



Casualty Actuarial Society Innovation's Contribution to Financial Strength

November 2019

How Critical is Innovation in this Stable Industry?

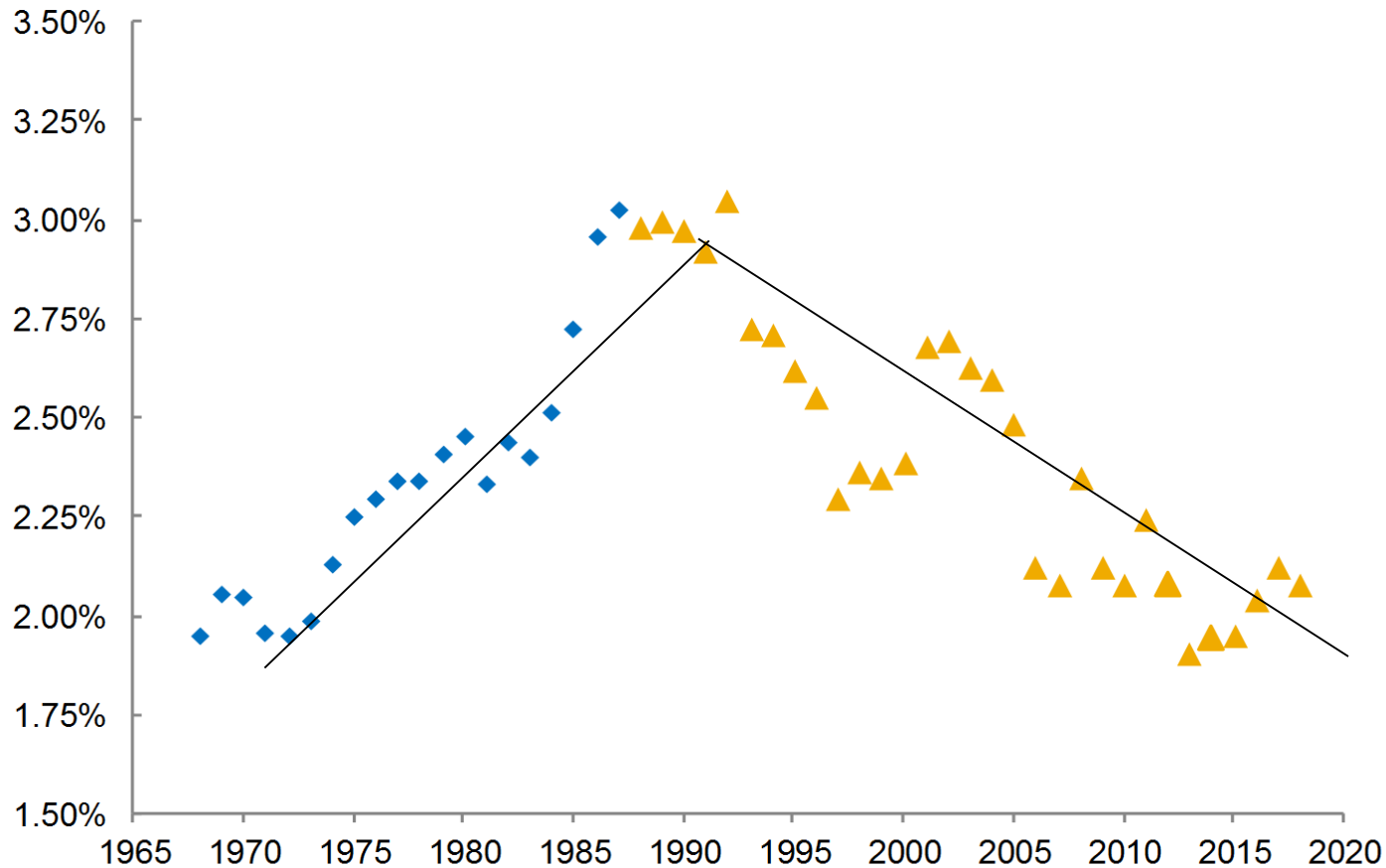
'87	Company	'18	Δ	Disposition	'87	Company	'18	Δ	Disposition	'87	Company	'18	Δ	Disposition
1	State Farm				34	America				67	Orion Capital			
2	Allstate				35	Employers Re				68	Teledyne			
3	Aetna				36	Zurich				69	NJ Manufacturers			
4	AIG				37	Motors				70	Westfield			
5	Liberty Mutual				38	Progressive				71	Utica National			
6	Nationwide				39	Commercial Union				72	John Hancock			
7	Hartford				40	California State Auto Assn				73	Foremost			
8	Farmers				41	Sentry				74	State Auto Mutual			
9	Travelers				42	Associated Insurance				75	Country Companies			
10	CIGNA				43	Auto-Owners				76	Selective			
11	CNA				44	Erie Ins. Exch.				77	Clarendon			
12	Continental				45	PMA				78	American Mutual Liab			
13	USF&G				46	Interins Exch Auto Club S. CA				79	Shelter Insurance			
14	Crum & Forster				47	Auto Club of MI				80	Mercury General			
15	Fireman's Fund				48	Berkshire Hathaway				81	Skandia America			
16	Chubb				49	Southern Farm Bureau				82	Employers Mutual Casualty			
17	Kemper				50	Cincinnati Financial				83	Zenith National			
18	St. Paul				51	Munich Re				84	California Casualty			
19	Royal				52	Employers of TX				85	Alfa			
20	USAA				53	Swiss Re				86	ALLIED			
21	General Re				54	Metropolitan				87	Argonaut			
22	Lincoln National				55	Old Republic				88	Arkwright			
23	Home				56	Federated Mutual				89	Fremont Indemnity			
24	Prudential				57	Ford Motor				90	Allendale			
25	American General				58	Colonial Penn				91	Medical liab Mut (NY)			
26	American Financial				59	Nationale-Nederlanden				92	Penn National			
27	Transamerica				60	Amica Mutual				93	Central Benefits Mutual			
28	Reliance				61	Atlantic Mutual				94	Hartford Steam Boiler			
29	Safeco				62	Winterthur				95	Commercial Credit			
30	GEICO				63	20th Century				96	Grange Mutual			
31	American Family				64	Amerisure Companies				97	SAIF			
32	General Accident				65	Harleysville				98	American Bankers			
33	Ohio Casualty				66	W.R. Berkely				99	Motorists Mutual			
										100	Indiana Farm Bureau			



The Case for Innovation – Reflection on US Macro Trends

Inflection Point of Innovation in the Mid-late 80s

Calendar year incurred loss % of GDP

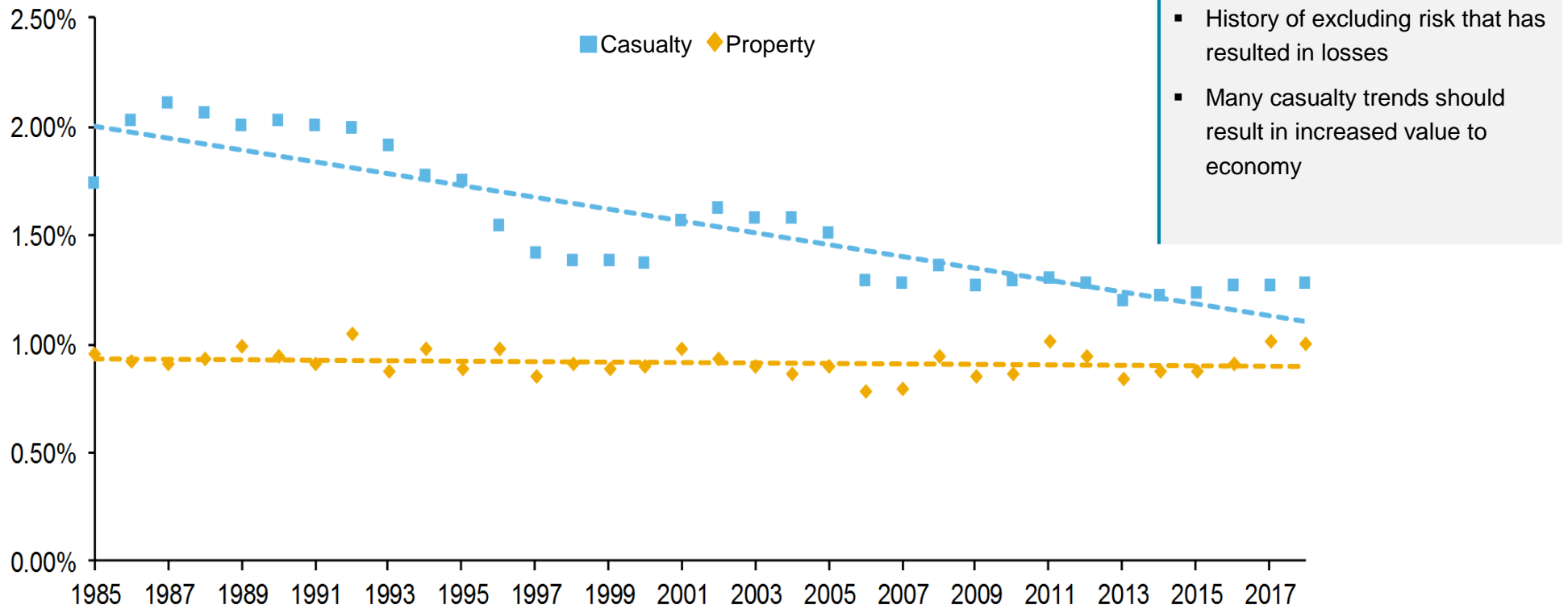


- P&C insured risk as share of GDP has been shrinking
- Decreasing trend since 1987

The Case for Innovation – Reflection on US Macro Trends

Casualty is the main contributor

Calendar year incurred loss % of GDP

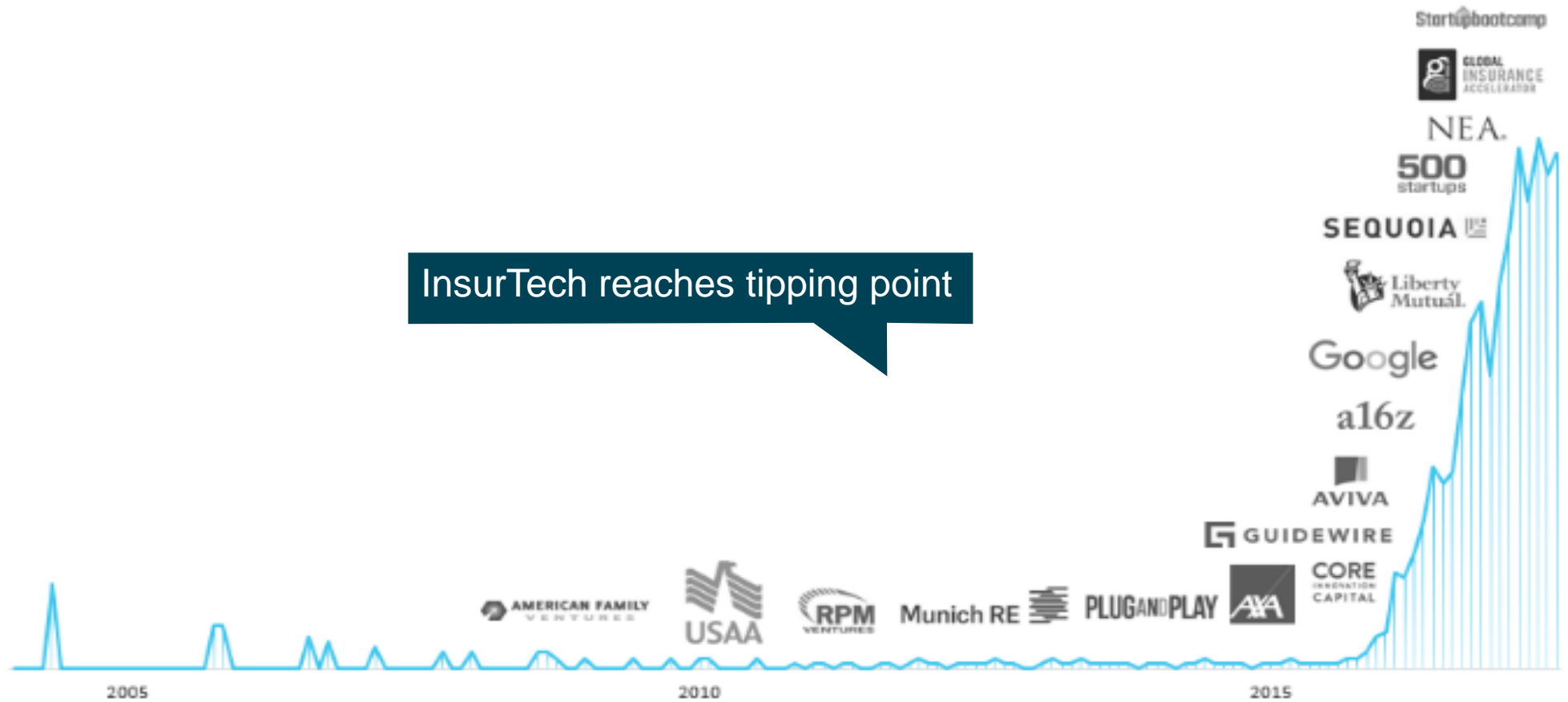


Primary Categories of Innovation



InsurTech Has Reached Tipping Point

Major players rapidly formed the ecosystem



Google Search Trends for "InsurTech"

Source: Sure Ventures

Proprietary & Confidential

Recent Investments Fall into Themes of Enabling Innovation and Disruption

Market opportunity

How is the technology enabling? Examples of Emerging Aon-partner innovators



- Digital marketing
- Online interaction models (e.g. P2P, gig economy)

- Improved **customer experience**
- Access to **new markets**, new insurable risks
- Opportunities for **new products**



- Process automation (e.g. RPA, NLP, Chatbots)
- Artificial intelligence/Machine learning
- Cloud compute/big data/data mining

- **Smart underwriting** and decision support tools
- **Connected data** across multiple channels
- New sources of **data to assess risk**



- Remote sensing (e.g. drones, spatial imagery)
- Connected devices, sensor technology
- Internet of things (IoT)

- **Enhanced data** for risk assessment
- Value added UBI analytics
- **Better risk mitigation**
- Emerging demand to insure new risks



- Distributed ledger assets
- Smart contracts

- **Enhanced integrity** and validation
- New risk products based on blockchain technology



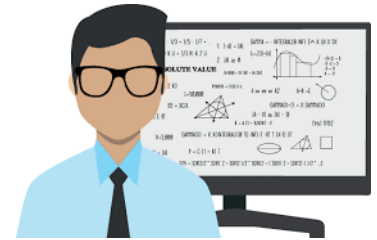
Source: Aon team analysis

Why has Insurance Attracted Attention for Potential Disruptors?

\$2 Trillion in 10-years

(\$B)

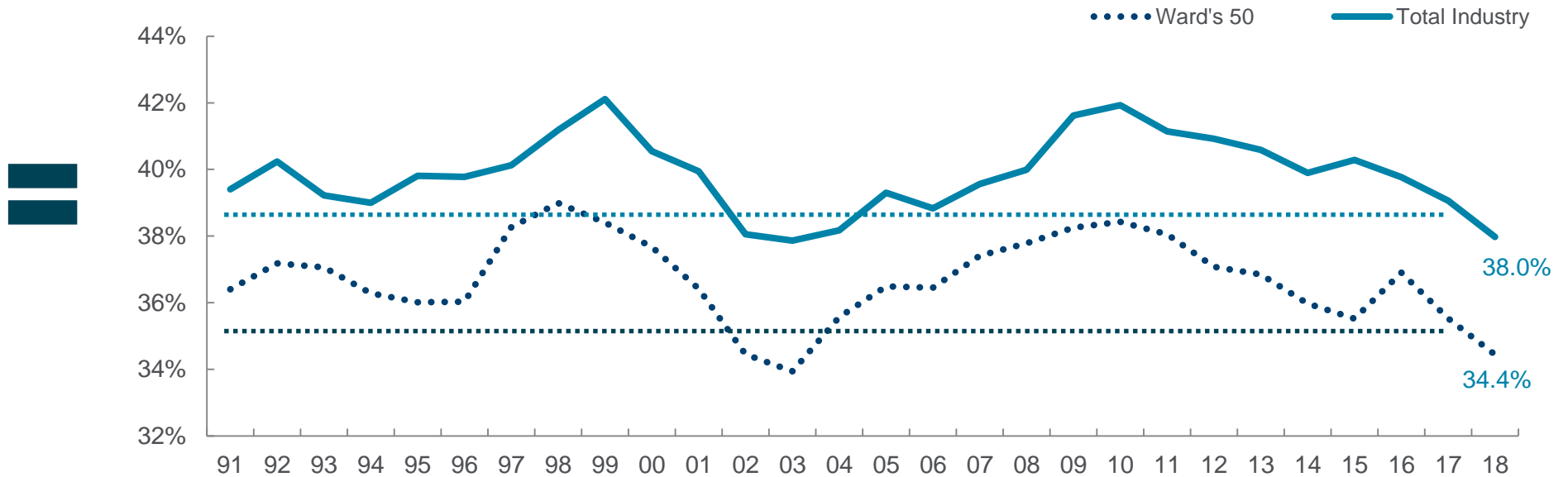
	Premiums Earned	Loss & LAE Incurred	Gross Margin
Personal auto	1,913	1,329	584
Homeowners	819	505	314
Other liability	547	359	188
Commercial property	417	261	156
Workers' Compensation	511	341	169
Commercial package	374	226	148
Commercial auto	289	201	88
Medical professional	99	60	39
All other	592	342	250
Total	5,560	3,624	1,936



Substantial Investment to Realize Expense Efficiencies



Total Expenses as % of Net Premiums Written



* Expenses include Underwriting, Loss Adjusting and Investment Expenses

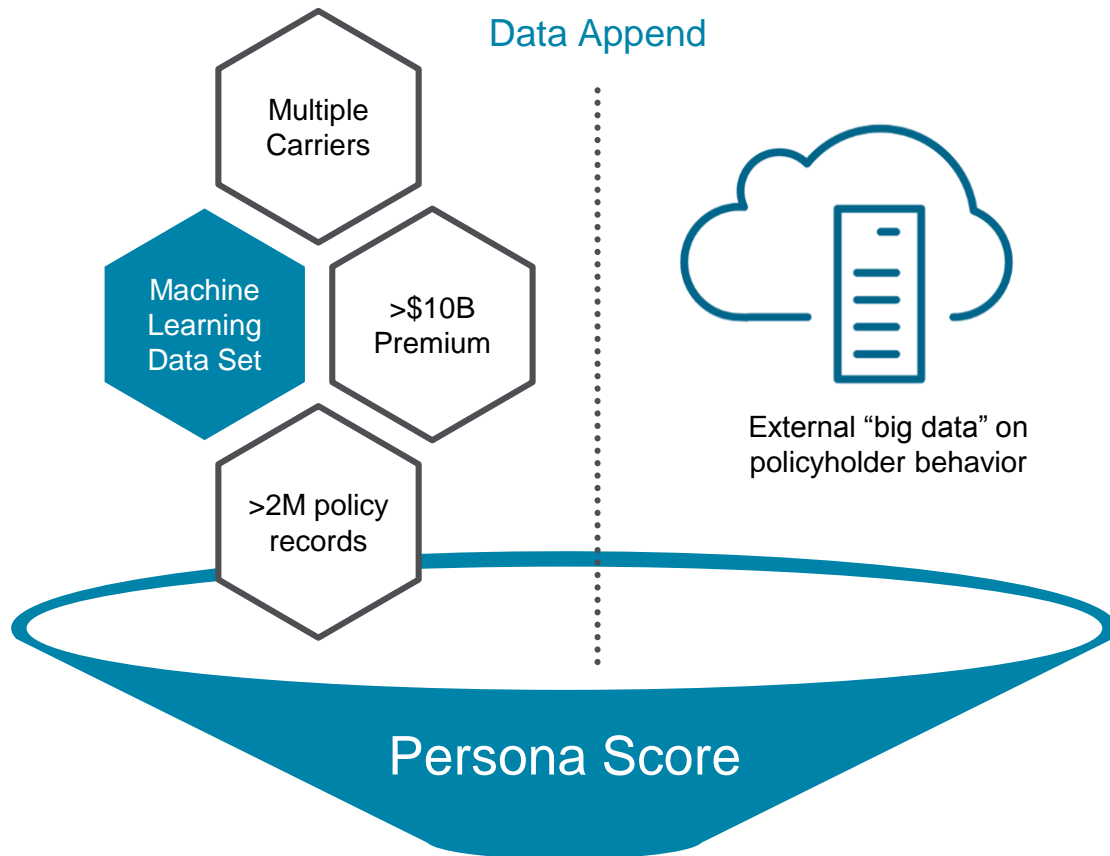
Machine Learning in Insurance: Data Harvesting




Groundspeed

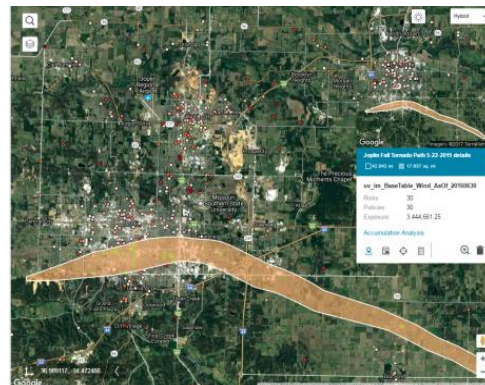
- Thousands of paper and PDF submissions
- Policy terms and loss run data extracted
- Perform actuarial analyses at scale on database of results

Machine Learning in Insurance: Persona Score



- Dozens of variables
- Disparate data sets
- Machine learning accommodates non-linear interaction effects

Claims Evolution

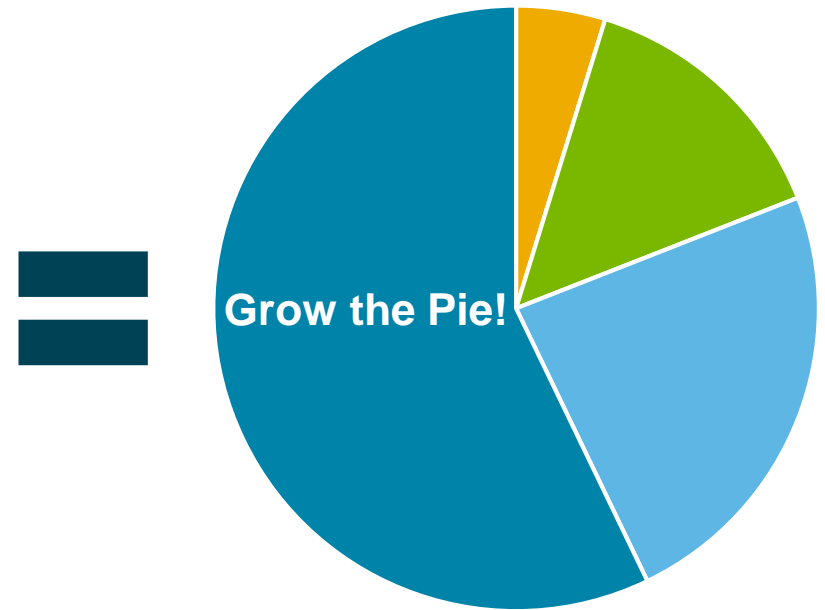


Challenges

Technological & Operational Innovation



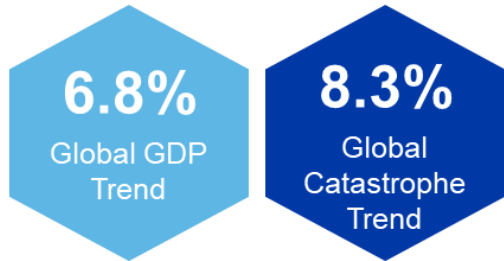
Product Innovation



Organic Growth Opportunities

Catastrophe loss trends

Catastrophes Losses Increasing

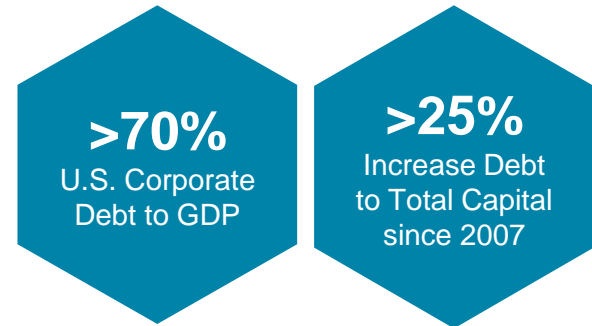
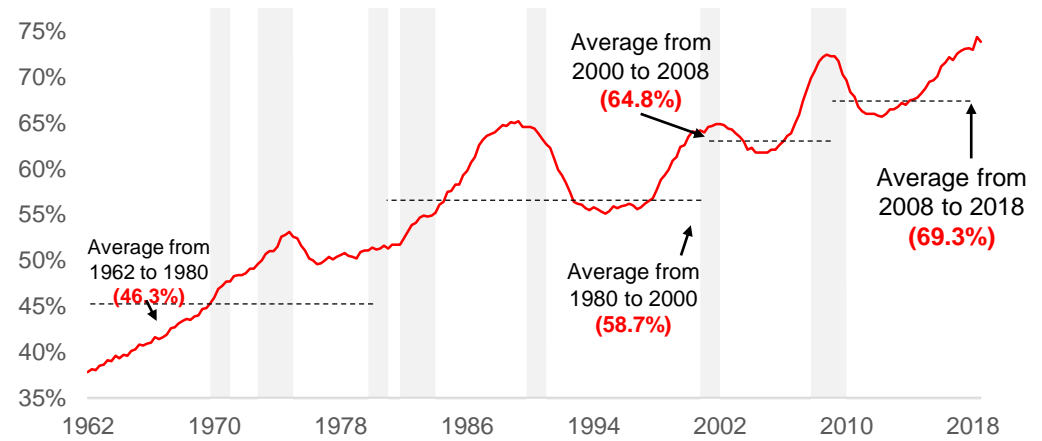


Significant Protection Gap

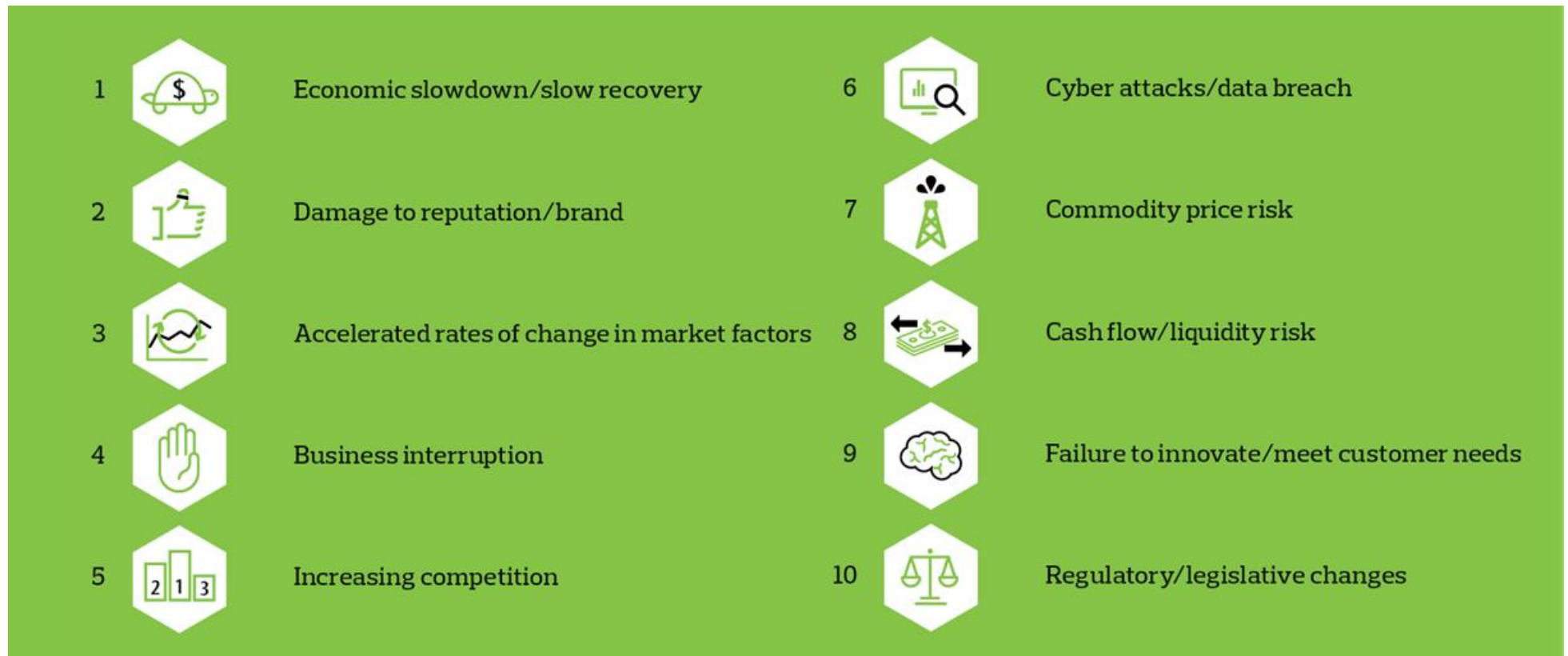


Corporate debt as a % of U.S. GDP

US nonfinancial corporations (core debt) as % of GDP



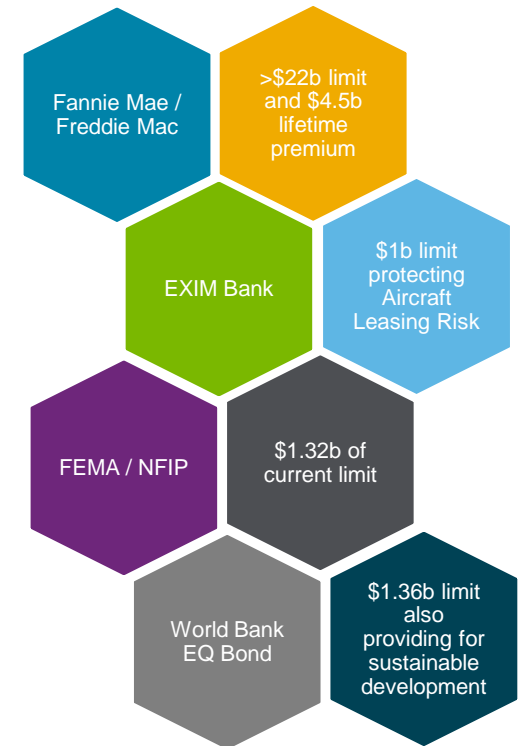
Top 10 Risks – Global Risk Management Survey



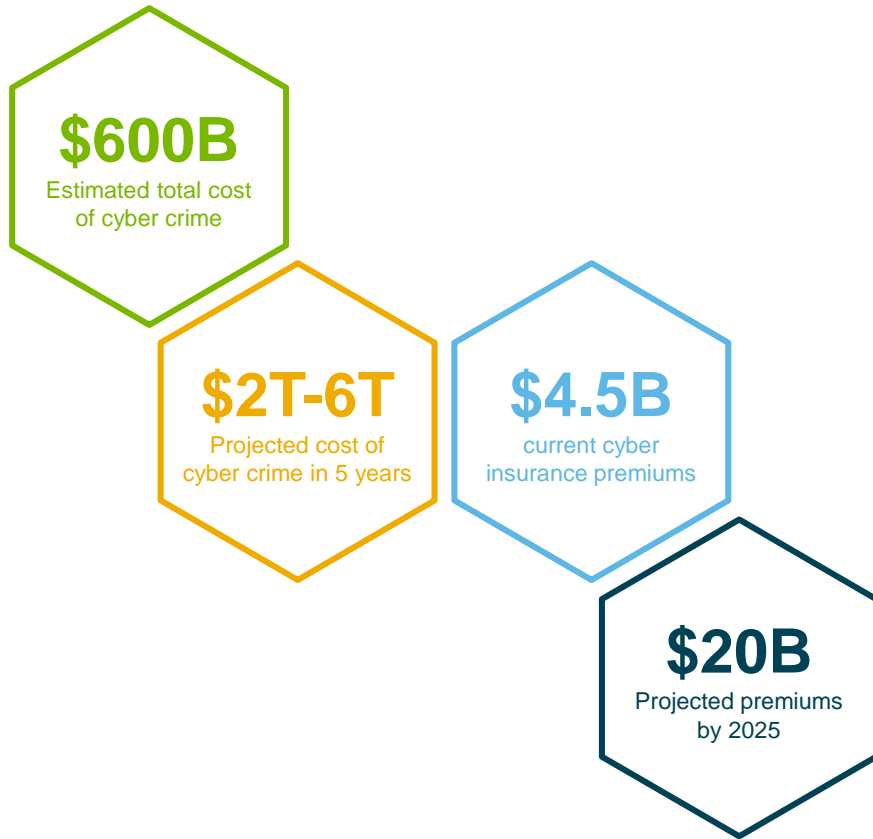
Public Sector – Current Partnerships and Opportunities



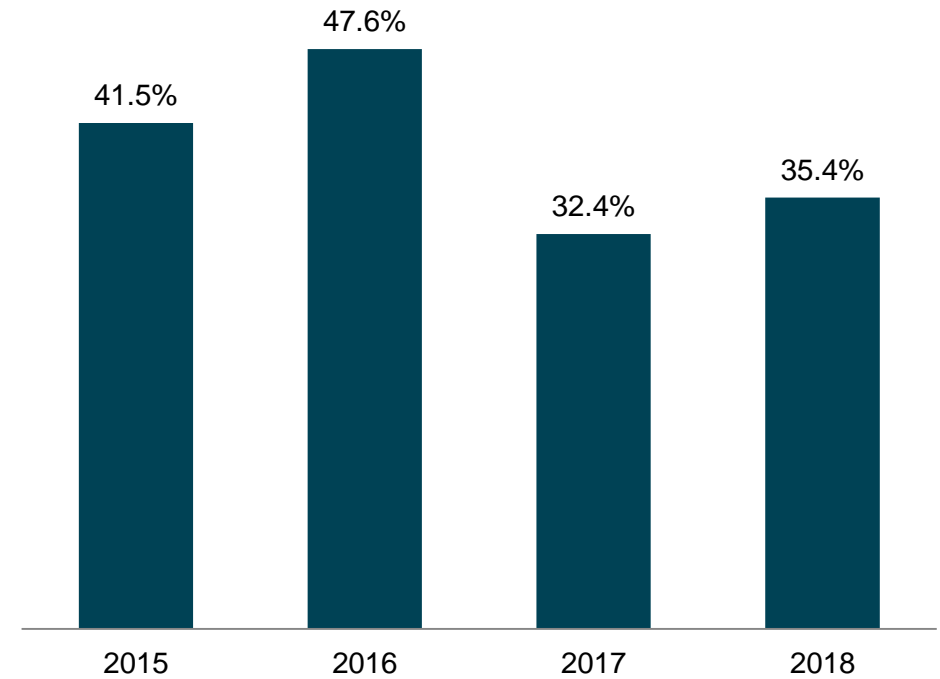
- Develop Innovative Solutions to Protect Sources and Uses of Funds
- Enhanced Risk Management Information
- Promote Long and Short-Term Financial Obligations
- Create Proactive Resiliency / Mitigation Strategies



Cyber Risk and Cyber Insurance



US Cyber Insurance Industry Loss Ratio (2015-2018)



Notes

- 1 Sources: CSIS, Allied Market Research, Allianz, S&P Global, Aon
- 2 Loss ratios analyzed by Aon from NAIC statutory filings

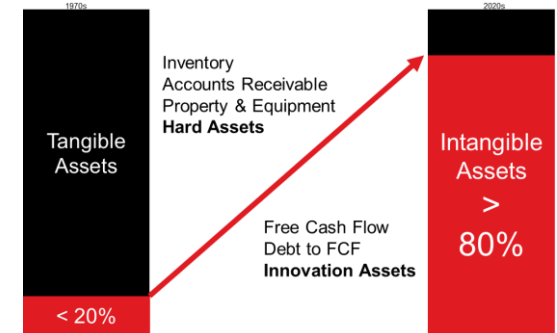
But We Are Barely Scratching the Surface Here...



AUTONOMOUS VEHICLES



TECHNOLOGY RELIANCE



INTELLECTUAL PROPERTY



Carbon, Plastic & Other Contaminants Roles...

CLIMATE CHANGE



DIGITALIZATION



INFRASTRUCTURE – P3



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