Autonomous Vehicles and Insurance

The Technology, New Mobility Models and Potential Industry Impact

Trusted Choice Company Partner Meeting

October 17, 2018

Private and Confidential

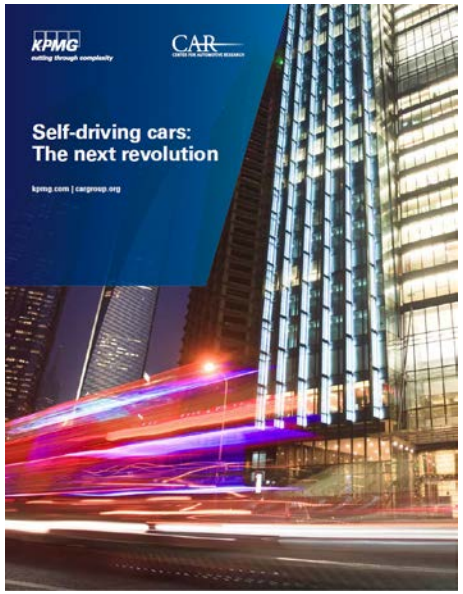
Agenda

1. Introduction and Market Update
2. Autonomous Vehicle Technology Update
3. New Mobility Models: Islands of Autonomy
4. Potential Impact on Insurance

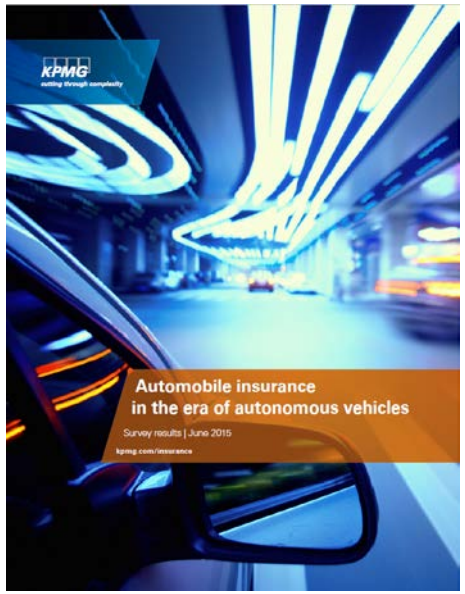
Introduction and Market Update

In the Beginning . . .

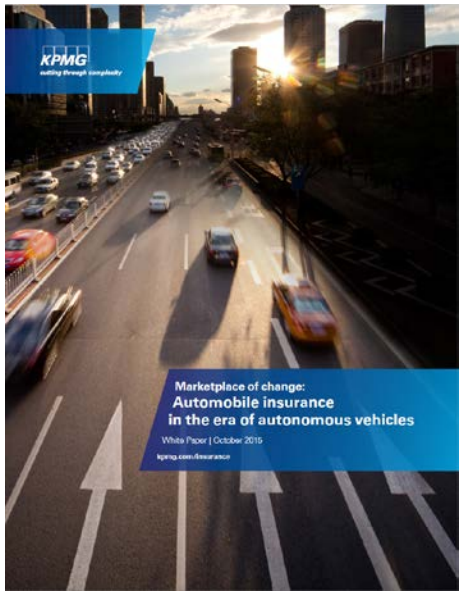
Fall 2012



Summer 2015



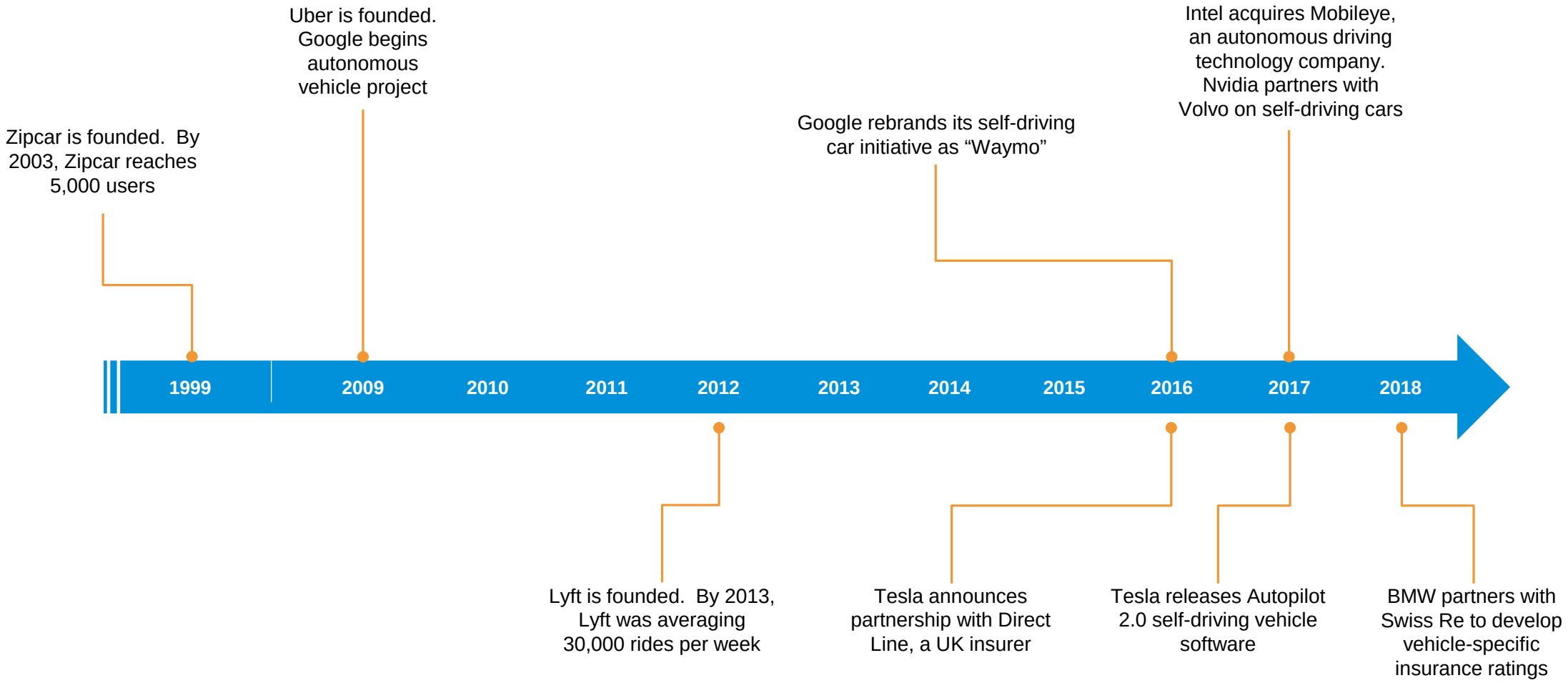
Fall 2015



Summer 2017

Fall 2017

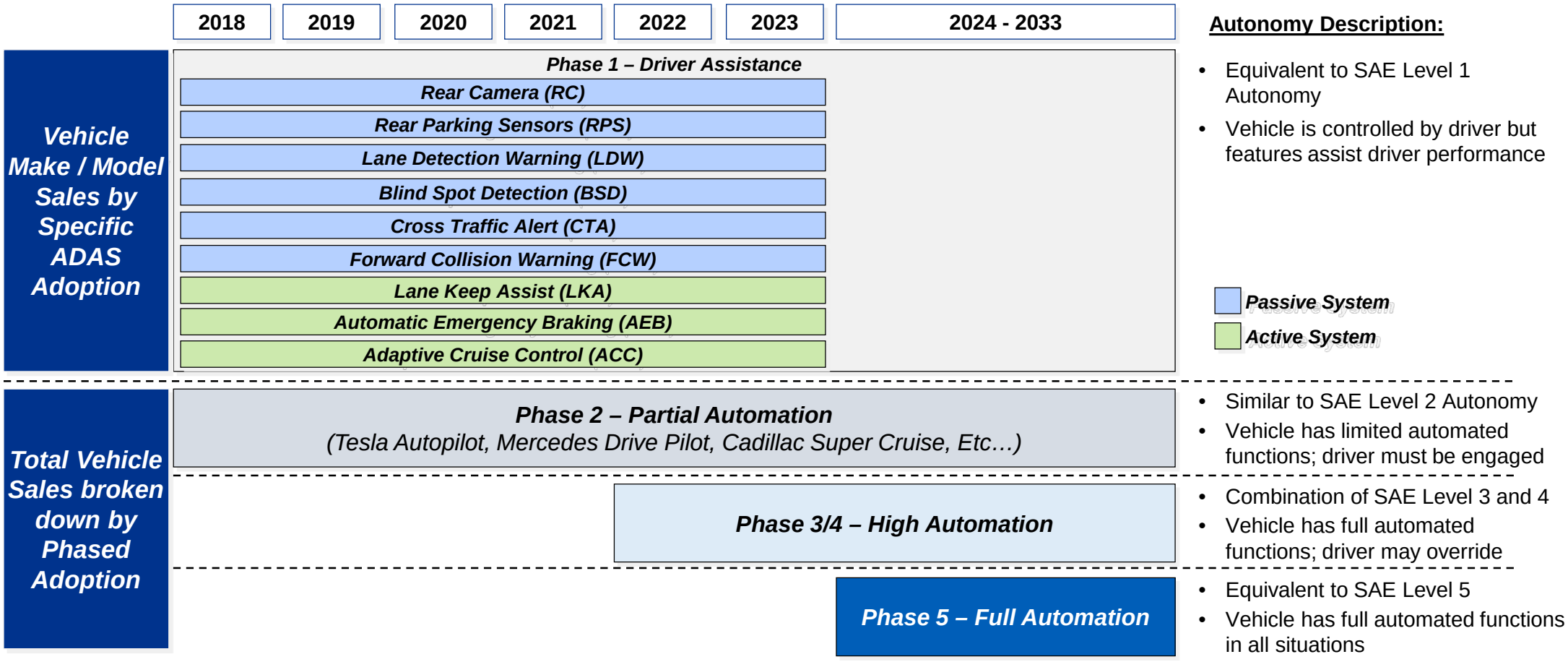
Changes in Transportation are Impacting Insurance



Source(s): Company websites, Reuters, TechCrunch and press releases

Autonomous Vehicle Technology Update

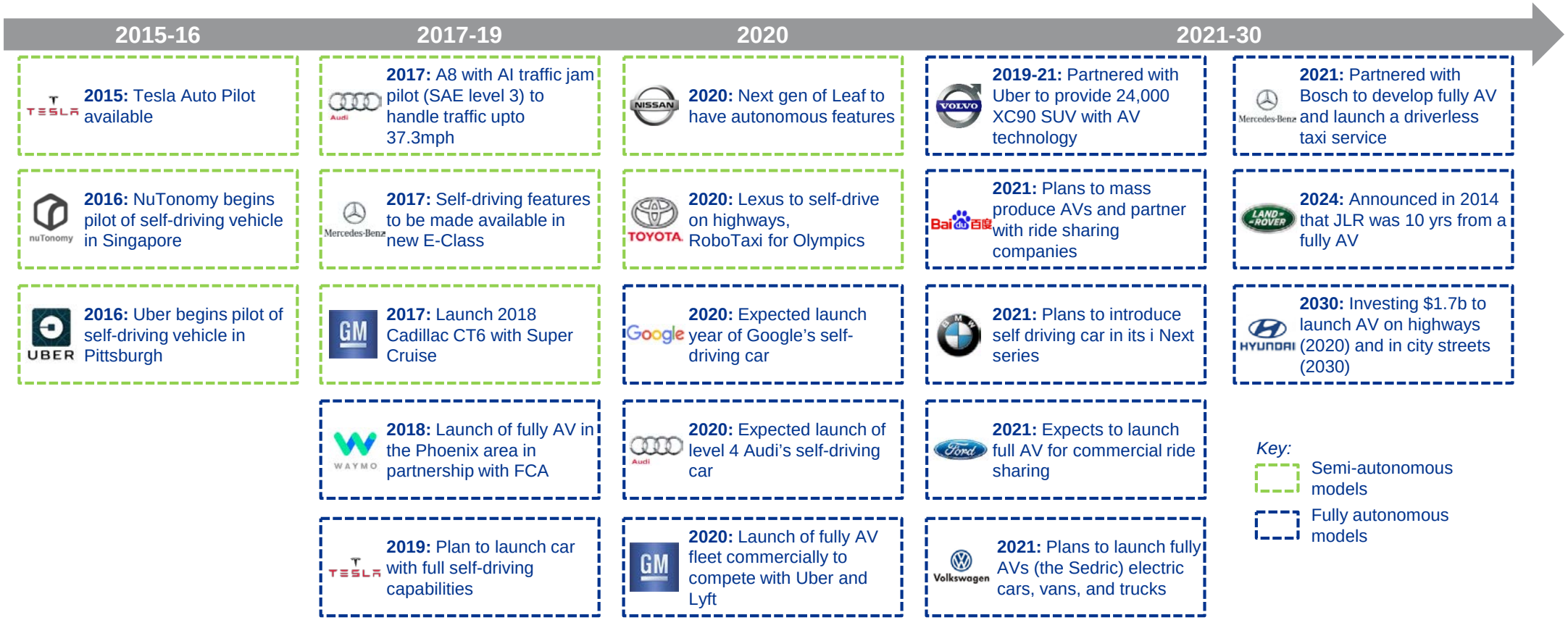
Model Phases and Adoption Estimates



Source(s): NHTSA, SAE

AV Launch Timeline

Company announcements to date indicate that autonomous vehicles are being developed aggressively with plans to launch post-2020

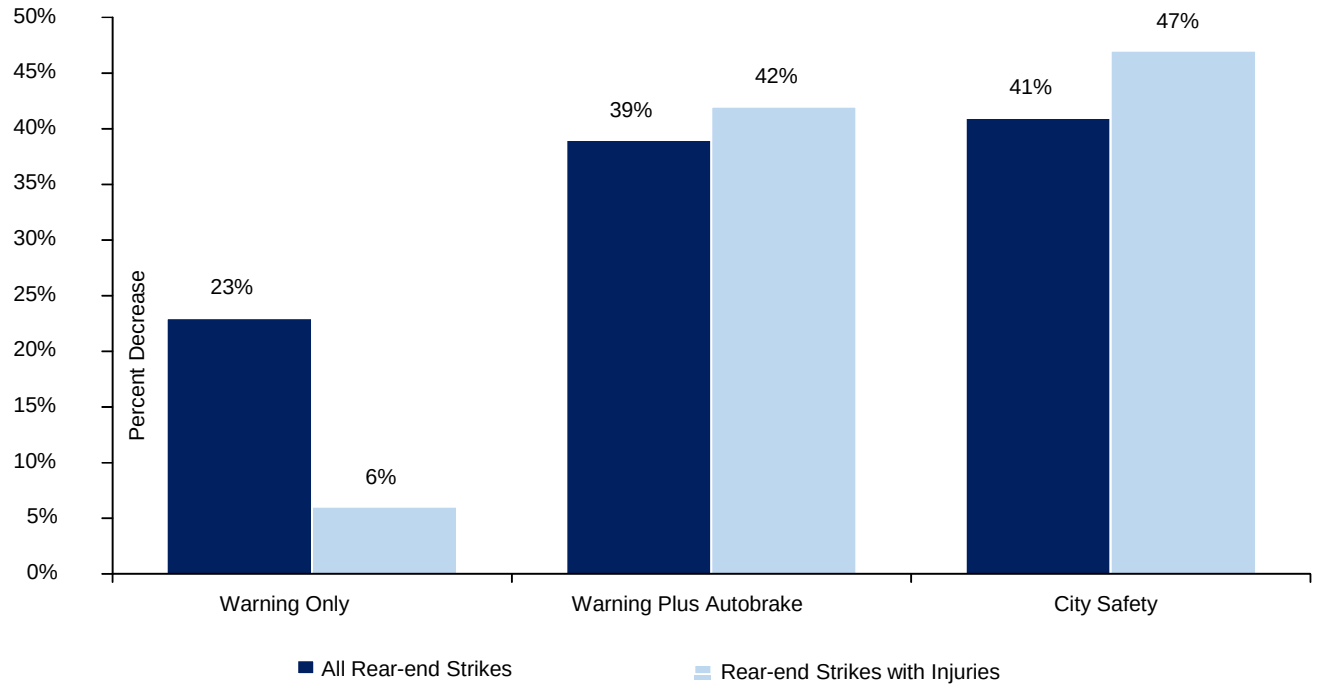


Source(s): CB Insights, The WSJ, Autonews.com, Topgear.com, Driverlessfuture.com, Business Insider, Wired, The Guardian, Slashgear, Drive, Huffington Post, Motoring.com, The Verge, IEEE, CNBC

Loss Effects of Autonomy Already Happening

Autonomy is making vehicles safer, with results being realized today. Crash avoidance features which underpin self-driving technology are already improving the safety profile of vehicles

Vehicles With Front Crash Prevention Technology[1,2]



According to recent IIHS findings, more than 700,000 police-reported rear-end crashes[1] in 2013 could have been avoided if the vehicles were equipped with auto break technology.

Note: (1) IIHS Study analyzes police-reported rear-end crashes in 22 states during 2010-2014 involving Acura, Honda, Mercedes-Benz, Subaru and Volvo vehicles with forward collision warning ("warning") and autonomous emergency breaking ("autobrake") vs. the same models without the optional technology; (2) 'City Safety' represents Volvo's low-speed autobrake system. The test was conducted by comparing two Volvo models with City Safety vs. other vehicles without front crash prevention technology Source: IIHS's research papers 'Effectiveness of Forward Collision Warning Systems with and without Autonomous Emergency Braking in Reducing Police-Reported Crash Rates' and 'Effectiveness of Volvo's City Safety Low-Speed Autonomous Emergency Braking System in Reducing Police-Reported Crash Rates' and IIHS's Status Report, Vol. 51, No.1, January 2016

New Mobility Models: Islands of Autonomy

The Trillion Dollar Question – **When** are Autonomous Vehicles Coming?

Knowing when is important . . .

. . . but so is **where.**

What are Islands of Autonomy?

"Cities with distinct metropolitan centers economically and socially linked to surrounding areas"

High density of riders

Frequent vehicle observations of the streets

Source: Information in "New Mobility Models: Islands of Autonomy" is from KPMG LLP's 2017 white paper, "Islands of Autonomy"

Islands of Autonomy . . . a New Transportation Ecosystem

New transportation market(s)

150-plus island markets

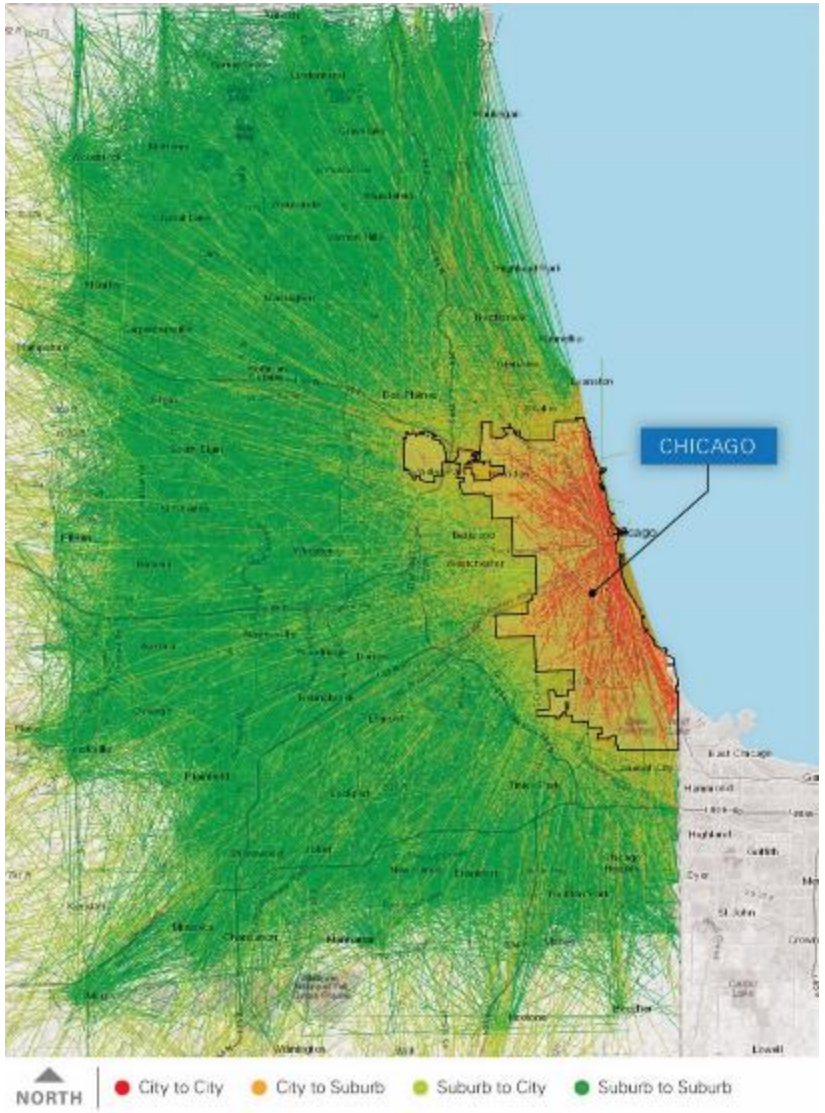
Trip mission focus

No one-size-fits-all vehicle – each island will need a unique mix of vehicles to meet consumer needs

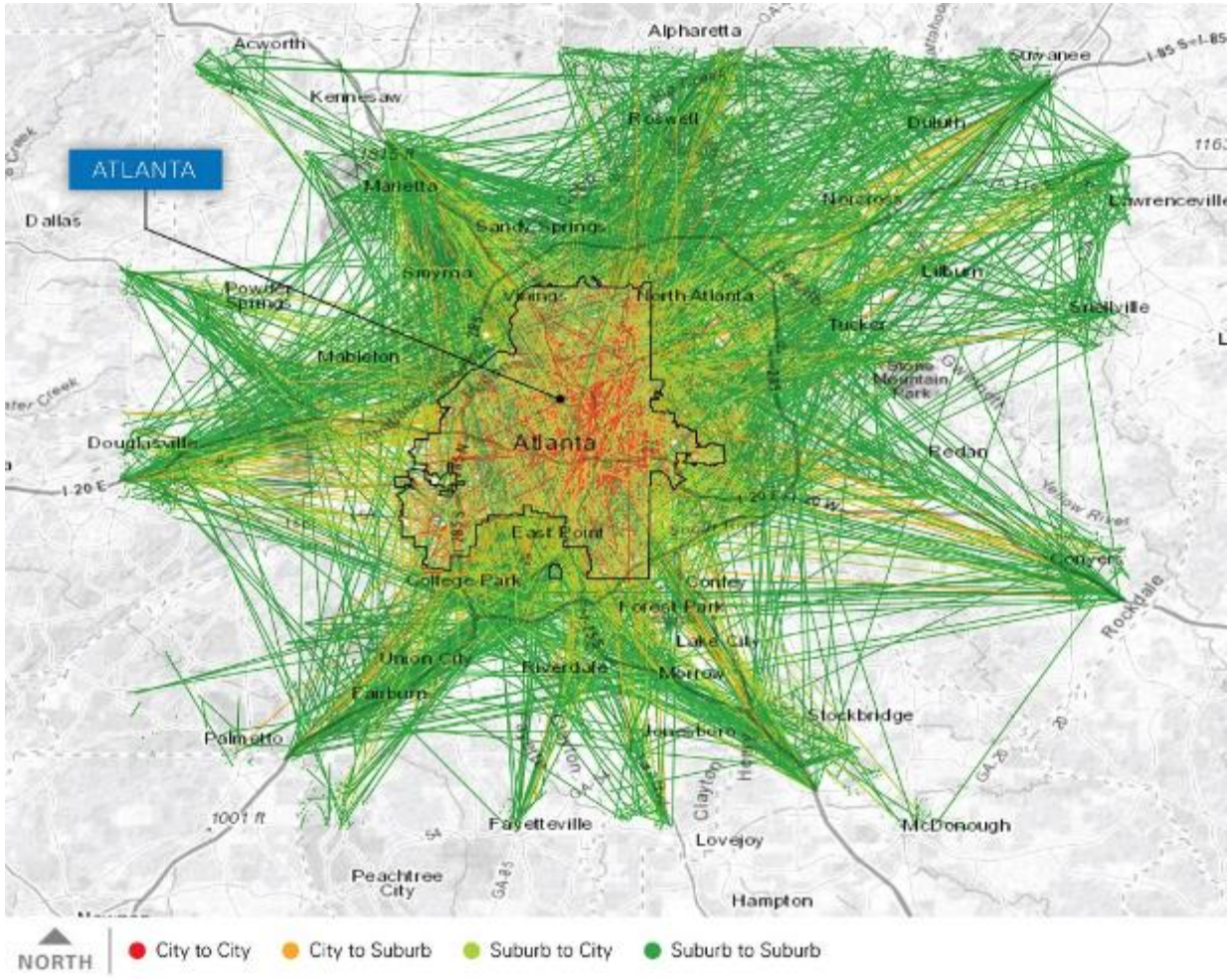
Potential (massive) decline in sedan sales

The islands will transform the car market, most heavily impacting the sedan class. Self-driving vehicles and mobility services provide options that have significant potential to reduce consumer desire to own cars, particularly sedans

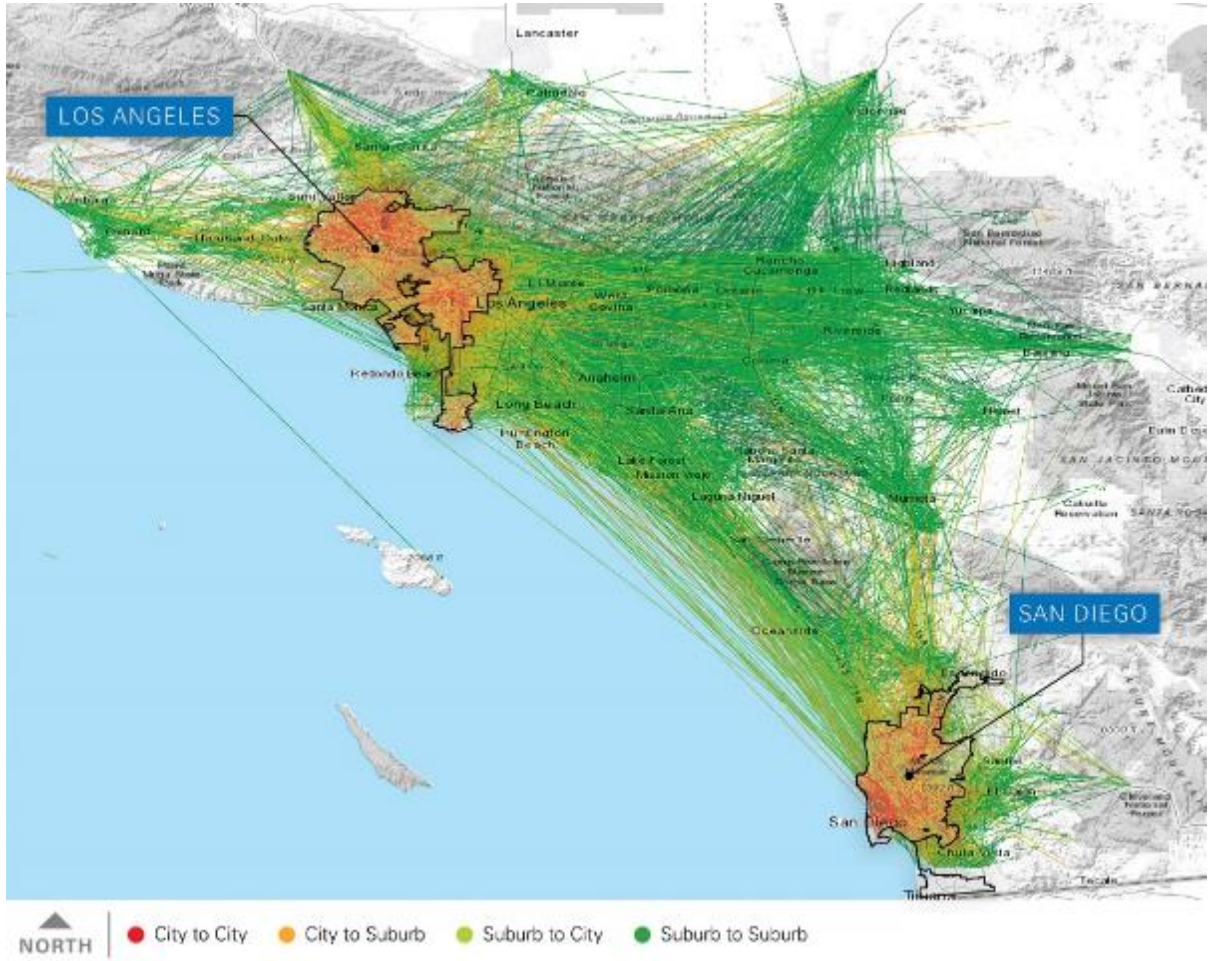
Chicago - A Half-Sun



Atlanta - A Star

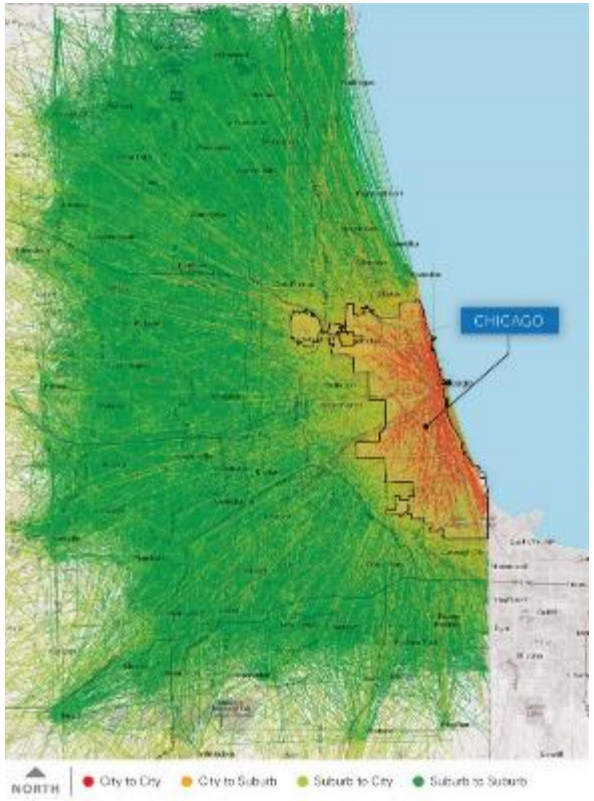


Los Angeles-San Diego – A Binary Star Megaregion

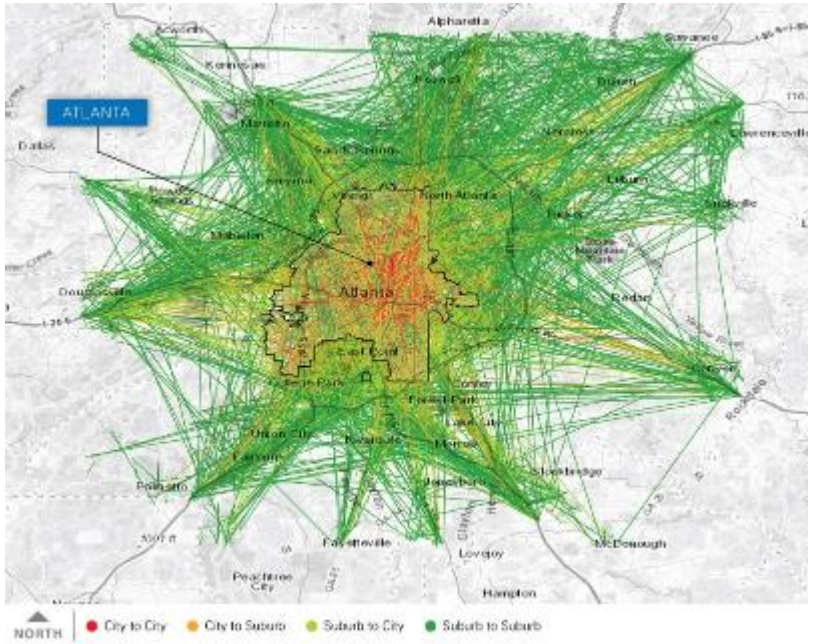


Different Islands . . . Distinct Transportation Requirements

Chicago
"A half-sun"



Atlanta
"A star"



Los Angeles-San Diego
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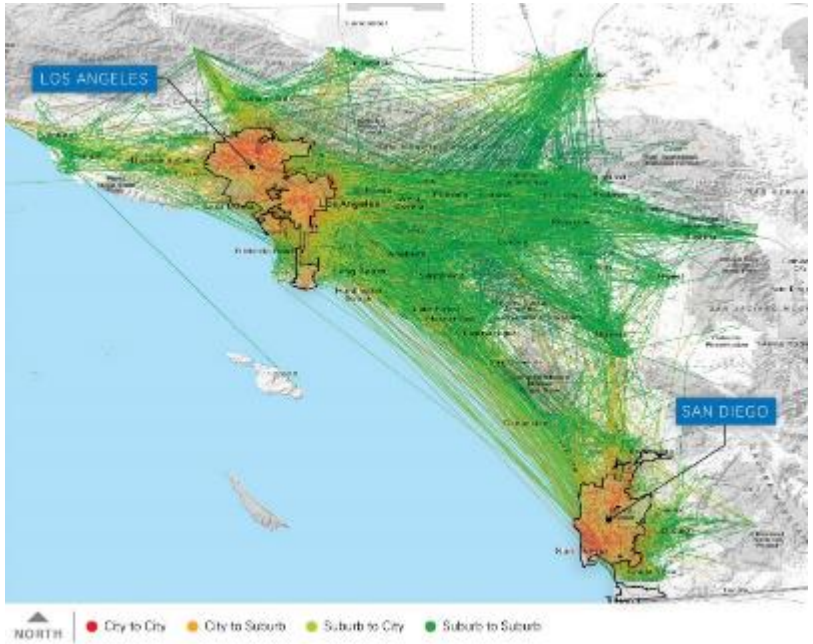
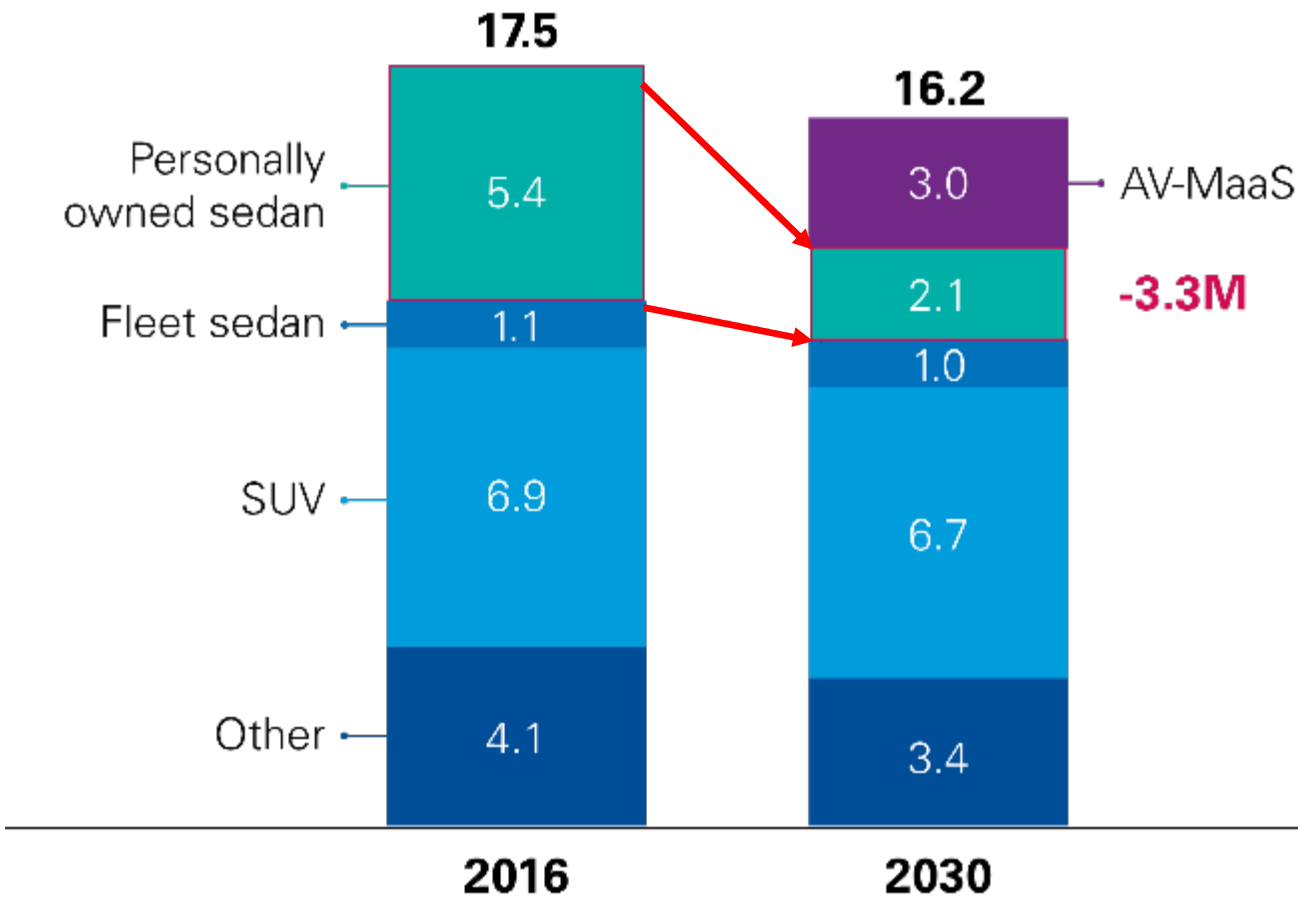


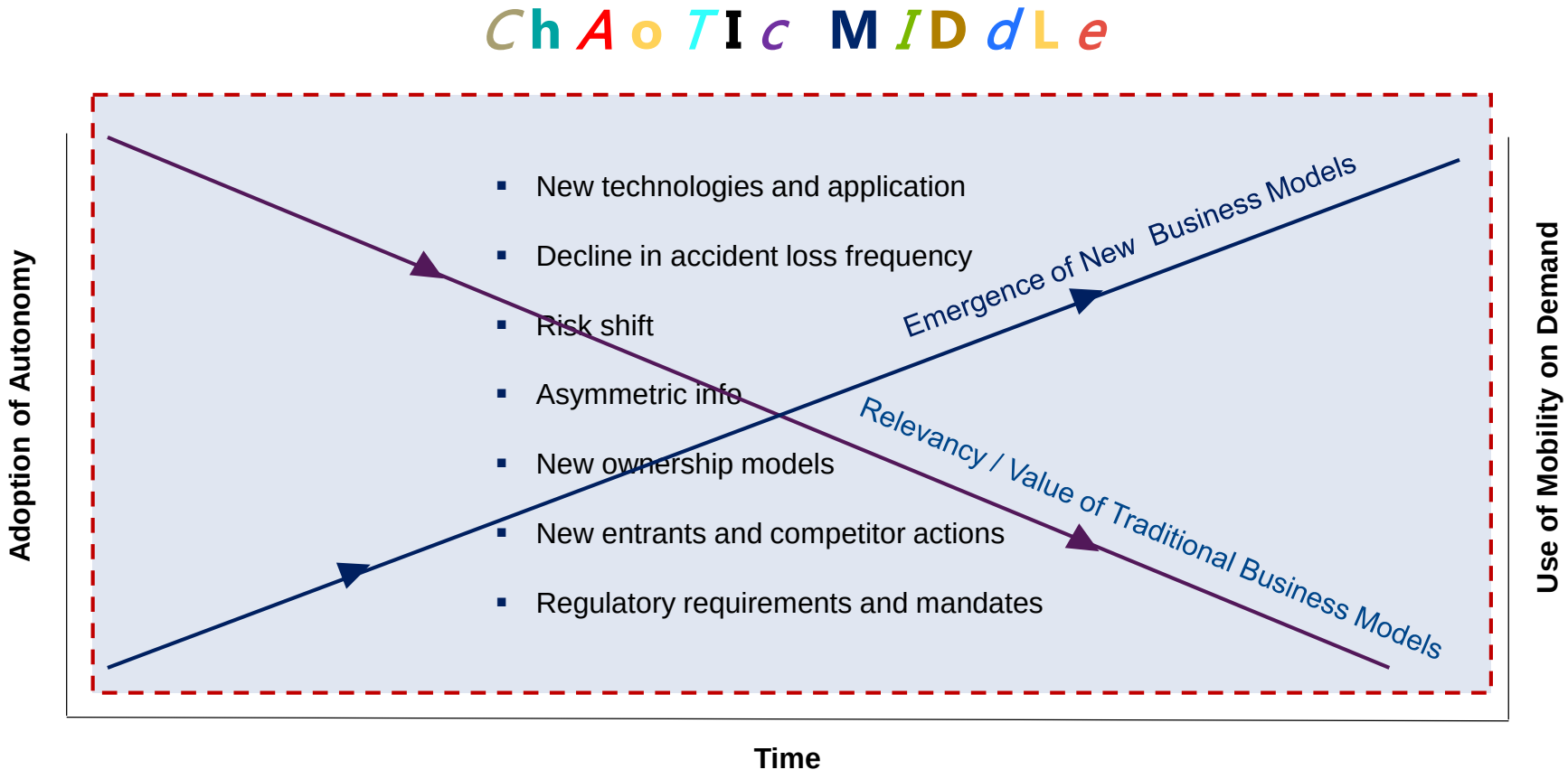
AV-MaaS and Potential Vehicle Sales Impact



Potential Impact on Insurance

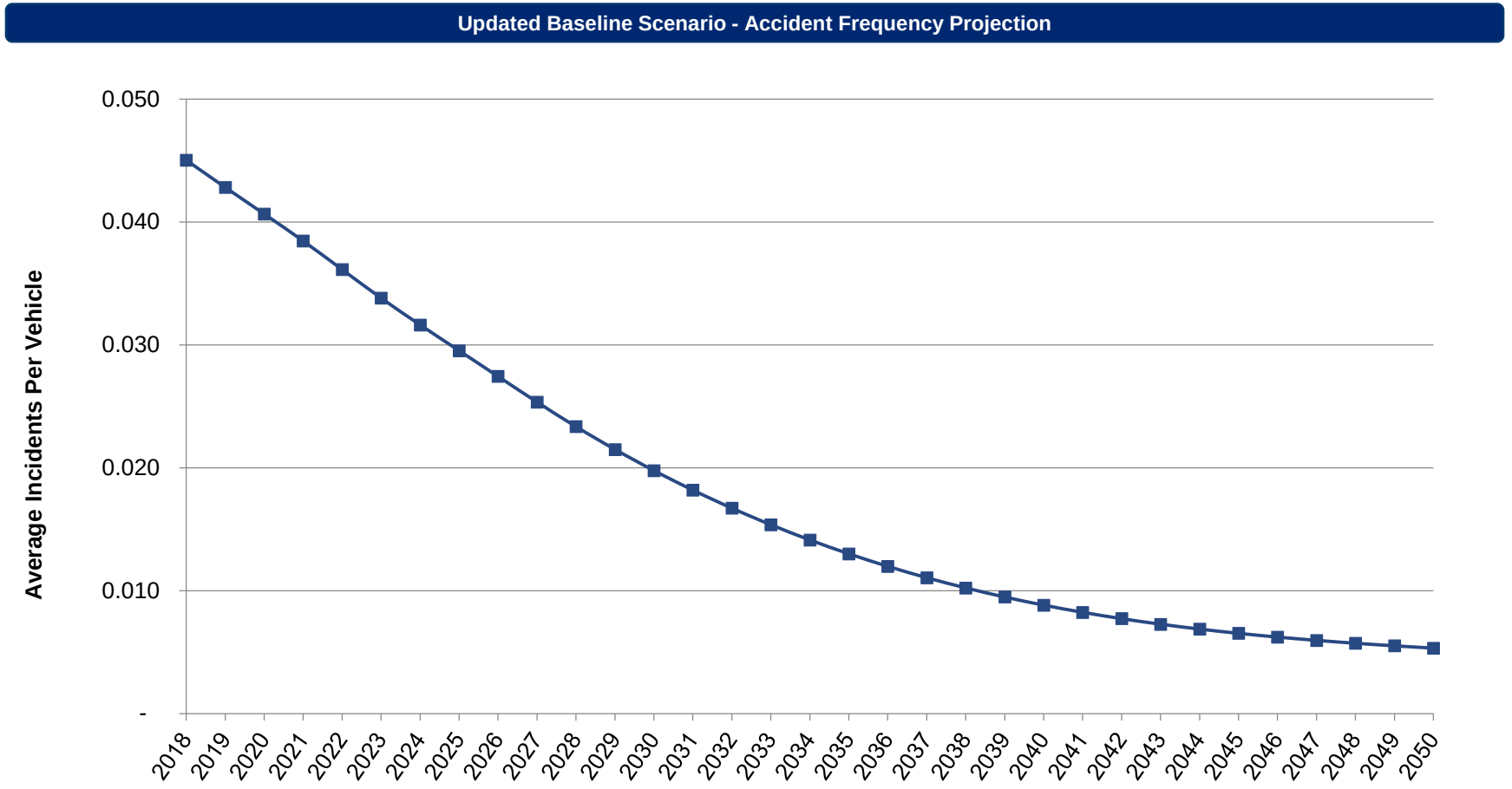
The 'Chaotic Middle' Begins

We anticipate a 'chaotic middle' over the next 5-10 years, during which business models and the competitive landscape are transformed



Accident Frequency Could Fall Dramatically

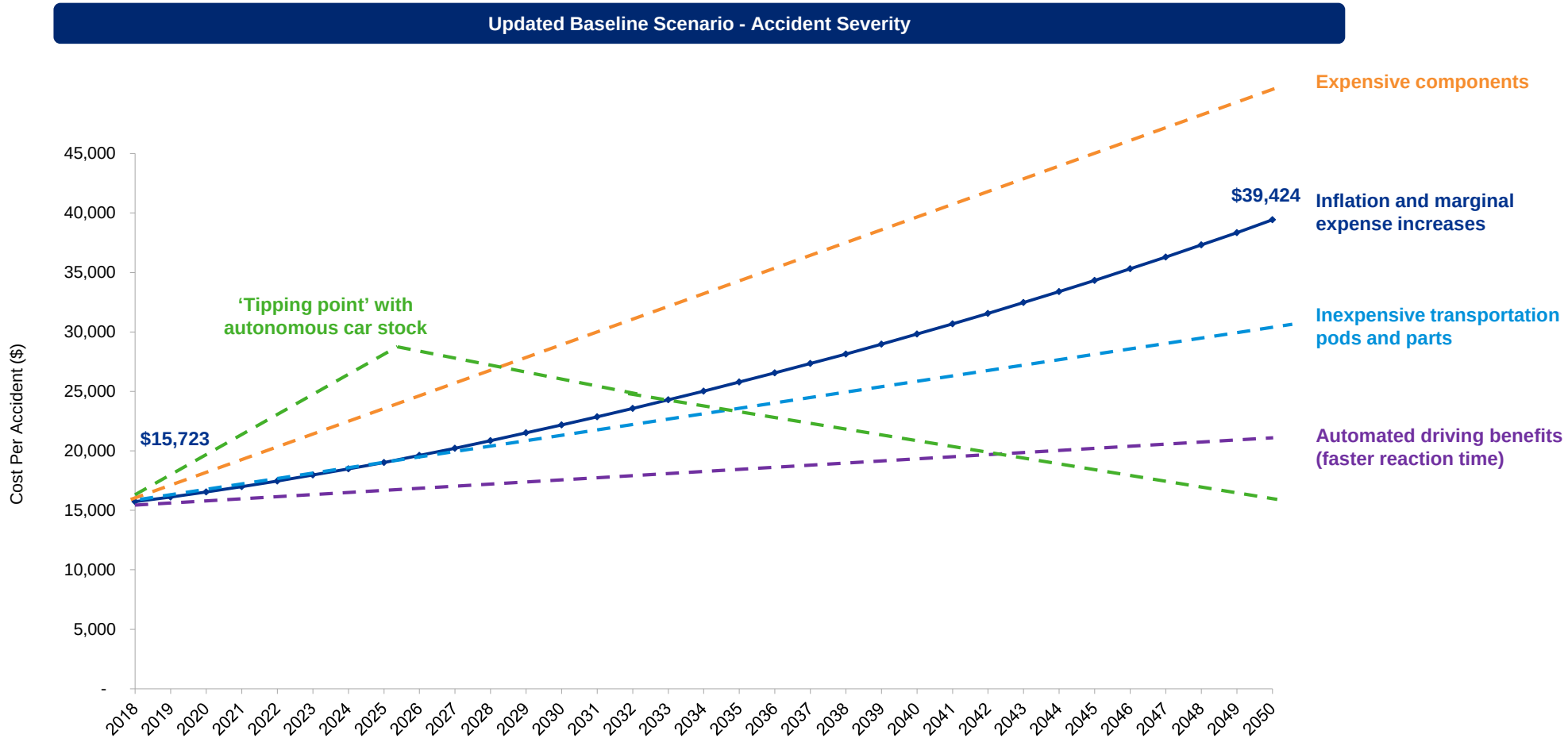
The KPMG Actuarial Team estimates by 2050 a potential reduction in accident frequency of almost 90% through additive benefits from technology improvements and car stock conversion



Source: KPMG LLP – "The Chaotic Middle: Autonomous Vehicles and Disruption in Automobile Insurance" – June 2017

Cost of Future Accidents is Uncertain

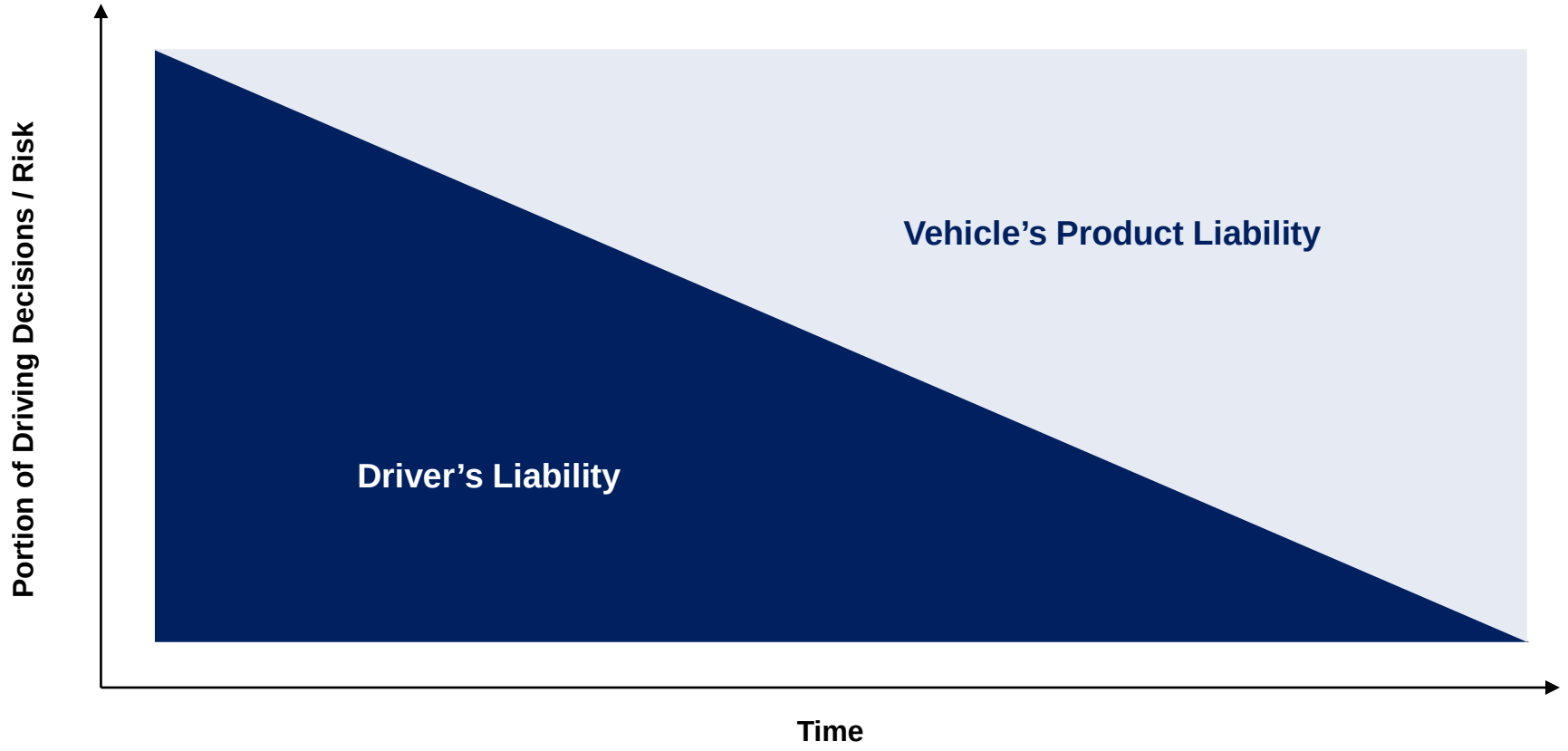
The severity of future accidents has several competing factors at play affecting the cost of the claim. While increased severity appears to be winning the current "battle" with frequency benefits due to improved safety technology, many market participants believe that over time there will be a 'tipping point' where costs plateau and eventually drop



Source: KPMG LLP – "The Chaotic Middle: Autonomous Vehicles and Disruption in Automobile Insurance" – June 2017

Potential Risk Shift

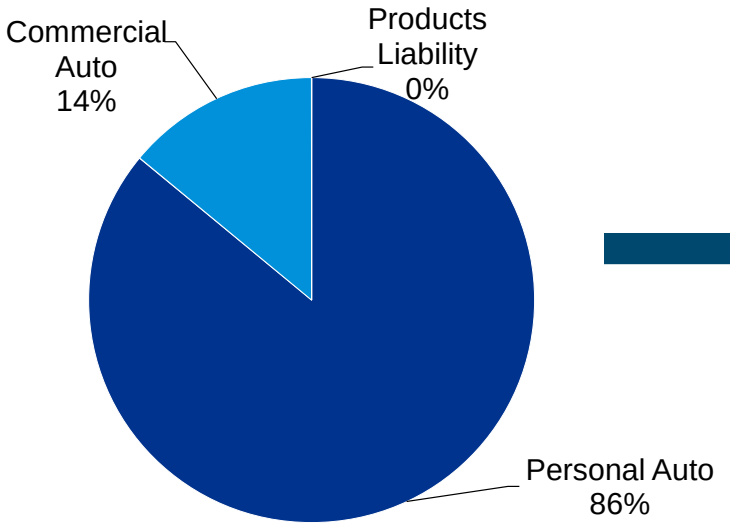
The majority of the driving risk will ultimately relate to decisions made by the vehicle's proprietary algorithms. The product liability to insure this 'brain' could become the primary type of insurance, with the driver's own liability an increasingly smaller factor



Mix of Insurance Lines Could Change

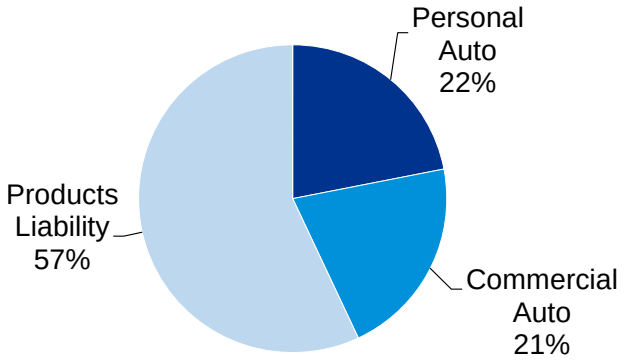
Changes in business mix translate into changes in underlying insurance. Traditional personal insurance may become a much smaller share of a smaller volume of losses

2017



~ $192 billion in losses

2050 – "Perfect Storm" Scenario

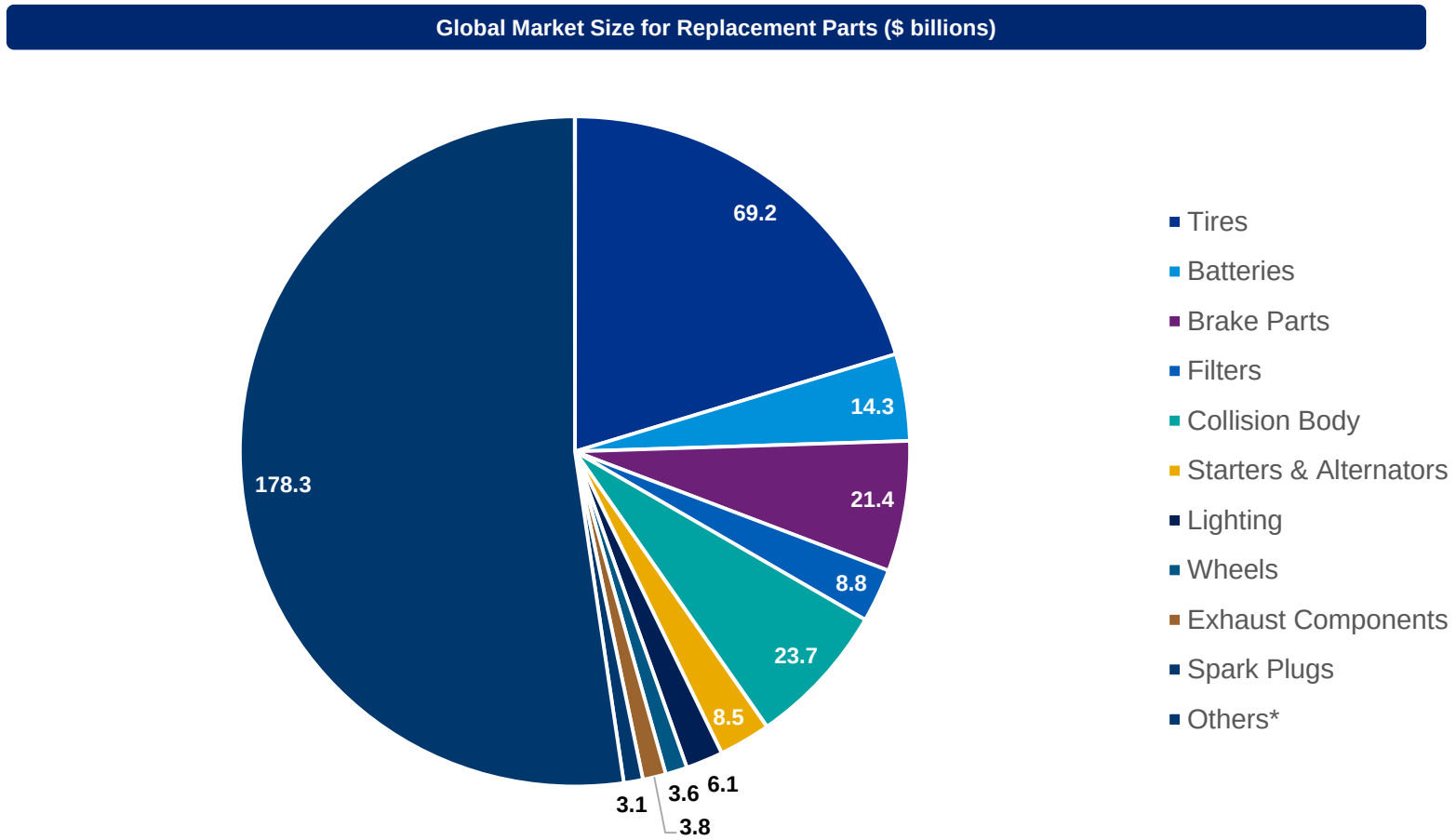


~ $55 billion in losses

Source: KPMG LLP – "The Chaotic Middle: Autonomous Vehicles and Disruption in Automobile Insurance" – June 2017

Replacement Parts

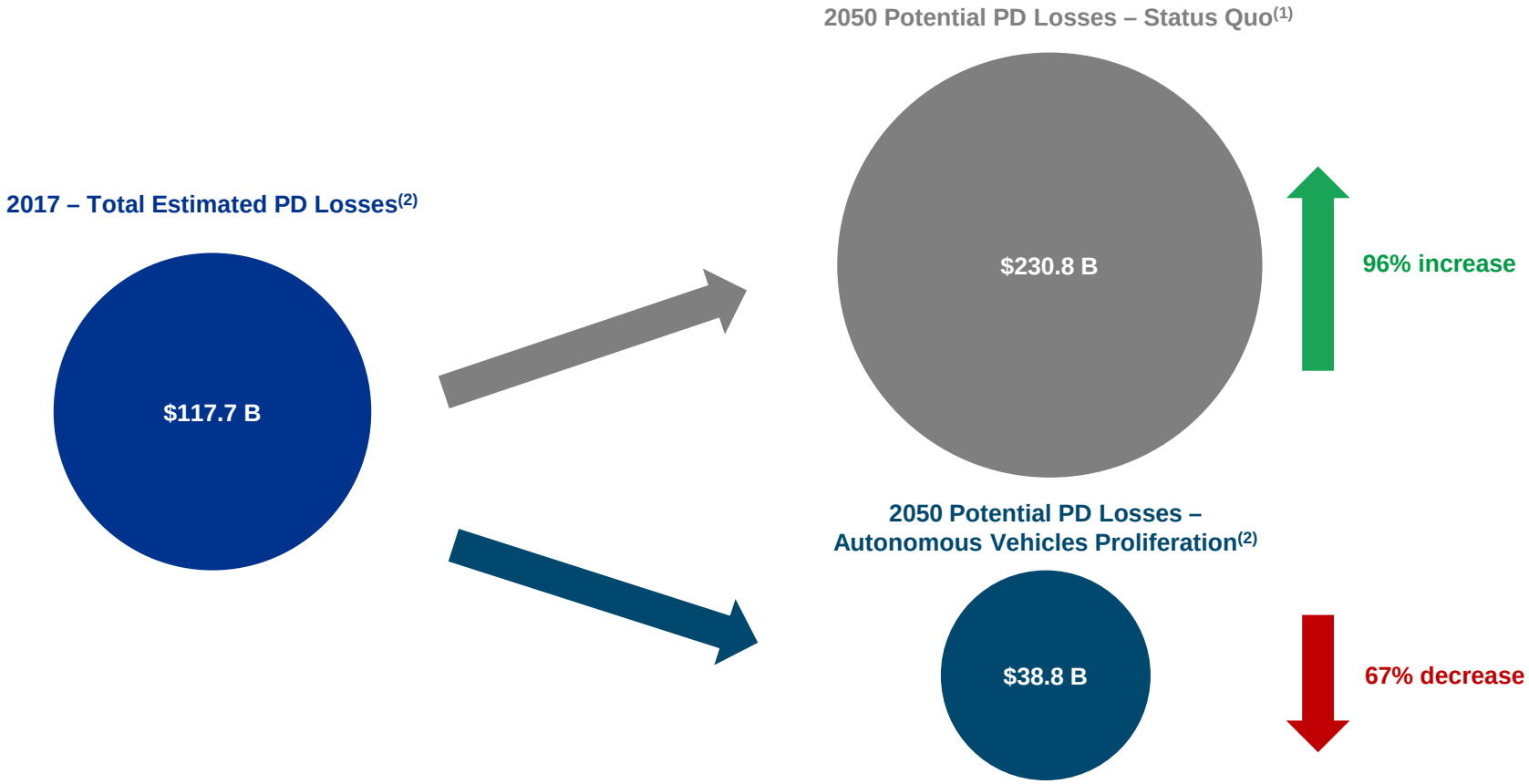
Global replacement parts, part of the broader automobile after-market business, represent a $340 billion(1) per year industry, with an annual historical growth rate of c.5%, thereby constituting a significant source of revenue for OEMs



Note: (1) Includes “manufacturer-level” replacement parts as of 2013, and excludes repairs or associated services. Source: Frost & Sullivan

Parts Business at Risk

The frequency and severity trends directly impact demand for parts related to accidents and the property damage ("PD") arising from them



Note: (1) Does not contemplate fully autonomous vehicles; and (2) Property damage losses are estimates and are based on KPMG LLP's Updated Baseline Scenario. Source: KPMG LLP actuarial analysis

Insurance Offers Several Business Plays

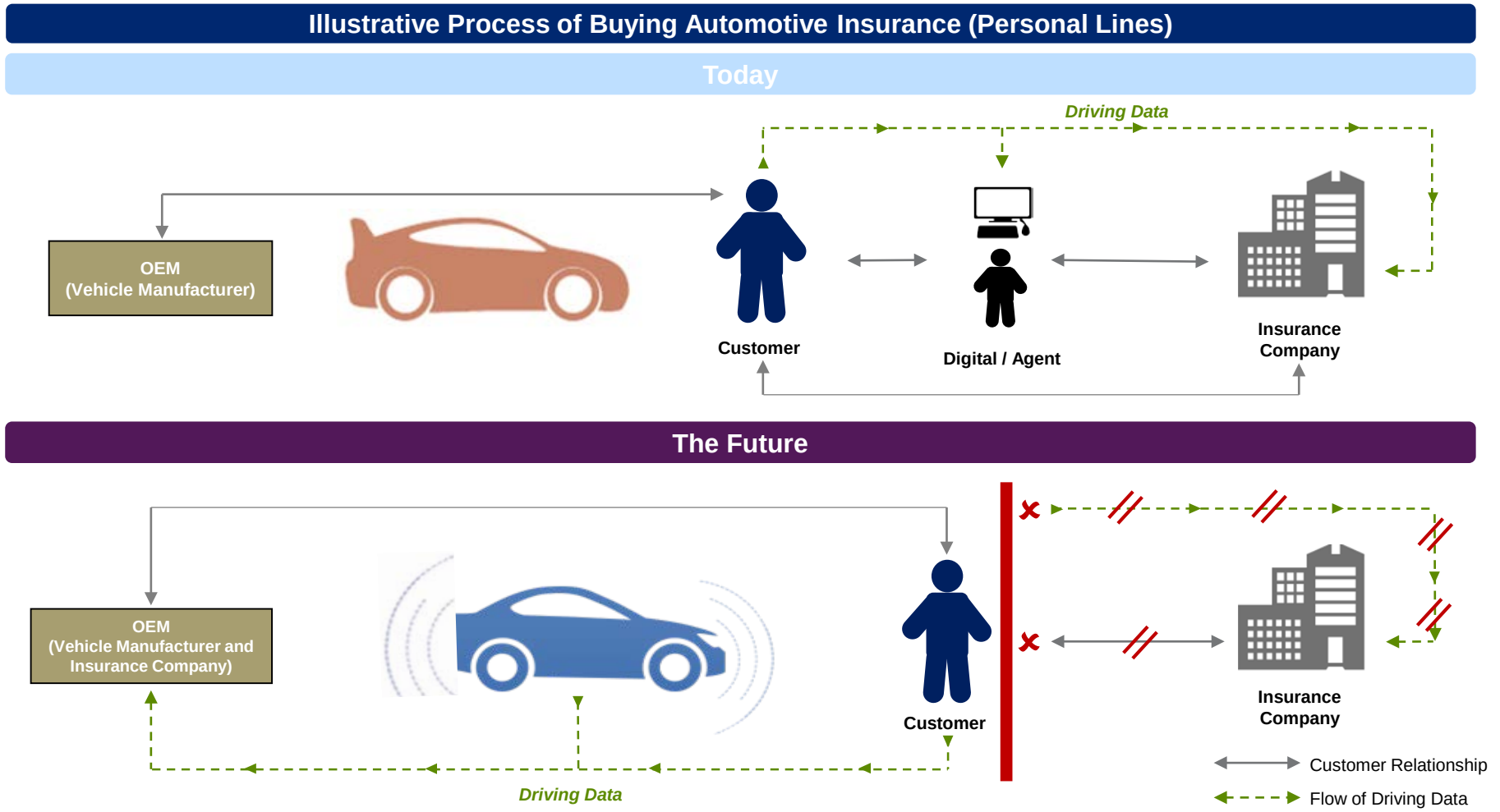
An OEM's potential (re)entrance into insurance could take a variety of forms that could evolve to match changes in its core business. There is flexibility to shift business models over time to reflect changes in the marketplace and scale of the autonomous operations / fleet

Illustrative Future State Business Models

	Entity	Scenario A	Scenario B	Scenario C	Scenario D
OEMs		▪ Provide driving and vehicle data to insurers	▪ Become distributor of insurance for a selected set of carriers	▪ Act as an insurance company with many functions outsourced	▪ Become a fully integrated insurance company
OEMs	**Strategic Angle**	▪ Telemetry data	▪ Brand, customer connectivity	▪ Product advantage	▪ Product advantage
OEMs	**Revenue Model**	▪ Licensing fees	▪ Commissions	▪ Underwriting profit and investment income	▪ Underwriting profit and investment income
Insurer		▪ License data from OEMs to underwrite policies	▪ Form alliances with OEMs	▪ Serve as third-party administrators - for example, current insurers could process the claims of the OEMs	▪ Transform business model to compete with new entrants ▪ Expand into new products and services

Potential Customer Relationship Implications

Ultimately, OEMs have the potential to not only control the data, but also the customer relationship, thereby dramatically altering the traditional auto insurance model



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