KPMG
cutting through complexity

The "Chaotic Middle": Automobile Insurance in the Era of Autonomous Vehicles

In Focus Seminar: The Gathering Storm – Digital and Climate Disruptors

October 27, 2016

Summary

Change is coming, and it is coming fast

Changing Auto Insurance Marketplace

Aligning Forces

Underlying market forces are already aligning to enable mass change

New Entrants and the 'Chaotic Middle'

Given their control of driving data and the customer relationship, automotive original equipment manufacturers ("OEMs") are particularly well positioned to disrupt the traditional insurance market, especially over the next 10-15 years

Reduced Accident Frequency

KPMG estimates an 85 percent reduction in accident frequency by 2050

Consumer Impact

Fewer traffic fatalities and lower insurance premium have the potential to benefit consumers, while data, privacy and other risks will need to be evaluated and managed

Shrinking Premium Pie and Different Coverage Mix

Lower losses lead to lower premium – KPMG predicts industry losses to decrease by roughly $60 billion within 25 years. A shift from personal to commercial and product liability coverages is also anticipated

Planning for the Future

Insurers need to understand their exposure in the auto insurance space and prepare their strategy and operations accordingly

Source: KPMG LLP actuarial analysis

Presentation Overview

1 **Alignment for Mass Change**	**Core elements enabling transformation**
2 **Timing**	**Four phases leading to a ‘new normal’ in a decade**
3 **Implications for Insurers and Consumers**	**Potential impact on insurers’ books of business and the consumer marketplace for insurance**
4 **The Chaotic Middle**	**Potential new entrants and changes in the insurance landscape**
5 **What Now?**	**Preparing for the future**

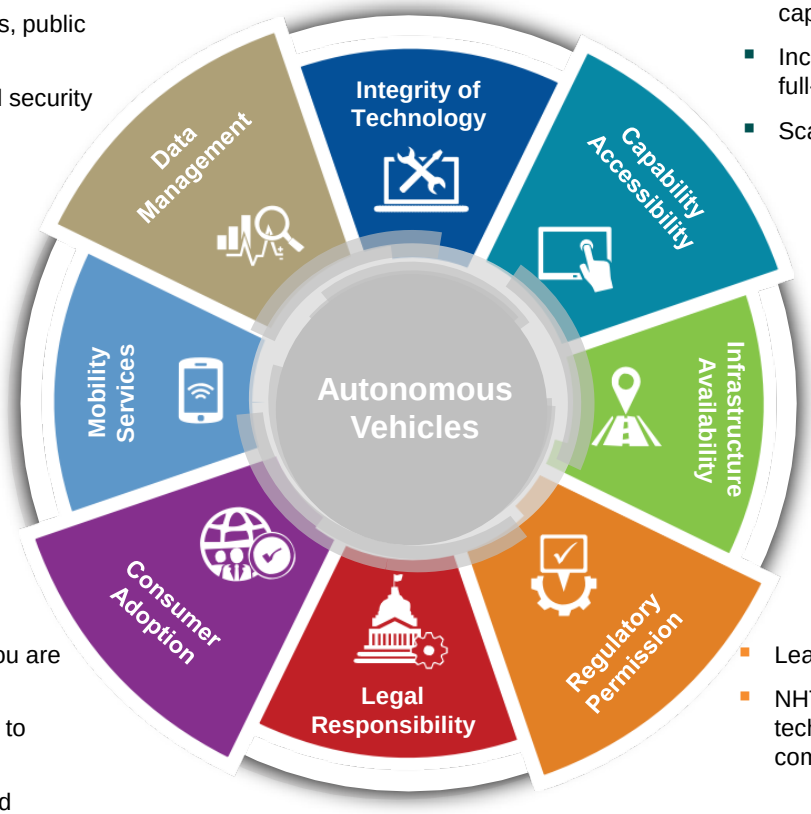
Eight Key Elements for Transformation

A variety of forces will be responsible for the foundational transformation across the driving ecosystem

- Technologies already exist
- Convergence and enhancement lead next wave

- 'Black box' driving data highly valuable
- Who owns the data – incentives, public good, etc…
- Integrity, storage, analytics and security critical

- Robust pipeline of new vehicles / capabilities
- Incremental advancements + leap frog full-autonomy plays
- Scale of operations drop costs over time



- Car-sharing is a standard option for urban drivers
- Potential end of two car household

- Technology works in existing infrastructure
- 'Smart' infrastructure (V2I) to complement vehicle-to-vehicle (V2V) communications

- More you know, the more likely you are to adopt
- Flexible value proposition tailored to individuals
- Focus on consumer education and awareness

- Leader states setting first round of rules
- NHTSA key factor in mandating technology – position papers and comment letters

- Driving risk will follow vehicle operator – driver to technology
- Hybrid environment of combined vehicle decisions will take time to sort

Four Phases of Transformation

No one has a crystal ball to predict the future pace of change. As we synthesized our initial analyses, we envision there to be four potential incremental changes to the transformation over the next 25 years, with the foundation laid for a "new normal" within a decade

"Training Wheels"

Now - 2017

- **Introduction to autonomous vehicles as manufacturers roll out some of the underlying technology**
- **High-tech companies express interest in fast-tracking production of fully autonomous vehicles**

"First Gear"

2017 - 2020

- **In 2017, partial driver substitution technology is introduced. A broader set of consumers experience this technology, witnessing firsthand its safety and soundness**
- **This helps shift market perceptions. Potential mandate from NHTSA for V2V communications**

"Acceleration"

2020 - 2025

- **Five years from now, fully autonomous all-speed vehicles become more common**
- **V2V capabilities are likely to be embedded in all new vehicles and the increase in scale drives down costs, making the technology accessible to a larger segment of consumers**

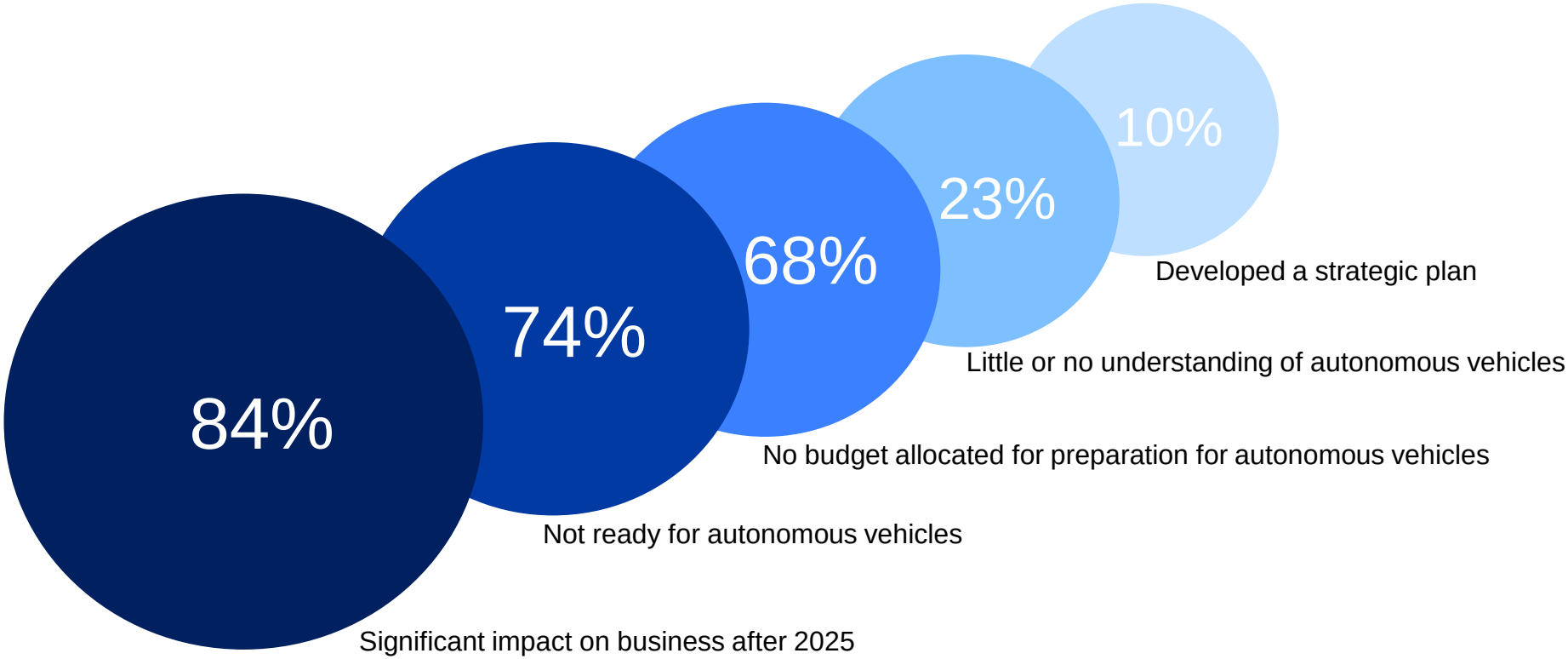
"Full Speed"

2025 - 2050

- **In 2025, a broad-based transformation begins. All new vehicles have autonomous capabilities and existing vehicles are potentially retrofitted**
- **Over the next 25 years, integrated driving emerges, a web of information is flowing between vehicles and infrastructure tightens. A "new normal" is realized by 2050**

Insurance Industry View on Timeline

Currently, there is significant skepticism among insurance leaders about the potential for autonomous vehicles to transform the industry - few insurers have taken action, most likely because many believe the change will happen far into the future, if at all

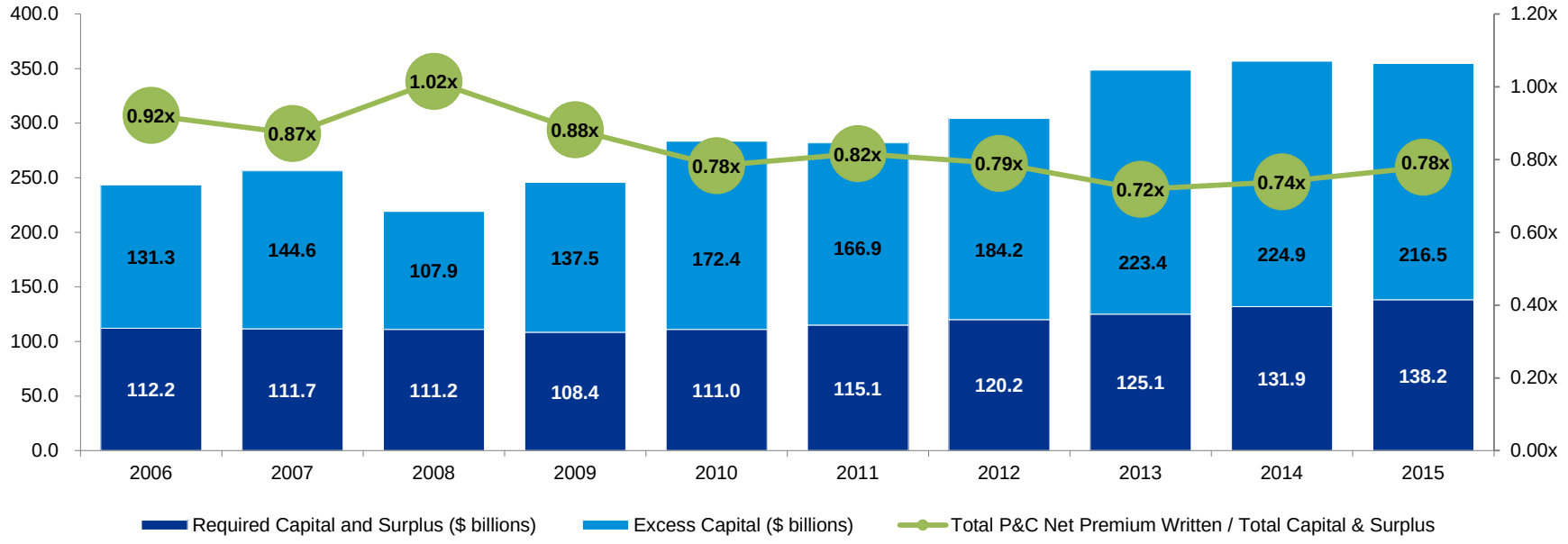


Source: KPMG LLP's 2015 Automobile Insurance in the Era of Autonomous Vehicles Survey Results

Insurer Excess Capital

The good news is that personal auto insurers have lots of capital, giving them significant financial flexibility. The bad news is that this large capital cushion may also give many a false sense of security

Capital Position of Top 15 Personal Auto Insurers' Overall P&C Businesses[1]



Note: (1) 2015 statutory P&C insurance data aggregated for the top 15 writers of private passenger auto direct premium written, based on SNL groups / unaffiliated companies. Required capital was calculated by dividing total P&C NPW by two given an assumed NPW / capital & surplus ratio of 2:1. Excess capital is then calculated by subtracting required capital and surplus from total capital & surplus of the top 15 personal auto insurers on an aggregate basis. Source: SNL Financial

Insurer Impact

Autonomous vehicle technology will result in a dramatically safer driver experience, thereby significantly impacting the insurance marketplace by reducing traffic fatalities and other losses

Insurance

Auto insurance
Claim frequency will fall, ultimately leading to lower premiums

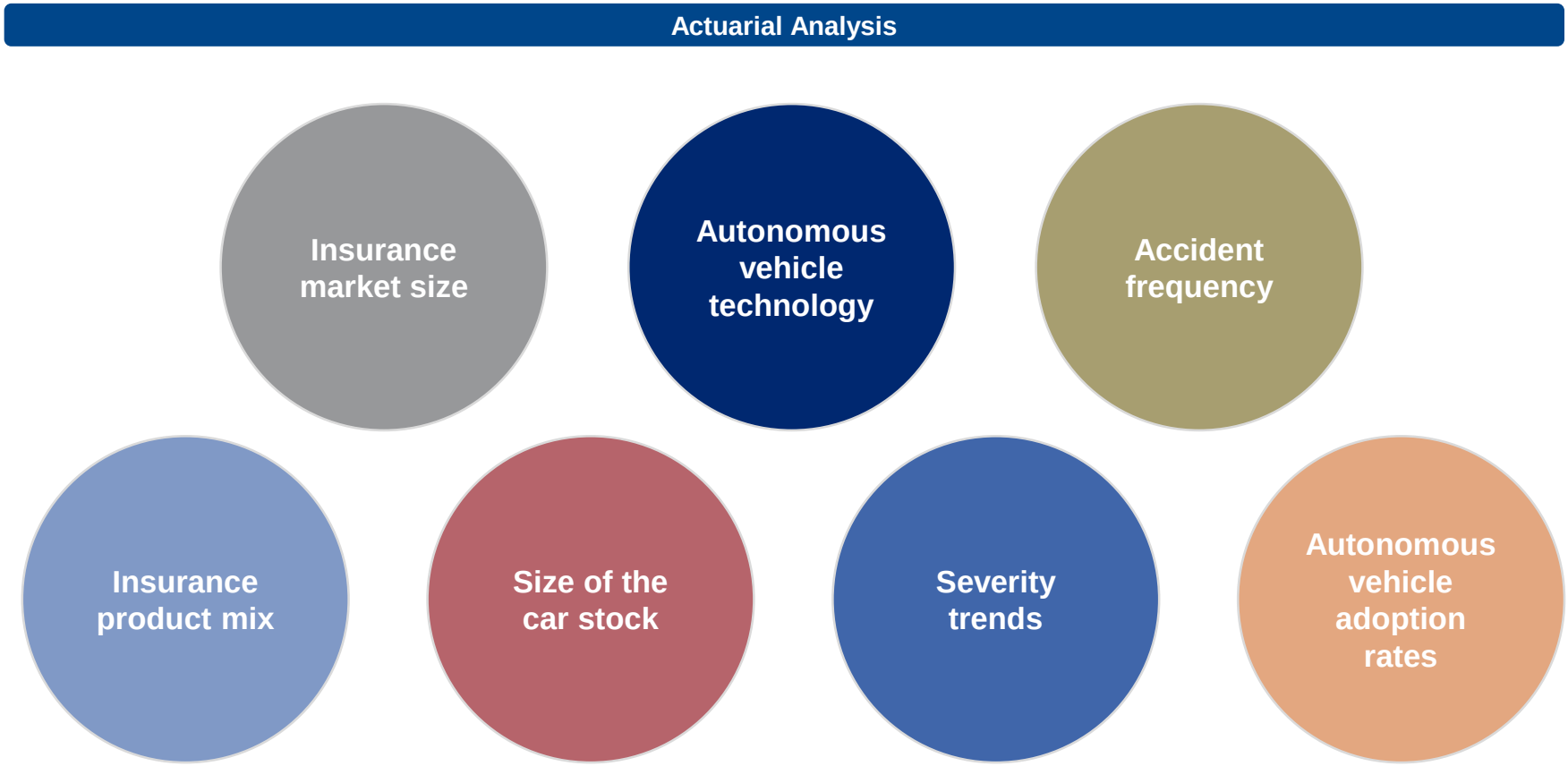
Life and annuities
Mortality tables will be impacted – road traffic accidents leading cause of death for ages 15 to 34

Workers' compensation
6% of claims costs arise from auto accidents

Source: KPMG LLP actuarial analysis and US Centers for Disease Control and Prevention (2010)

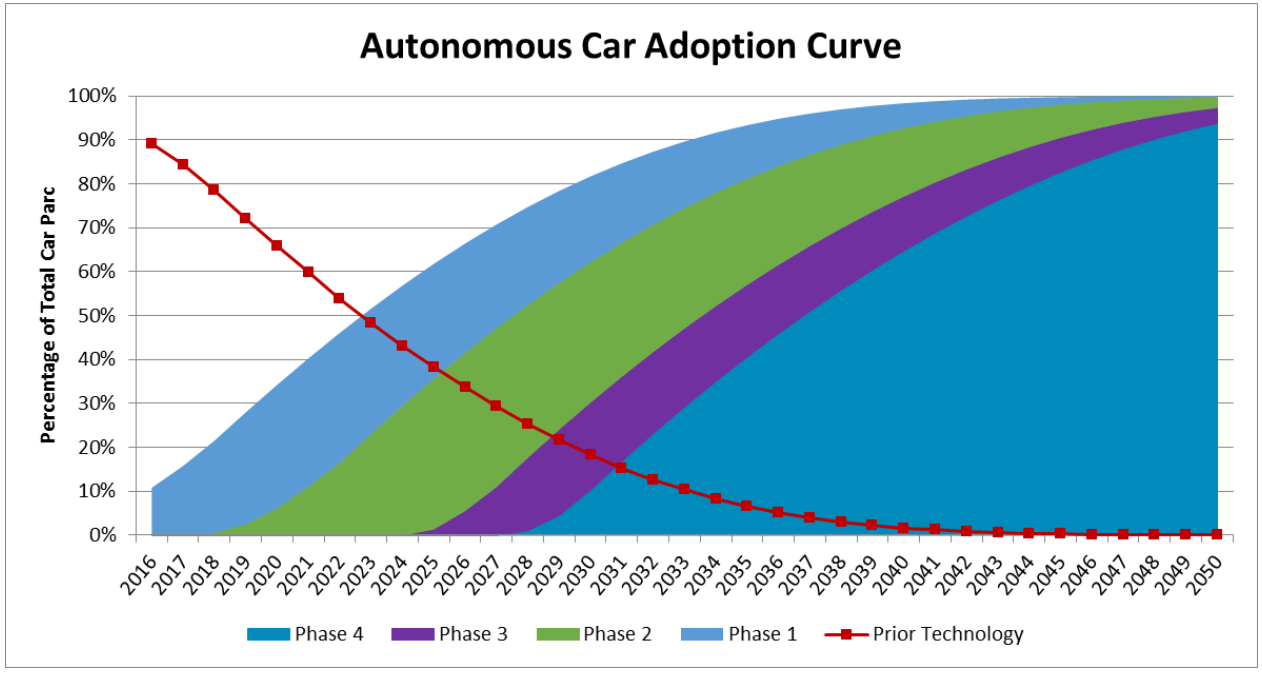
Actuarial Analysis

Working closely with our automotive team and leveraging their extensive research, KPMG's Actuarial Team developed models to translate the technology and market changes in order to demonstrate the potential impact on auto insurer performance



Adoption Assumptions

KPMG developed a model to test the potential effects of Autonomous vehicles on the auto insurance marketplace. The first assumption of the model mapped the cumulative effect of the four phases of advancing technology (per the baseline scenario) on the stock of total cars. By 2028, cars with some degree of automated controls could account for over half of those in use and nearly all vehicles by 2050.



Commentary

- The baseline scenario uses reasonable assumptions based on reviews of industry literature around introduction timelines and capabilities of new phases, and turnover of the car park.
- Note the change in car stock takes place as vehicles are retired and replaced
  - It could accelerate if there is a:
    - Surge in demand for the new capability
    - Government mandate
    - Widespread retro-fitting

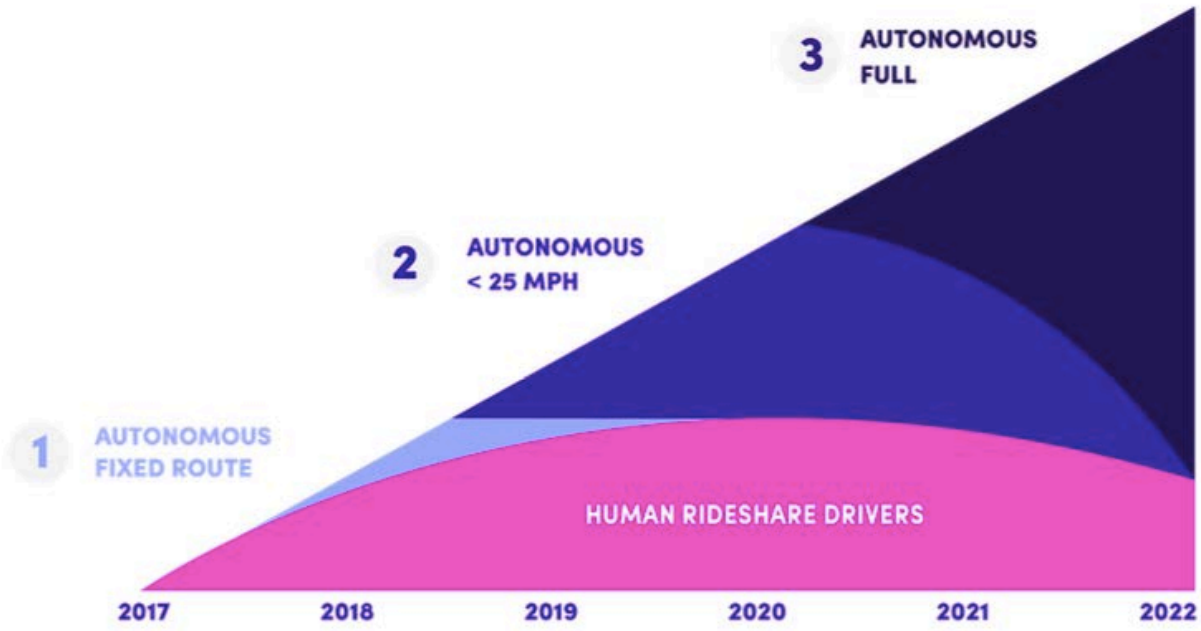
Source: KPMG LLP actuarial analysis

Lyfts Point of View on Autonomous Technology Roll Out

Lyft says robots will drive most of its cars in five years

Expect to see semi-autonomous vehicles driving on fixed routes by 2017 in a subscription model.

BY JOHANA BHUIYAN · @JMBOOYAH · SEP 18, 2016, 9:15A



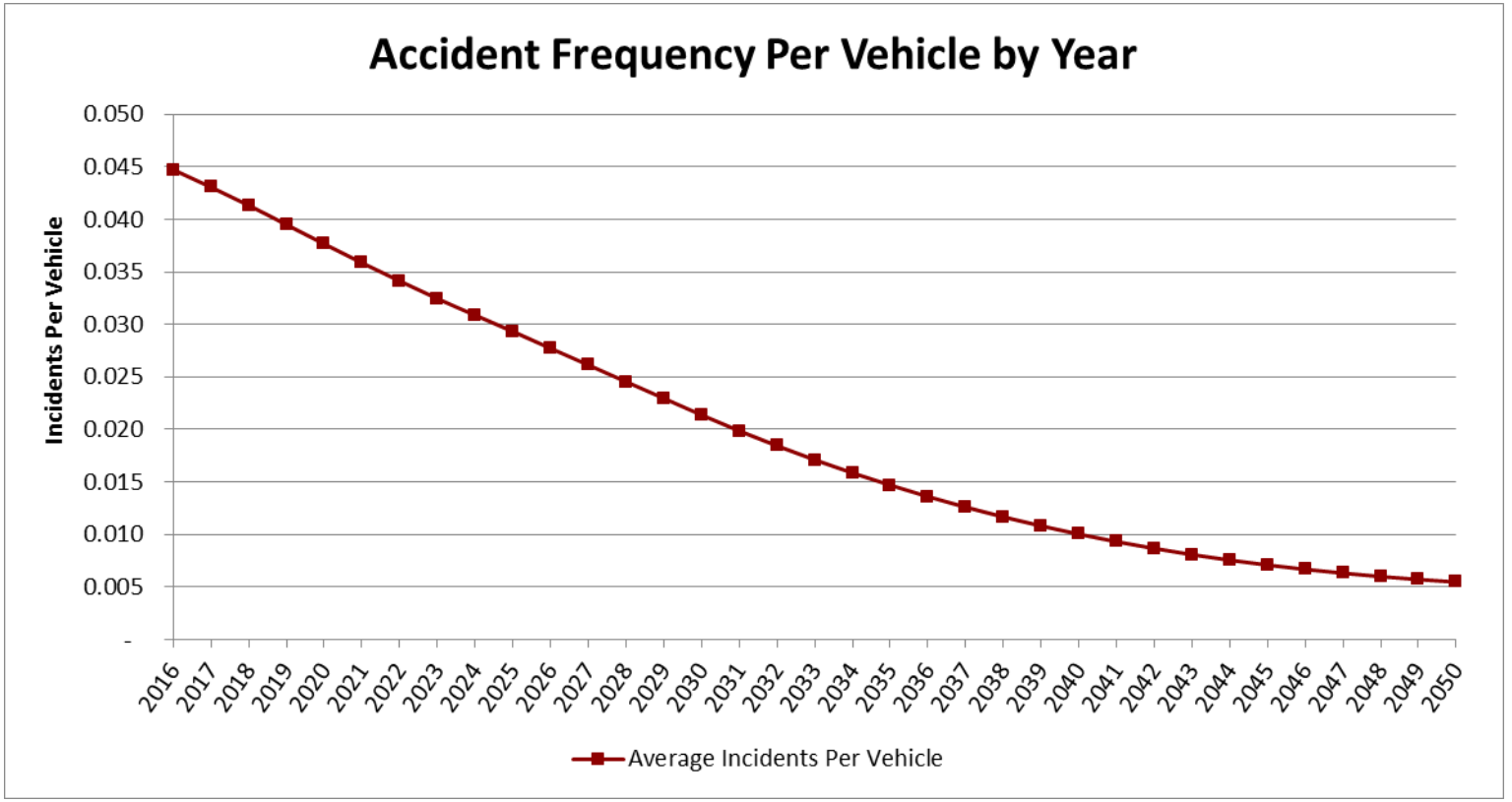
Following the significant investment in Lyft by General Motors in early 2016, John Zimmer, the Lyft CEO gave a widely followed interview laying out the plan of the ride share company to employ the new technology.

A few months later, GM bought Cruise, an automotive technology innovator.

Personal adoption of the technology will likely lag the commercial applications.

Accident Frequency

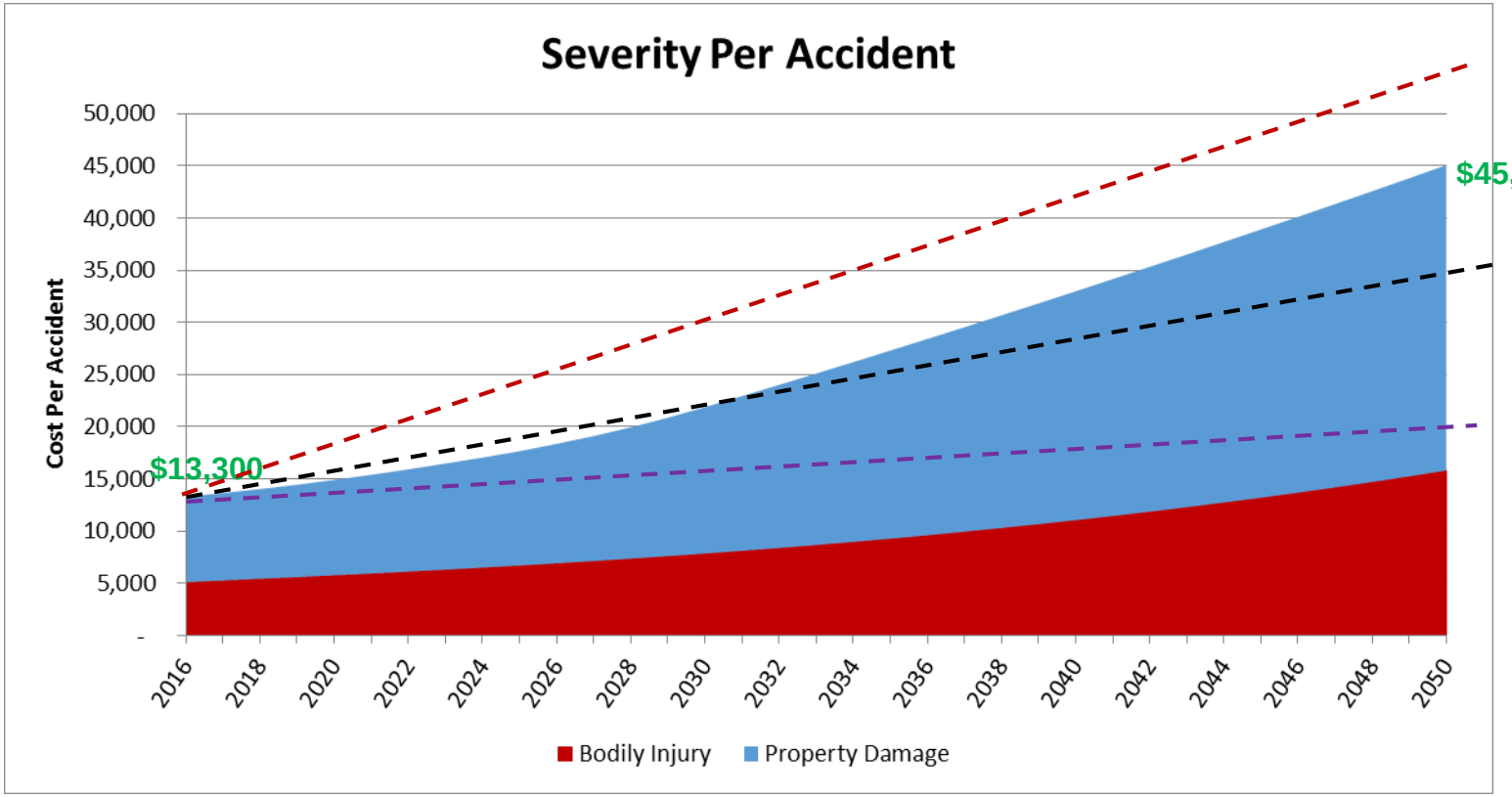
Given the new safety technology in autonomous vehicles, the KPMG Actuarial Team predicts a potential 85% reduction in accident frequency by 2050, which is the largest driver of loss reduction



Source: KPMG LLP actuarial analysis

Loss Severity

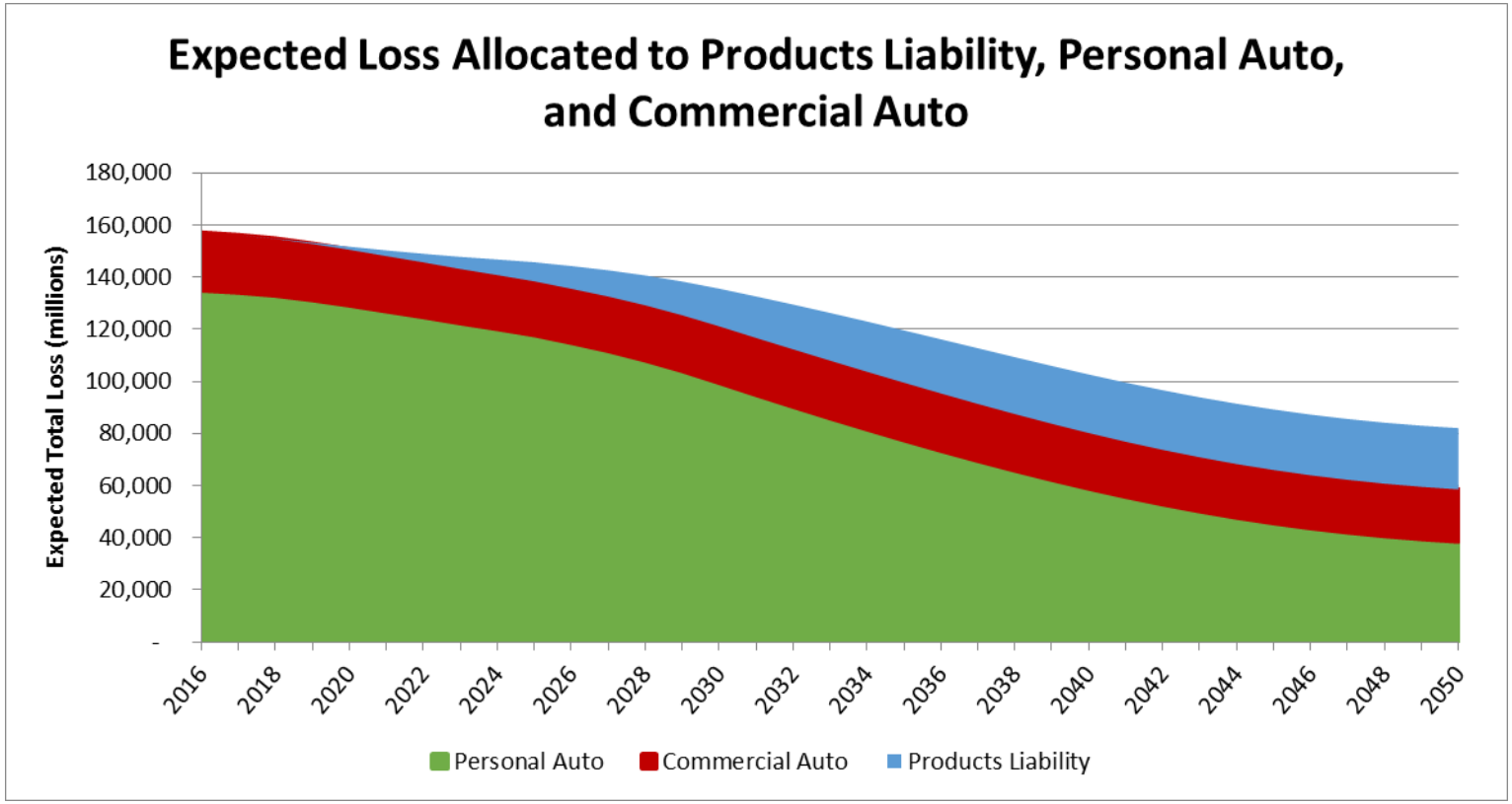
The KPMG Actuarial Team modeled severity broadly in line with inflationary trends. There are, however, a variety of different potential scenarios that could have a significant impact on severity over time



Source: KPMG LLP actuarial analysis

Industry Loss Costs

Safer vehicles could result in total auto insurance industry losses decreasing by 50% by 2050 with commercial and product liability accounting for a larger portion of the loss pie



70% decrease in personal auto losses

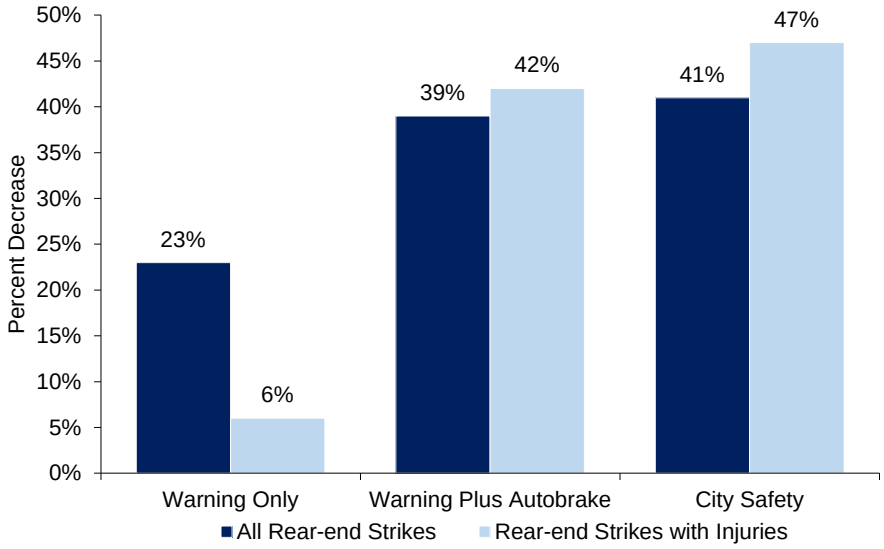
Source: KPMG LLP actuarial analysis

Automated Vehicle Technology is Making Driving Safer…Today

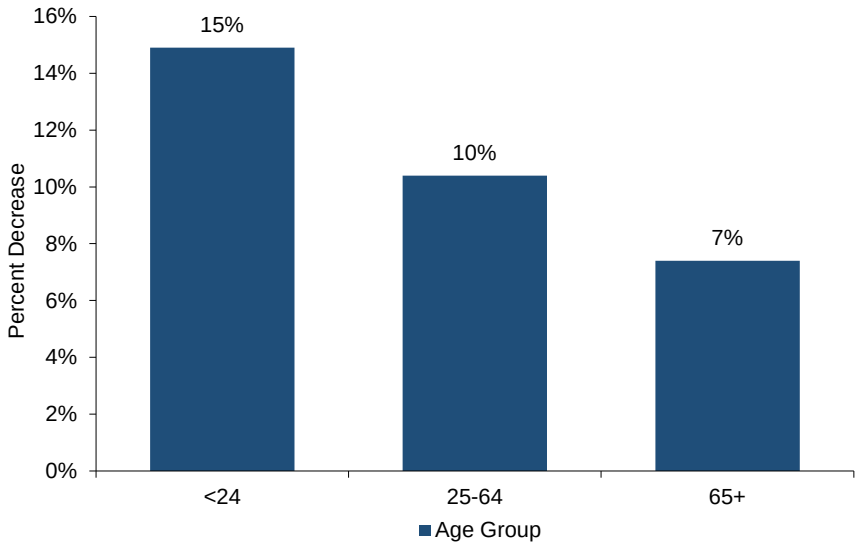
Crash avoidance features which underpin autonomous vehicle safety technology are already improving the safety profile of vehicles…

Impact on Driving Safety of Vehicles With Crash Prevention Technology vs. Vehicles Without It

Vehicles With Front Crash Prevention Technology[1,2]



Prop. Damage Liability Claim Frequency by Driver Age[3]

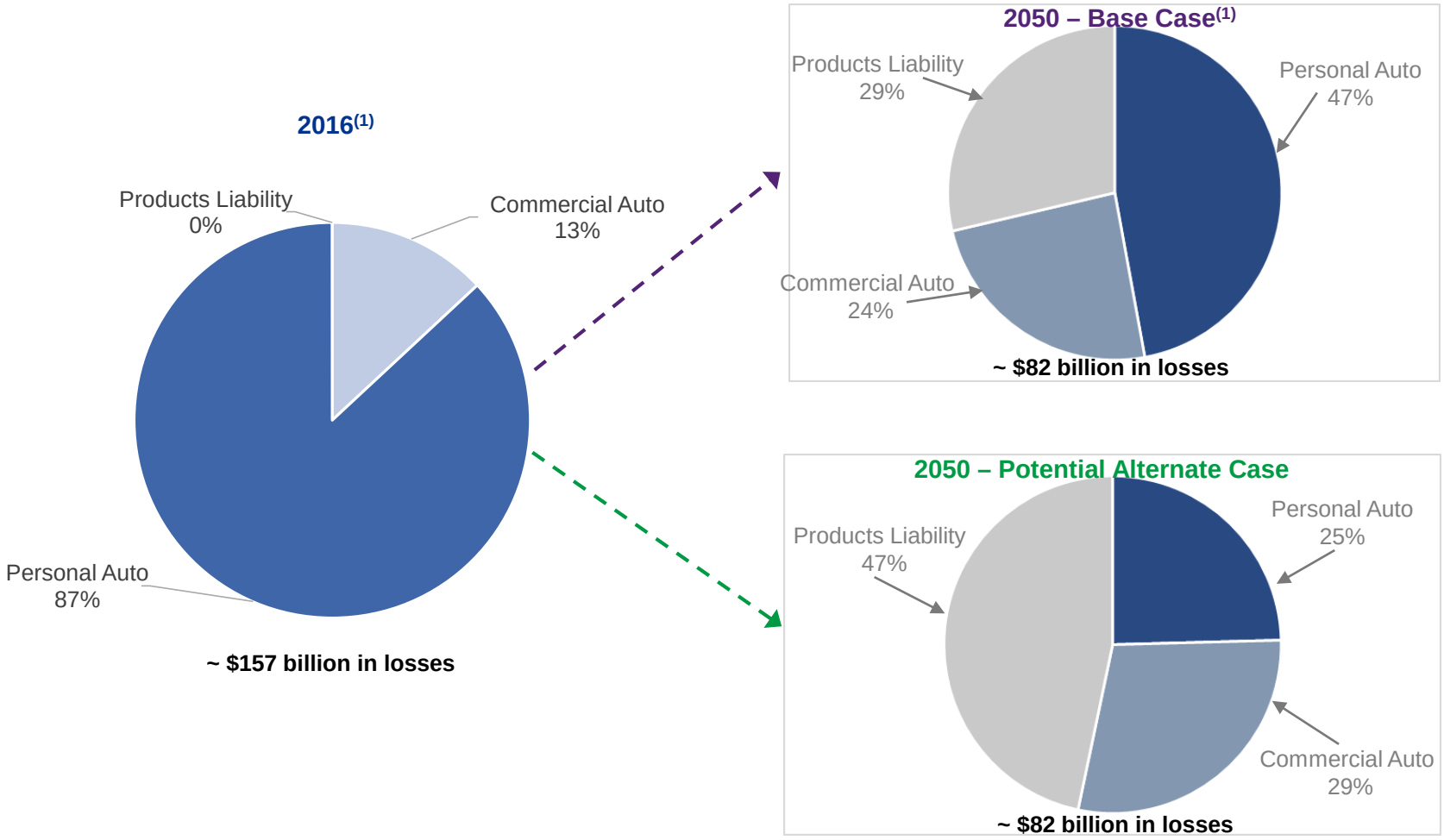


…furthermore, according to recent findings[1], more than 700,000 police-reported rear-end crashes in 2013 could have been avoided if the vehicles involved were equipped with autobrake technology

Note: (1) Study analyzes police-reported rear-end crashes in 27 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; and (3) Study examines Honda's camera-based and radar-based forward collision and lane departure warning systems for vehicles equipped with these features vs. vehicles without them, bucketed by driver age group. 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'

Potential Business Mix Composition

While personal and commercial auto insurance represents the whole loss pie in 2016, products liability insurance will play a greater role in the future as the vehicles themselves make more driving decisions



Note: (1) Based on KPMG LLP actuarial analysis

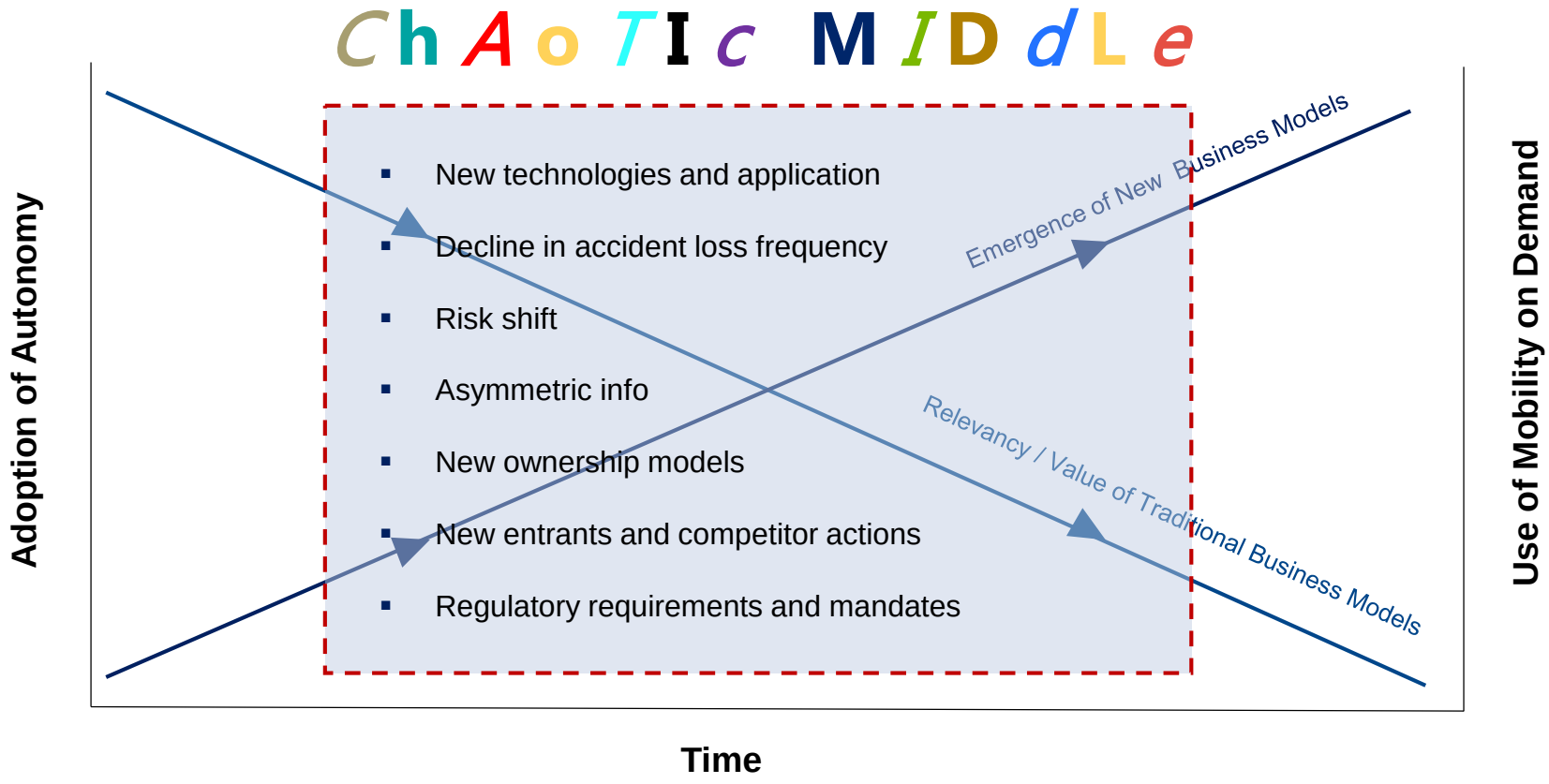
The Consumer, the Autonomous Vehicle and Insurance

From safety to saving money on insurance dollars spent, autonomous vehicles have the potential to positively impact consumers in a variety of different ways, although associated risks of this new technology also must be considered

	Considerations	Potential Benefits
General	▪ Cost of vehicle ▪ Cyber threats ▪ Privacy issues ▪ Ownership of data ▪ Access to mobility (urban areas most likely to benefit)	▪ Safer vehicles = less auto related deaths and injuries ▪ Autonomous mobility-on-demand and cost effective, tailored means of transportation ▪ Greater access to mobility for urban youth, the disabled, the elderly and other segments of the population
Insurance Related	▪ Lower premiums most likely to benefit those utilizing autonomous vehicles more ▪ Pricing transparency if included in sticker price ▪ Insurance industry disruptions – job impact	▪ Lower losses lead to lower premiums ▪ The “new” two car family – now one car family supplemented by mobility-on-demand – lower overall insurance (and vehicle) spend

The 'Chaotic Middle' Begins

The transformation to a future marketplace defined by full autonomy and pervasive mobility on demand will be highly disruptive. We anticipate a 'chaotic middle' over the next 10-15 years, during which business models and the competitive landscape are transformed. Future success will require the ability to anticipate and adjust to rapid change

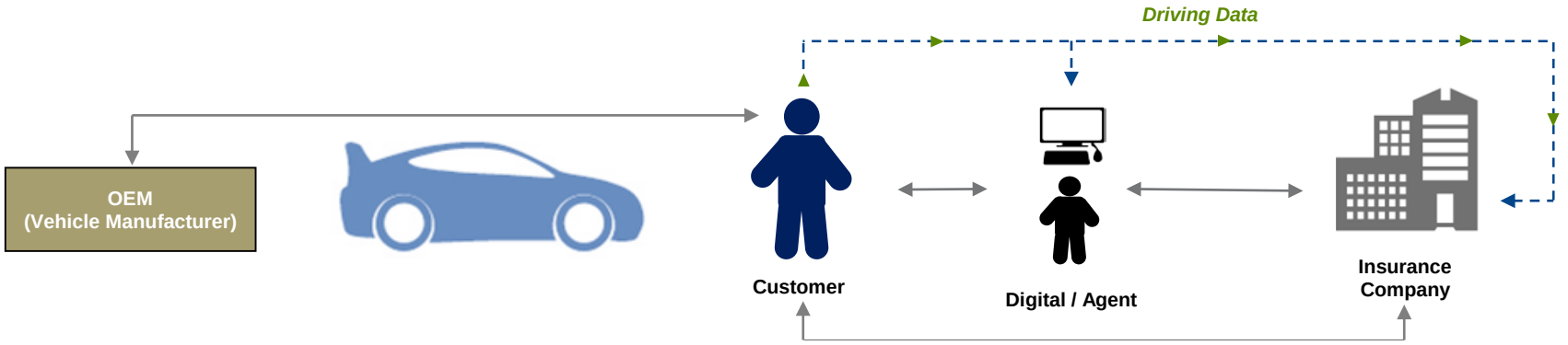


The OEM Advantage - Data and the Customer Relationship

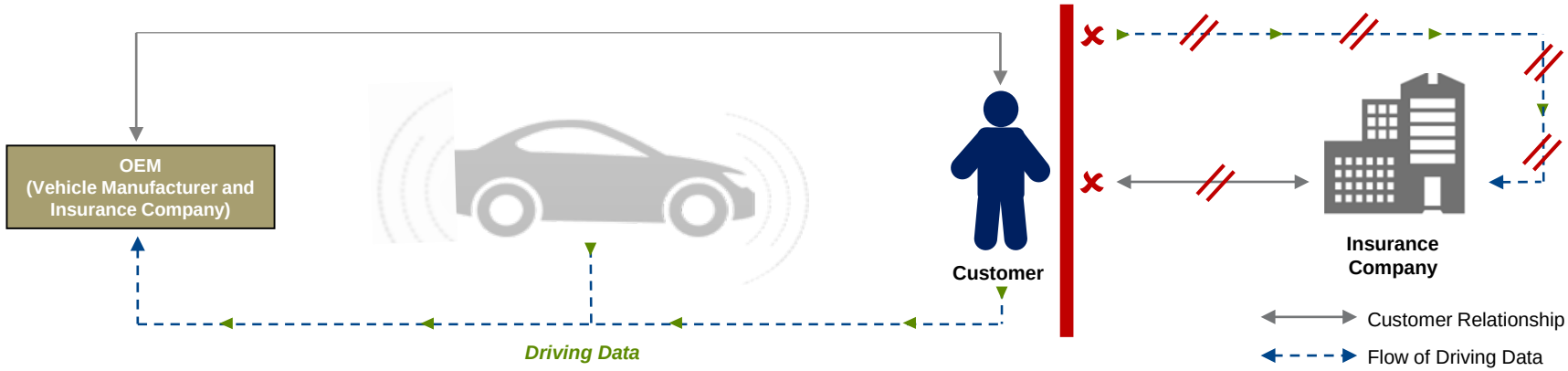
Ultimately, the original equipment manufacturers ("OEMs") have the ability to not only control the data, but also the customer relationship, thereby dramatically altering the traditional auto insurance model

Illustrative Process of Buying Automotive Insurance

Today



The Future



Potential Business Models

The (re)entrance of OEMs into insurance could take a variety of forms

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**	▪ Fees	▪ Commissions	▪ Underwriting profit and investment income (annuity) ▪ Vehicle and parts sales	▪ Underwriting profit and investment income (annuity) ▪ Vehicle and parts sales
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

Preparing for the Future – Auto Insurance Considerations

1. Acknowledge that the Autonomous Vehicle Transformation is Real
2. Understand Exposure
3. Evaluate Business Strategy / Consider Diversification Options
4. Identify and Monitor Leading Indicators
5. Prepare Operations
6. Understand Cost Structures
7. Align with Other Insurers and Form Partnerships

Questions

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