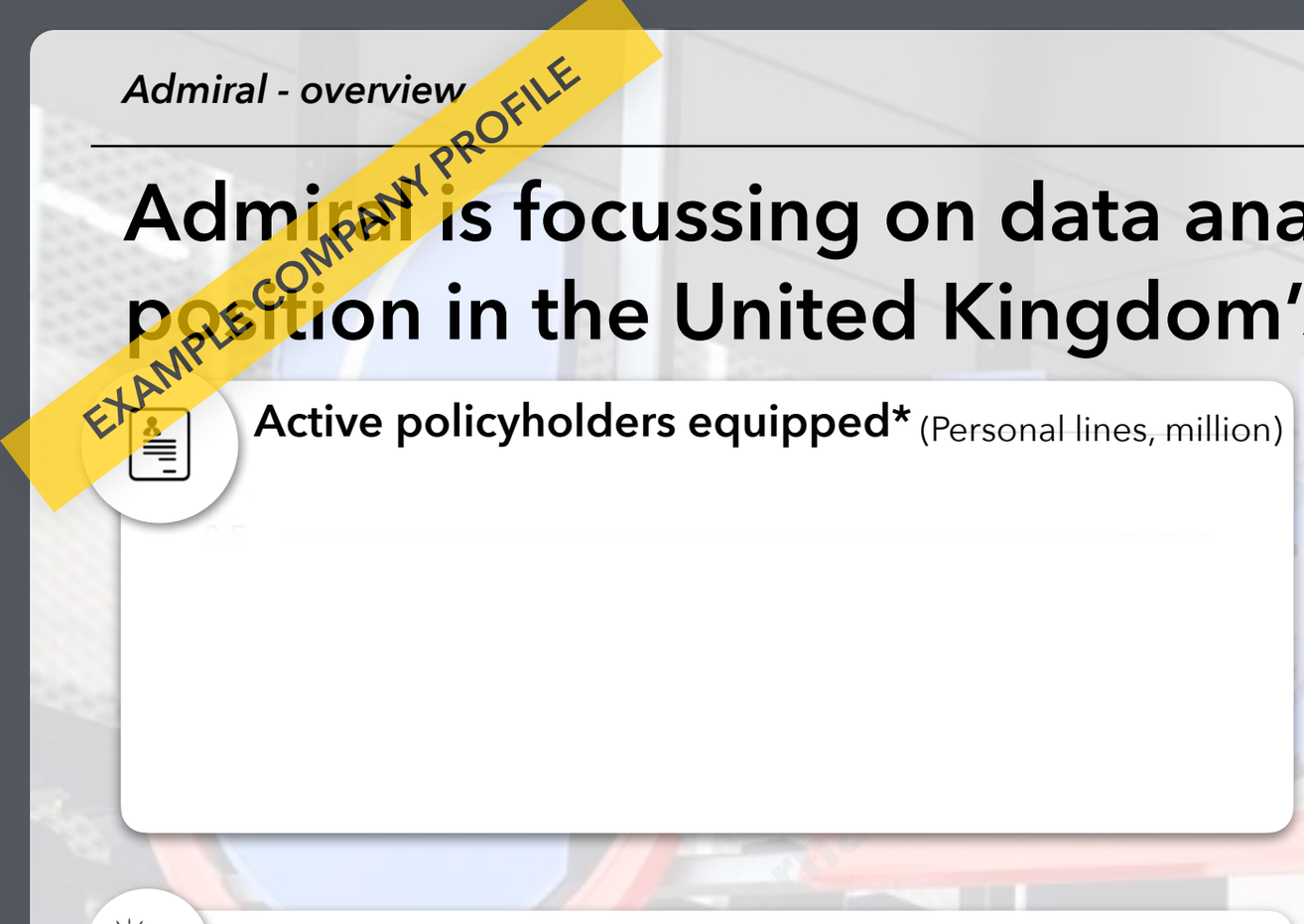


Telematics technology provider

Source: PTOLEMUS; Note: (*) based on countries in which the insurer actively offers UBI programmes

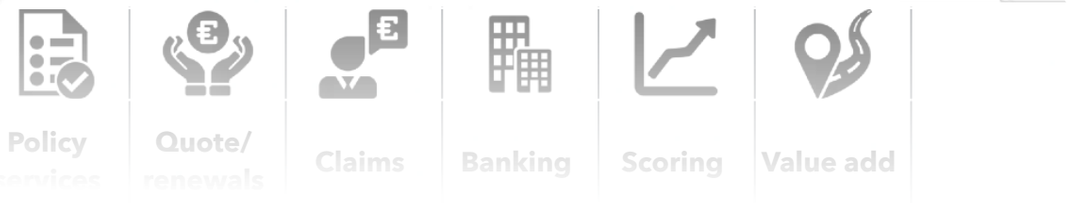
Admiral is focussing on data analytics in order to enhance its position in the United Kingdom's UBI market

Active policyholders equipped* (Personal lines, million)



- **Admiral's** number of policies increased by an average XX% CAGR from 2016 to 2020:
  - It represented about XX% of UK's UBI market (XXX active policies) in 2020.
  - A collaboration with **CMT** in 2018 allowed the insurer to explore **smartphone** based programmes in the UK;
  - Furthermore, in 2020, **Admiral** founded a data and analytics department

Solution provided today & partners



Source: PTOLEMUS; Note: (*) PTOLEMUS estimates

Admiral has partnered with players such as Octo Telematics, Reactail, CMT and Vodafone for its UBI programmes

Recent timeline of events

Funding
Launches
Announcements

1991 — Admiral is founded.

2010 — Admiral launches a black box based PHYD programme for young drivers in Italy with OCTO.

2013

2014 ... 2016 — Admiral launches a black box based PHYD programme for low risk drivers in Spain with OCTO.

... 2018

2019 — Admiral launched a temporary car insurance product via Veygo.

2020 — Admiral announces the sale of Penguin Portals Group and Preminen to RVU.

Admiral introduced a cross-departmental project to enhance data

Source: PTOLEMUS

Little Box is a simple black box based UBI programme which provides a free theft tracking service for stolen vehicles too

Example of programme: "Little Box" by Vodafone

- **Little Box** is a programme distributed by **Admiral** in partnership with **Vodafone**.
- The device records and analyses **braking, time of the day and journey length.**

"Little Box" key features

- The programme requires the professional installation of a **black box** which is scheduled and
- In addition, the programme offers a vehicle needs to be worth at least £250.

Little Box - Black box insurance

"Little Box" ratings

Reevoo

★★★★½ (3,113 ratings)

- *"We went for the plug in box so made it extremely easy to get up and running. Also*

Despite being active in the market since 2010, Admiral choses to use a limited number of features for its PHYD programmes

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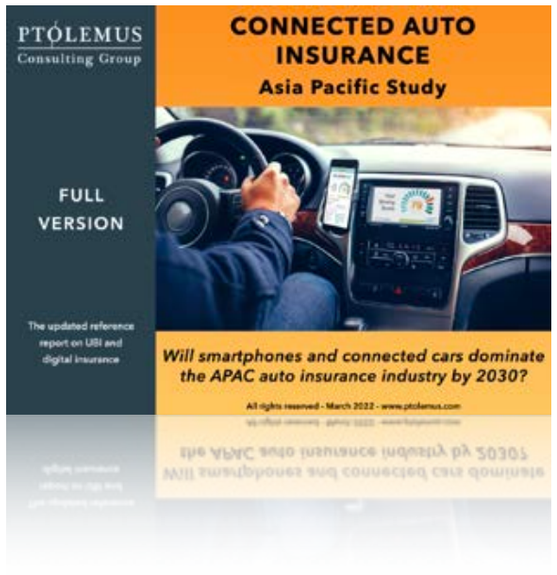
The study comes with a single, worldwide company licence



The global reference report on UBI and Connected Auto Insurance

	Report ONLY		Additional market forecast
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Contents	• **430-pages of analysis** of the connected auto insurance industry including, strategies, use-cases and geographies • Strategy analysis and assessment of the **4 key routes** OEMs have to enter the connected insurance market • **Profiles of 2 key countries and 1 region** covering the APAC connected auto insurance industry, including details such as: - Share of active UBI policies & top car insurers - Market trends and timeline - Regulatory summary and UBI impact assessment - UBI value chain in Africa		• Excel file with outputs and charts • Global Forecasts from 2020 to 2030 • Includes, technology splits, revenues by technology, distribution model and region/country, and active policies
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