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# Whitepaper

## Business Case for Connected Insurance Ecosystem

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A Larsen & Toubro  
Group Company



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## 1 Synopsis

Insurance as an industry has been impacted by consumer behavior like what is being witnessed in Banking and Retail industries. The NAIC (National Association of Insurance Commissioners) data on written premium indicates that there is a slowdown in insurance premium collections. The pattern clearly suggests shifts in buying behaviors on the personal and commercial insurance side fueled by easier access to data and how goods and services are consumed by people all over the world. Changing population trends have also impacted some of this with a visible slowdown in population growth. While the traditional sources of historic data have long been relied on for product design and go to market strategies, access to data via sensors in different areas of the insurance life cycle have opened a new avenue for product design shifting the attention from pure risk transfer to elements of risk mitigation and risk prevention. For the newer insurance entrants that do not carry the legacy of old transactional systems, a connected ecosystem presents a bigger opportunity. Riding this wave of technology proliferation traditional insurance carriers have started also exploring IoT connected sensors as packaged offerings outside of the typical telematics product bundles, exploring opportunities in property, specialty areas and workers comp.

The data collected as part of this new wave of products being rolled out will set the stage for new product categories that are priced competitively and can change pricing dynamically in response to market situations triggered by usage or natural events. In addition to pricing, the process of underwriting and claims notification are also going to be areas getting impacted by the entry of sensors. These devices could potentially be connected to the backend systems of insurance carriers feeding real time data, this could be information that in today's world is typically updated after the fact or by human operators. The business use cases are evolving and in the next few years' carriers and insurance tech companies are poised to shape the future of an ecosystem of connected devices that will make the selection, pricing and underwriting of risk change in ways we are only beginning to learn.

The ecosystem of connected devices will provide insights to predict a future that most insurance carriers did not have the infrastructure to foresee a few decades ago. Today, sensors present an opportunity to manage and prevent risks in an ecosystem, giving it a whole new dimension.

In this white paper, we discuss how IoT-connected devices in a Connected Insurance Ecosystem, can be leveraged for risk analysis. We will also highlight how data from different sources can be used for analysis and decision making, with insights based on current information vs historic experience.

## 2 Analysis and Background

The industry's approach to 'risk' has been relatively unchanged since the very beginning. Simplistically put, the model has leveraged the concept of risk transfer, coupled with the application of math of probability on historical data sets. At the heart of any insurance product, the fundamental model has stood the test of time, and this has worked in the absence of devices that can provide real-time data, in an infrastructure hosted outside the insurance provider's network.

Times have changed and technology has evolved to the point where we have the infrastructure, and the means to capture data pertaining to usage, movement and various other external factors that are pertinent to the entire risk that an insurer maybe covering. From time immemorial outside of flight, Man's strongest desire has been to be able to predict the future. The entire insurance industry has thrived on historic data, and the ability to calculate the probability of an event occurring based on the historic experience. An ecosystem with connected sensors, presents a situation where predicting the future is possible with eyes, ears and insights into the risk covered by the insurance carrier.

IoT-connected devices for the purposes of this white paper fall under the following broad categories.

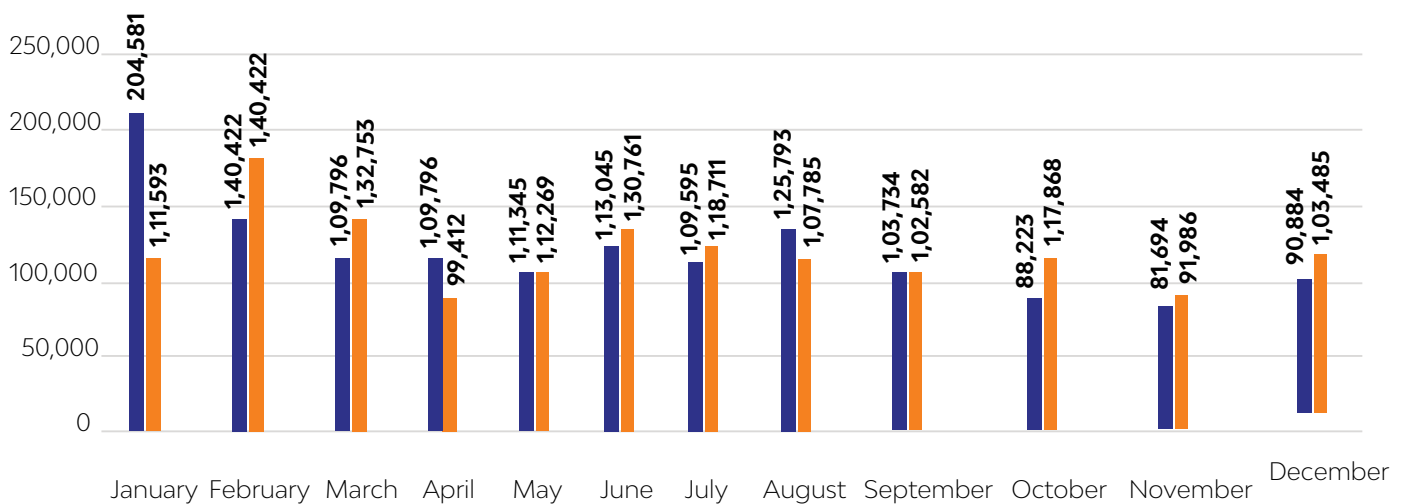


We foresee the evolution of a connected ecosystem under these six broad categories of devices, which will fuel data analysis of sensor data with a flavor of demographic info, historical experience and third-party data. This data can be consumed by complex algorithms forecasting trends and providing insights at the most granular level of Risk classes. This can happen under a coverage or sub coverage as defined in marketable products sold by an insurance carrier.

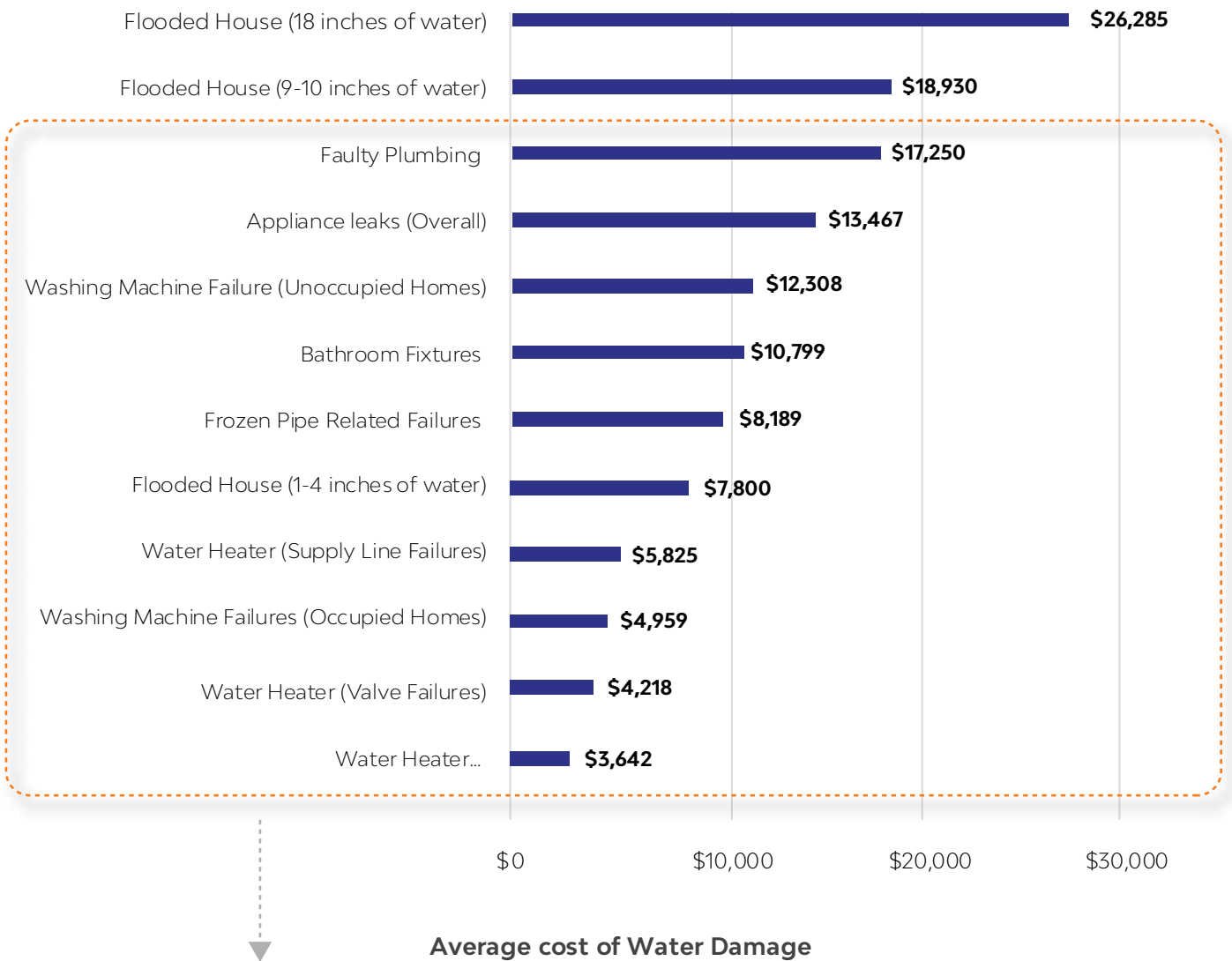
This paradigm shift will be visible in a more responsive risk assessment model, where the calculation metrics and the risk assessment algorithms will help experts assess and price insurance products. They can use scoring frameworks in a manner, where the pricing updates can be done in an ongoing manner based on the sensor data that is collected.

The results of this change in decision points will be witnessed with outcome-based risk assessment and added benefits of competitive pricing and predictive analytics, that would be closer to the actual experience. In cases where risk prevention is not a possible outcome, the sensors could serve as recording tools for event data or real-time product monitoring validating assumptions used for product pricing or definition.

In a study from the National Insurance Crimes Bureau, the average cost of water damage claims was \$6965, with the maximum being as high as \$ 26,285 for a single itinerary in a claim for the calendar year of 2015. However, the count of claims was 1.3 Million for the same period. This translates to roughly 9 Billion plus of water damage losses alone. Even a 5 to 10 % change in this number, would leave a significant impact. If you go with a rough estimate of \$2000 per incident the investment in sensors would pay for itself, and still provide additional savings if amortized over a 3 to 5 year period.



**Water Damage Counts in 2014 & 2015**



The Average cost of a repair caused by avoidable circumstances or human negligence pays for the cost of sensor installations. **Water Damage Facts:** Insurance Industry Research from Market Intelligence Reports published by National Insurance Crimes Bureau

### 3 Driving change

Market leaders are poised to drive this change fueled by one, some or all these reasons:

#### Economic Drivers

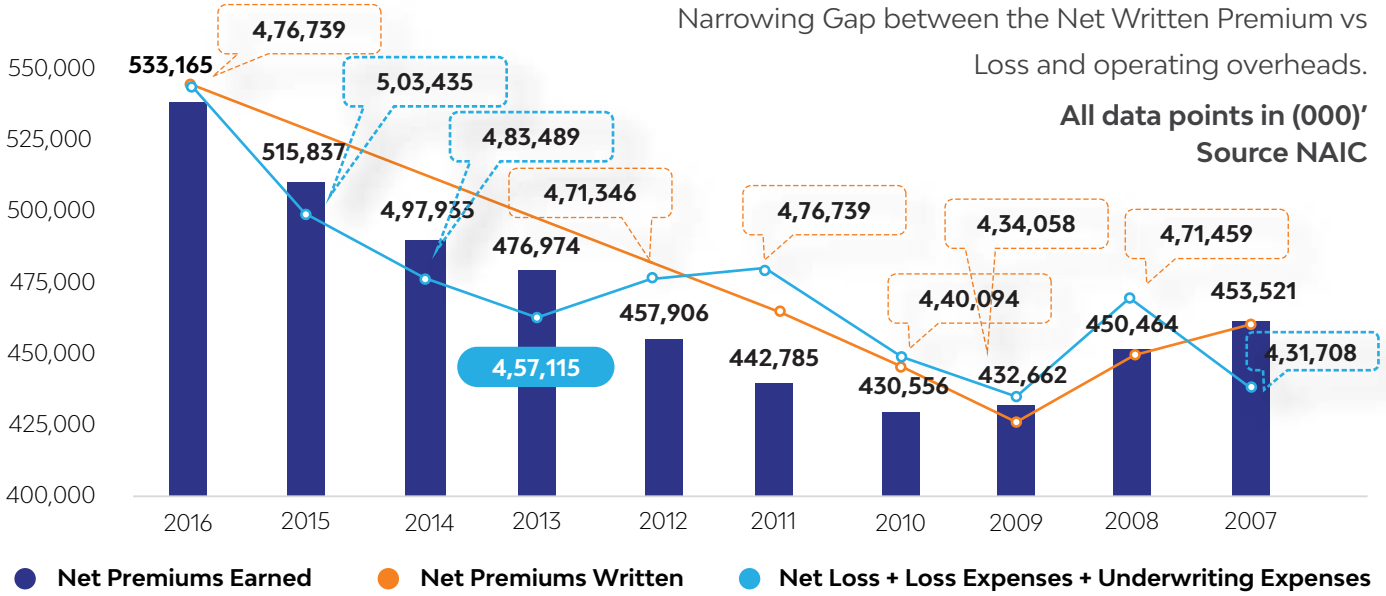
Historically, investment earnings were an easy fallback for insurance carriers, and the prospect of a growing client base to fuel future income was the ray of hope in the midst of catastrophic losses. All this worked just fine in the 80s-90s, but times are changing and investment incomes are not as lucrative and regulations are dampening any possibilities to realize massive investment growth.



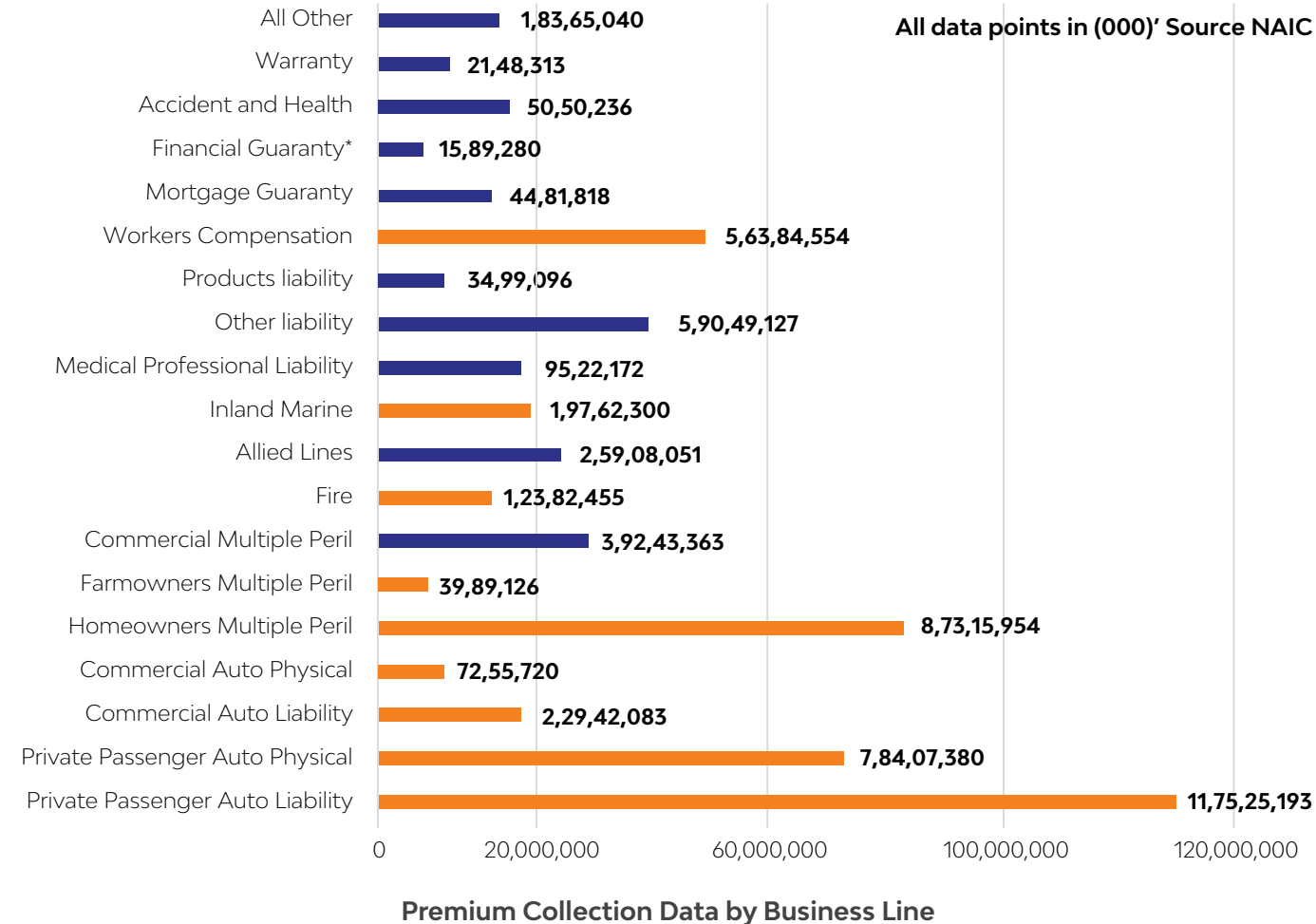
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Narrowing Gap between the Net Written Premium vs  
Loss and operating overheads.




The Graph shows how the gap between income and expenses is shrinking, and the only opportunity that may soon be left is to manage losses stemming from claims. In a market that is relatively flat from a growth view point and diminishing returns on investment incomes, IoT connected devices present an opportunity of risk prevention, mitigation and monitoring that never existed a decade ago.



This Graph highlights the Lines of business we have identified based on written premium data, that presents a great opportunity for the application of IoT-connected devices to monitor, prevent or mitigate risk.

- Sensors can be used for incentivizing new business targeting more technology savvy customer group in the Private auto group, which represents over 190 Billion in Written Premiums
- The Written premium by Line of business for the calendar year of 2015
- This represents the list of key lines of business, where risk management services can help in increasing the profitability
- The maturity of these lines of business with reference to carrier collected data and third-party data, makes these lines candidates for having a pilot to deploy sensors
- Data collected from the sensors can be leveraged for better pricing

Line Of Business	Written Premium in bn Appx. 2015	Water Pressure/ Leakage/Quality	HVAC-Humidity, Ventilation, Air quality	Electric Meters Supply Fluctuations in Voltage	Accelerometer gyroscopic	Fire Sprinkler Systems, Alarms	Location Monitoring sensors for Equipment
Private Passenger Auto Liability	117.5	●	●	●	●	●	●
Private Passenger Auto Physical	78.4	●	●	●	●	●	●
Commercial Auto Liability	23	●	●	●	●	●	●
Commercial Auto Physical	7	●	●	●	●	●	●
Homeowners Multiple Peril	87	●	●	●	●	●	●
Farm owners Multiple Peril	3	●	●	●	●	●	●
Fire	12	●	●	●	●	●	●
Inland Marine	19	●	●	●	●	●	●
Workers Compensation	56	●	●	●	●	●	●


  
Weak to Strong

### Applicability of Sensors to Business Line based on Risk Exposure

The next 5 years are bound to see the influx of self-driving autonomous cars. How this will impact the Personal auto segment that represents over 190 Billion dollars of written premium remains to be seen.

The commercial fleet and Commercial auto segments have already started seeing impacts of disruptive technology. And as the proliferation of connected cars, and cities, gains momentum this segment that is a big contributor to the written premium will see a tectonic shift from Risk transfer, to smarter risk control

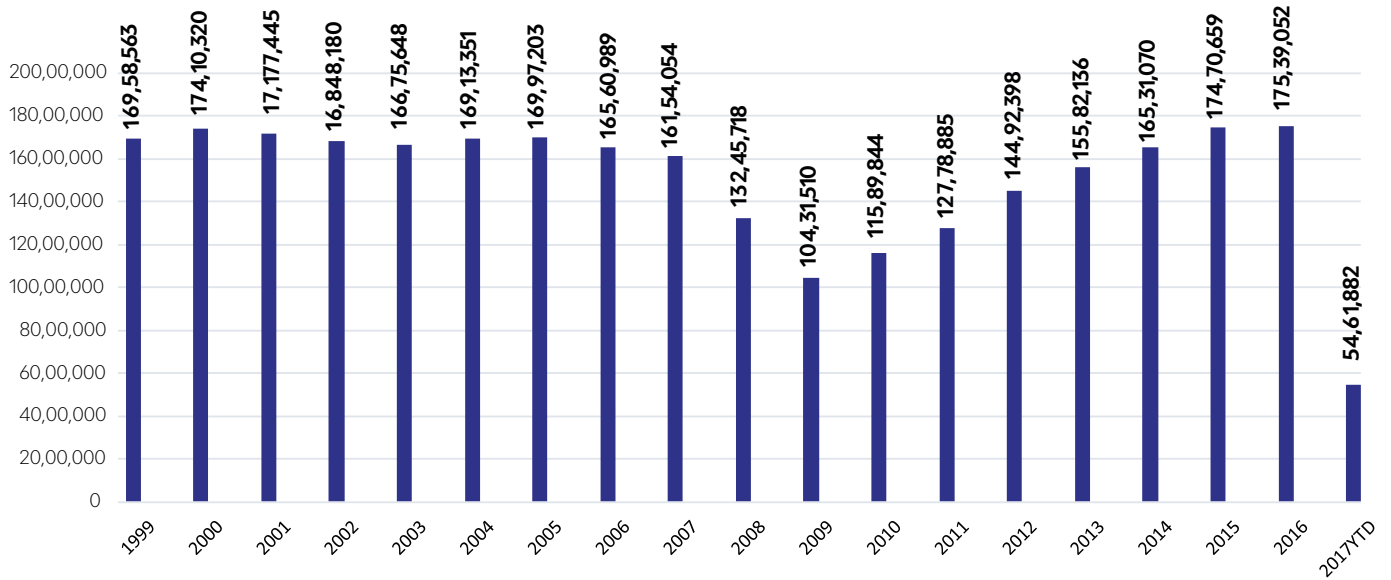




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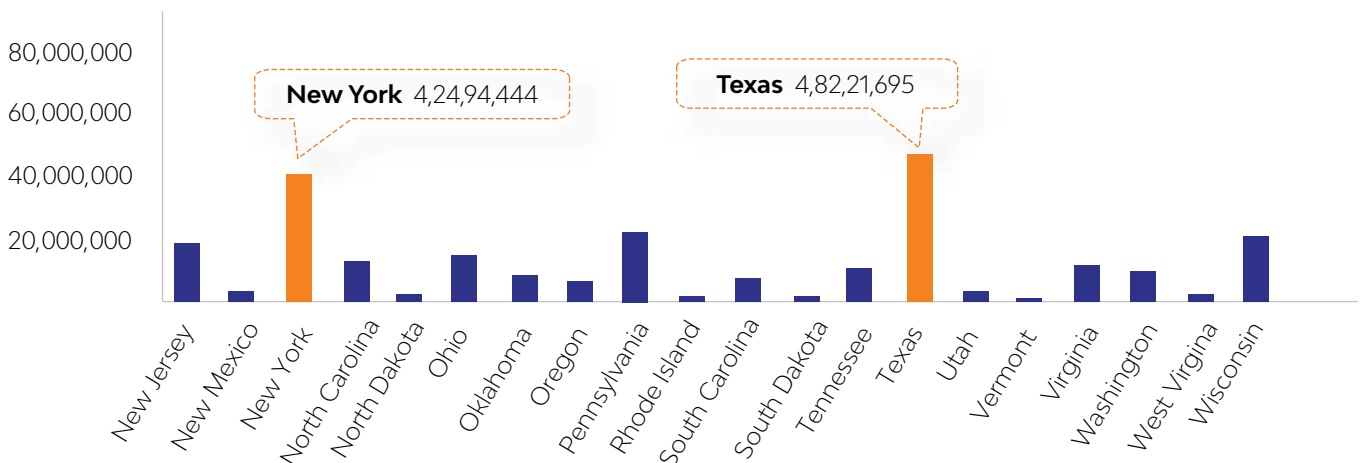
initiatives fueled by insurers and auto makers alike and the lines of separation will continue to disappear. As auto makers like Tesla see market opportunity in insurance with their smart cars, the remainder of the auto industry will also take queue.



Source: Automakers & ANDC YTD is for first 4 months of 2017

### Demographic Drivers

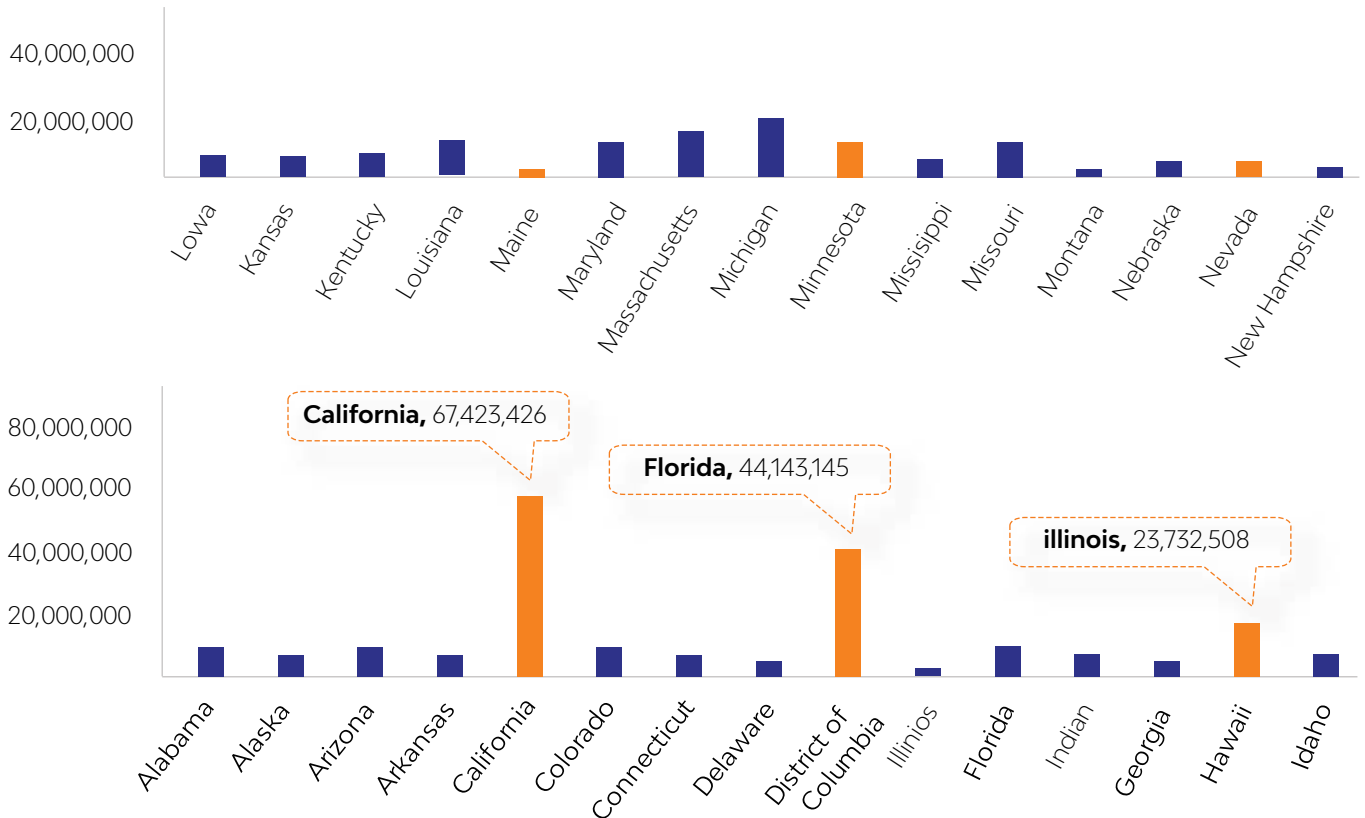
The most interesting data points are on Net premium data collected State wise. Close to 39% of all collection are from the top 5 states. This clearly indicates that in order to validate any hypothesis, the sensor data from a few states can be used to validate product pricing definition and associated benefits of a sensor roll out, before making any attempts of a country wide roll out.





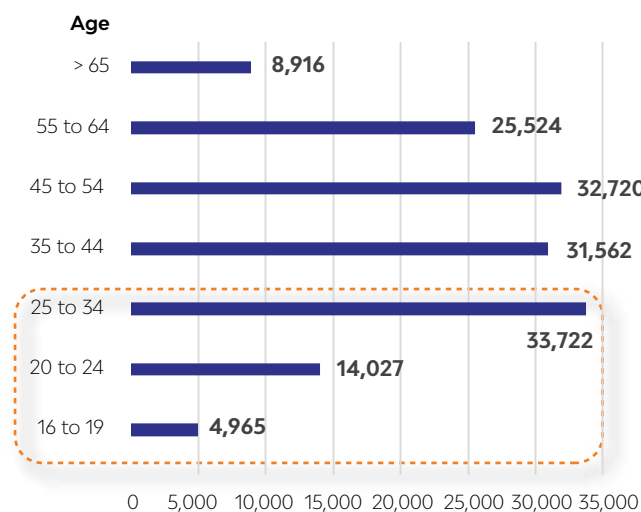
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**Workforce Trends**

The workforce is seeing some radical shifts with middle and senior management seeing a visible shift of decision makers under the age of 40. This will also have an impact on the technology roadmap that some insurance companies will embark on. The personal affinity and technology adoption mindset of the decision makers will be translated into professional buying decisions and adoption of IoT sensors.

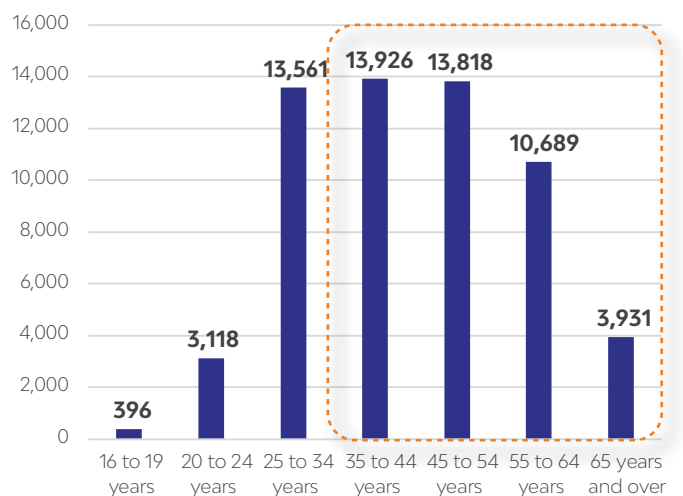


All data points in (000)'

Data from Bureau of Labor Statstic

Data for **59,438,000 jobs** pertaining to Management, professional, and related occupations from the overall **employed population of 151,436,000 for the year 2016**

All data points in (000)'



Data from Bureau of Labor Statstic

Data for overall employed population of **151,436,000 for the year 2016**



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### Consumer Trends

Last mile consumers are poised to be dominated by a subset of younger customers, whose buying choices and technology adoption are radically skewed towards a more digital experience.

Categories	% mix
Flourishing Families	4.52
Suburban Style	4.85
Promising Families	3.36
Young, City Solos	3.18
Middle-class Melting Pot	3.97
Significant Singles	4.84
Families in Motion	2.97
Singles and Starters	10.96
Power Elite	5.34
Booming with Confidence	6.61
Thriving Boomers	6.11
Family Union	5.16
Autumn Years	6.25
Blue Sky Boomers	6.58
Pastoral Pride	4.98
Cultural Connections	5.22
Golden Year Guardians	8.02
Aspirational Fusion	2.95
Economic Challenges	4.13

Traces of this shift are apparent in some of the disruption seen in the retail sector. Amazon's cashier less grocery shopping model or the driverless cars of the future are all an indication of shifting demographic patterns. A younger customer base will also have similar expectations from the insurance buying and servicing journey. Connected devices fill this void and better align to a digital experience for the entire insurance value chain. The Data from Experian in the table below Segments the US Customer Base with the top 39 % of buying consumers being under the age of 40.

#### **Declining cost of Sensors & energy storing devices:**

The declining cost of sensors and batteries getting more efficient, will fuel adoption of sensors as some of the hindrances for entry of sensors in risk monitoring and prevention are overcome.

## 4 Opportunity and Application of using Sensors

Market leaders are poised to drive this change fueled by one, some or all these reasons:

#### **Usage data:**

It could be an onboard sensor or a monitoring video cam with motion detection, the possibility of a risk event is tied to usage. Even in the event where a claim event is triggered for reasons outside of equipment usage, the device can be used for capturing event data used to derive Subrogation revenue from the party at fault.

#### **Pricing differentiator:**

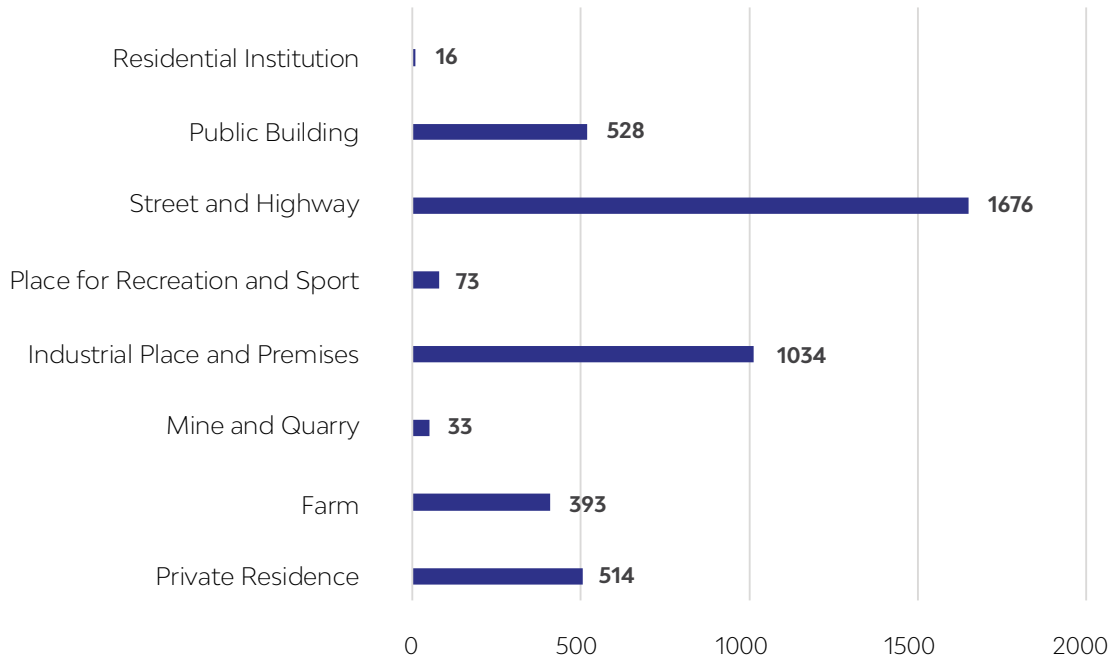
The data collected, can be used to better price risk in order to make the insurance product more competitive. Regional insights, demographic data on usage patterns and movement of people, with reference to assets covered under different types of insurance coverage can provide additional insight to pricing.

#### **Risk Prevention:**

The data collected providing insights into preventing or reducing the risk events from occurring, present the biggest possibility for IoT sensor usage in insurance. Water damage losses is one of the key areas for using sensors. Industry research has captured some very thought provoking data points. For instance, a recent study from the National insurance Crimes Bureau, points to data suggesting that a significant percentage of water damage losses could be prevented or reduced by introduction of water pressure sensing devices designed to switch off water mains in the event of sudden water pressure changes, due to frozen water pipes.

Another application of sensor technology put to use, is in areas where backup sump pumps kick into action on the alert of minor flooding incidents detected by sensors installed on the floor of basements. While claims are bound to happen, the introduction of sensors can reduce or even prevent an incident from occurring in certain instances.

In the Workers Compensation area, sensors offer the possibilities of tracking the movement of staff and movable assets and sending alerts to staff on the proximity to heavy machinery or high fatality prone zones.

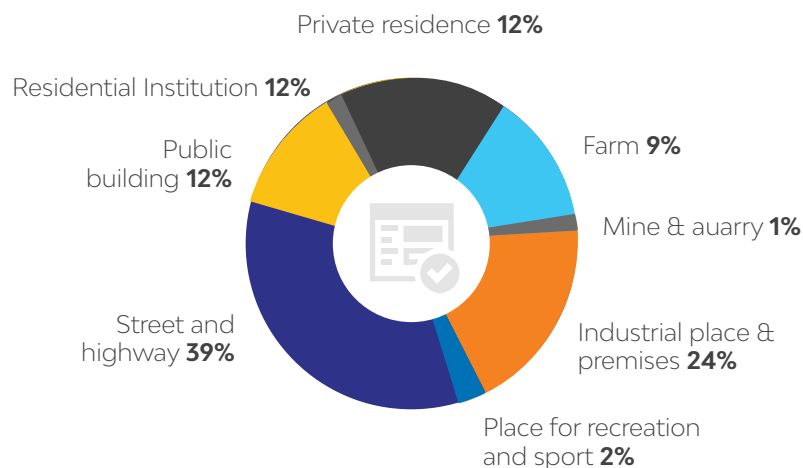


**Fatal occupational injuries Goods producing (NAIC code GP1AAA)**

Fatal occupational injuries by selected worker characteristics and selected industry, All US, all ownerships, 2015 for, Goods producing (NAIC code GP1AAA) as a sample set:

- 59% of all fatal occupational incidents occurred on location where IoT monitoring devices could be used
- The IoT devices could assist to predict hazardous conditions
- Data capture associated with the claims incident is also a possible use case

**Data collected from Bureau of Labor Statistics (BLS)**



**Fatal occupational all ownerships Goods producing (NAIC code GP1AAA)**

## 5 Conclusion

With the shift in goods and services, there is a possibility that personal and commercial auto segments will change drastically due safer and smarter vehicles on the road, and carriers will be forced to revisit pricing and new emerging product segments in response to this. Connected homes and commercial establishments also present the same shift in trends requiring Insurance carriers to bundle their product offerings with sensor bundles that could pre-empt an incident.

Another major influence to the proliferation of connected devices is going to be driven by the retail segment, where there is a silent revolution in progress with smart Televisions, and home appliances that will eventually impact the insurance ecosystem as well. All this will be connected with overarching analytic platforms and computing capabilities that are defying Moore's law, with the pace at which technology is driving progress in the area of Big data and Analytics.

The future of insurance is going to be defined by connected devices that will provide data in short cycles over an infrastructure channel that will help carriers price products more dynamically and responsively to customers and market needs. Despite all the progress we make on the technology front, incidents are bound to happen and risk will still be present.

The only difference will be that the census and historic loss experience data will be replaced by data coming as a regular feed from connected devices, and the algorithms to predict the probability of events will get smarter as an outcome.

The dawn of smart cities, homes, cars, workplaces & living spaces are the only natural progression. Insurance-as-a-service will need to catch up with the ecosystem it is created to cater to. The data collected from industry sources and our hypothesis from it, points in this direction. The carriers that approach this opportunity with the openness to change and adapt with the ecosystem that they service, will thrive in the decades to come. A classic example of this can be seen in the entertainment industry, where names like Blockbuster bear witness to the wrath of not keeping pace with the ecosystem that they serviced. As technology moved from physical devices to streaming entertainment over the internet, blockbusters inability to keep pace with these changes took its toll on the existence of the firm, and made way for streaming service like Netflix to quickly change the way entertainment was delivered over a digital medium. Similar changes can be expected in how connected devices will impact the insurance industry; and there is a possibility of seeing the lines between Insurance companies and technology firms blur. The insurance carriers that recognize these changes and react in a timely manner, will reap the benefits of this technology wave set to change the industry.

## 6 About the author(s)



**Christopher Fernandes** is Director Solutions in Insurance in LTI. He is an Insurance Solutions Leader, with a focus on Big Data Analytics, Robotic Process Automation and Packaged Solutions delivery. Focusing on key clients serviced by LTI, with an added responsibility to articulate Go-to-Market strategy for new offerings in the P&C and Life Domain in the US. He has also worked in insurance companies managing business operations as part of start up operations and subsequently moved to technology consulting helping insurance & health care companies improve process controls and innovate business operations.



**Rodney David** is in Consulting Practice in LTI. He has over 2 years of experience in Account Management Support & Proposal Bid Management. He has a good understanding of the key industry trends and key issues impacting the Insurance industry in North America. He is also involved in Insurance solutions designing. He holds a Master's degree in Business Administration and Bachelor's degree in Management Studies.



**Sanghamitra Paul** is a Senior Business Analyst (Insurance) in Consulting Practice in LTI. She has experience working with leading, US-based insurance companies. Her expertise includes Data Analysis, Client handling and establishing relationships with critical business stakeholders in the project, and acting as a liaison between Business and Technology. She has an engineering (IT) degree and is working in both P&C and Life Insurance, taking care of Functional and Technical aspects in Requirement gathering and Designing solutions.

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